MAX PLANCK INSTITUTE FOR SOCIAL ANTHROPOLOGY WORKING PAPERS

MAX-PLANCK-GESELLSCHAFT

Working Paper No. 65

STEPHEN P. REYNA

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Halle / Saale 2004
ISSN 1615-4568

Max Planck Institute for Social Anthropology, P.O. Box 110351,
06017 Halle / Saale, Phone: +49 (0)345 2927-0, Fax: +49 (0)345 2927-402,
http://www.eth.mpg.de, e-mail: workingpaper@eth.mpg.de

Hard Truth and Validation: What Zeus understood[1]

Stephen P. Reyna[2]

Abstract

This essay introduces to anthropology and other human sciences a particular variety of approximate truth, termed *hard truth*, together with certain methods appropriate to its validation. The argument is presented in three sections. Positivist, post-positivist, and *vulcaniste* positions, with varying approaches to truth, are identified in the first section. A rationale is proposed for utilizing the latter position. Next, in the succeeding two sections, this position is applied to construct the idea of a hard truth. The notion of generalization is clarified in the second section, as this is the symbolic structure that must bear the burden of truth. Hard truth is formulated in the third section. It is argued that the validation of such truth depends upon the labor of producing *validation histories* with *evidential ladders* and *validation sets, universes and hierarchies*. The essay's conclusion reveals what Zeus understood, and how this is relevant to questions of truth.

[1] I would like to thank Keebet von Benda-Beckmann for commenting on an earlier version of this paper. She helped it immensely; its problems are of my own making. Additional acknowlegements are in order to Bettina Mann and Judith Orland who substantively and editorially improved the text. Finally , over the long haul, Nina Glick Schiller is an enormous support for my project.

[2] Stephen P. Reyna, University of New Hampshire, Anthropology Department, 311 Huddleston Hall, Durham, NH., USA, Tel: +1-603-868-5919, Email: spreyna@cisunix.unh.edu and Max Planck Institute for Social Anthropology, Advokatenweg 36, 06114 Halle/Saale, Germany, Tel: +49(0)345-29-27-119, Email: reyna@eth.mpg.de .

CONTENTS

Introduction

> ‘Let us consider what the name Hermes means (…). Well, (…) the name Hermes appears to be related to discourse (‘logos’); the characteristics of the interpreter (‘hermeneus’), the messenger, the accomplished thief, the deceiver with words (…)’ (Plato, *Cratylus*).
>
> ‘When Hermes took the post of the messenger of the gods, he promised Zeus not to lie. He did not promise to tell the whole truth. Zeus understood. The ethnographer has not’ (Vincent Crapanzano 1992: 45).
>
> ‘Constructed and partial truths are not the nemeses or terminators of science but the defining conditions of its existence’ (Marvin Harris 1995: 67).

Hermes was a shifty piece of work, ‘the deceiver with words’, as Plato put it. However, in a time of fable he was all there was if you wanted to know big truths, those of the gods. Hermes did not lie, as Vincent Crapanzano reminds us. But he did not tell the whole truth, the naughty trickster. He told partial ones. Some in the business of seeking to know humanity have come to be a particular sort of acolytes of Hermes. These hermeneuts believe truths to be constructions, trickster fabrications; so why bother with them? Of course, another take on the matter is Marvin Harris’ view that ‘Constructed (…) truths’ are good for your scientific health. This is a fundamental divergence of opinion. Truth is constructed, forget it. Truth is constructed, construct it.

The goal of this essay is modest; to begin discussion exploring how it might be that ‘constructed truths’ are the ‘defining conditions’ of science, at least in anthropology and other human sciences. This is done by proposing a novel *vulcaniste* view of approximate truths and what I shall term hard truths. The argument to attain this goal is presented in three parts. The first part of the argument explores positivist and post-positivist approaches to science to distinguish *vulcaniste* from other traditions investigating science. With the help of Eduard Manet’s *Déjeuner sur l’Herbe*, *vulcanisme* is seen to be an insider’s reflexivity, which eventually leads to the conclusion that a particularity of *vulcanistes* is their insistence that science is an art that constructs theory. The next section of the first part of the argument considers how truth has been treated within anthropology, arguing both that scant attention has been given to it and that it really does matter. So it is high time, if anthropologists wish to continue as anything other than shifty tricksters, that they develop a tradition concerned with understanding truth, in order to better achieve it.

The second part of the paper begins this labor by proposing a particular *vulcaniste* approach to approximate truth. It does so by explicating what it is that possesses the attribute of truth. This is a generalization. A generalization is imagined as a particular type of organization, a

conceptual structure. The section examines this structure, explicating what its parts are and how they are related. This leads to a discussion of the nature of representation; a discussion that involves consideration of the implications of certain aspects of Ferdinand de Saussure's semiotics for the possibility of constructing generalizations that actually represent reality. A generalization is shown to be a complex 'picture' that can be focused at several levels of representation – of empirical generalization, theory, and hypothesis. A notion of the stratigraphy of representation is introduced as an aid to analyzing representational complexity. It is further explained that these different levels of representation constitute a theoretical gallery in which explanation occurs.

Permit a distinction between '*diktat*' and 'theory' at this point. The former is opinion *without* validation of truth. The latter is generalization *with* validation of truth. It is easy to issue a *diktat*. Even acclaimed philosophers do it. For example, Richard Rorty has claimed,

> 'These distinctions between hard facts and soft values, truth and pleasure, and objectivity and subjectivity are awkward and clumsy instruments. They are not suited to dividing up culture; they create more difficulties than they resolve' (Rorty 1991: 36).

Without commenting upon the substance of Rorty's proclamation, it should be clear that it is thinkable that 'distinctions between' facts and values, etc., are 'clumsy', if it is true they create 'more difficulties than they resolve'. However, nowhere in the essay in which Rorty makes this statement is there evidence that absolutely supports Rorty's claim and the claim is absolute. In all places at all times 'hard facts and soft values, truth and pleasure, and objectivity and subjectivity are awkward and clumsy instruments'. Further, nowhere in the essay does Rorty indicate where such evidence exists. Rorty's statement, then, is a *diktat*. *Vulcaniste* canon holds the art of pronouncement to warrant belief without warrant. However, saying it is so, does not make it so. The merit of a theoretical generalization is its approximate truth. This warrant is constructed through validation, which leads us to the third part of the paper.

The essay's third part develops a *vulcaniste* notion of hard truth and, then, advocates certain practices useful for validating such truth. Durable truths are a type of approximate truth, and the understanding of approximate truth proposed utilizes Charles Sanders Peirce's (1871, 1878, and 1902) and William James' (1907) pragmatic theories of truth, as well as Ronald Laymon's (1985) 'confirmational history' approach to approximate truth. Once the general view of approximate truth is formulated, it is explained how certain more difficult to acquire truths may qualify as hard truths. There is consideration of the implication of Clifford Geertz's (1973) 'thick description' for the realization of such truths. Equally, there is a

conversation about the relevance of certain of Bruno Latour's and Steve Woolgar's (1979) views on facts for the development of such truths. A new notion of the old notion of commonsense is seen to be helpful in the making of truth.

The paper concludes by revealing the mystery of what Zeus understood. The revelation may strike some as a shocker. Read carefully the pages that follow because they, as do those of any competent mystery, prepare the reader for the ultimate denouement; and perhaps the real surprise of the essay is that what is supposed to come as a dramatic realization is not so outrageous after all. Finally, I am an anthropologist, so that many of the text's examples come from this discipline. However, though the examples are particular, the argument is not, and may be of interest in other human sciences. It is time to begin the argument, so let us develop *vulcanisme* and, then, inspect the treatment of truth by some within anthropology.

I. *Vulcanisme* and the Anthropological Approach to Truth

This section embraces something new, a way of understanding science, and rejects something old, an attitude toward truth that characterizes some in cultural anthropology and other human sciences. A brief discussion of positivism and constructivism will help readers to grasp the *vulcanisme* utilized to craft understanding of science.

Four Isms: Positivism, post-positivism, constructivism, and *vulcanisme*

> Tiger, tiger, burning bright
> In the forests of the night,
> What immortal hand or eye
> Could frame thy fearful symmetry?
> (…)
> What the hammer? What the chain?
> In what furnace was thy brain?
> (Blake, *The Tiger*)

The poet Blake was fascinated by creation and, in the above quotation, posed the question: What could construct something as awesome as the tiger. Of course, a classical answer to Blake's questions was Vulcan. The old Roman god of smiths did the forging. We shall get to him in due course but, to do so, let us begin by discussing positivism. This was, and is, a particular philosophy of science, first explicitly formulated by Auguste Comte (1798-1857), to explain the nature of scientific practice. Emile Durkheim called positivism, 'The most impressive event in the philosophic history of the nineteenth century (…)' (1982: 13). Though, by the middle of the 20th century, positivism had become, according to Raymond

Williams, a 'swear-word by which nobody is swearing' (in Bynum et. al. 1981: 333). Of course, there were a number of positivisms, and it is not always clear which positivism is under attack.[3]

There was a 19th century French school, which began with Comte's block-buster, six volume *Cours de Philosophie Positive* (1830-42) followed by his mini block-buster, four volume *Systeme de Politique Positive* (1851-1854).[4] Durkheim's *Les Règles de la Method Sociologique* (1895) was arguably the most influential text in French positivism after those of Comte. Mill brought Comte's positivism to the Anglo-Saxon world in *Auguste Comte and Positivism* (1865). Logical positivism (also known as the Vienna Circle), a German-Austrian tradition, flourished in the early 20th century and included Moritz Schlick, Rudolf Carnap, Herbert Feigl, and Otto Neurath.[5] An instrumental positivism, articulated by George Lundberg and William Ogburn, was influential in U.S. social sciences between the 1930s and 1960s. In general, however, either implicitly or explicitly, most anti-positivist polemic is reserved for Comte.

And for good reasons; there are problems with this positivism that stem from its absolutism. The term absolutism has a number of meanings. A colloquial use of it is something that is 'complete' (*Random House Dictionary* 1967: 6). One speaks in this sense of absolute freedom. In political thought, absolutism is government where complete power lies with the sovereign. Louis XIV longed to be an absolute monarch. The 'positivist absolutism' of Comte combines the above two usages of the term asserting that science has the power to produce absolute truth and that this truth justifies absolutely a particular political position.

Positivist absolutism claimed that is was absolutely clear that all sciences were one, sharing a 'unity (…) of Method' (Comte 1855: 38). Sciences, using absolutely the same methods would reduce their particular generalizations to 'one body of homogeneous doctrine' (Ibid: 37) or theories. These theories would exhibit absolute truth. These truths would be absolutely 'invariable natural *Laws*' across space and time (Ibid: 28, emphasis in the original). As a

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[3] Introduction to the different positivisms can be found in Bryant (1985), Adorno et. al, (1976), Alexander (1982), Giddens (1978), Simon (1963). There is at least one current defender of positivism (Turner 1985). Roscoe (1995) provides an excellent discussion of the reception of positivism within cultural anthropology.

[4] Auguste Comte's *Cours* was translated into English and abridged by Harriet Martineau as the *Positive Philosophy of Auguste Comte* (1855). The *Systeme* was translated by Richard Congreve as *System of Positive Polity* (1875). Comte's work had immense influence on the intellectual and political life of countries throughout Europe, South America, and North America (see Cashdollar 1989; Hawkins 1936; Kent 1978; McGee 1931; Lins 1964). For example, the motto on Brazil's flag '*Ordem e Progresso*' is taken directly from Comte.

[5] Ernst Mach was an inspirer of the logical positivists. Karl Popper, Ludwig Wittgenstein, and Karl Hempel participated in, influenced, and ultimately broke with the Vienna Circle. Achinstein and Barker (1969) offered a set of articles appraising logical positivism. Among these was a wonderful presentation by Toulmin (1969: 25-57) of the intellectual context of logical positivism. Friedman (1999) surveys a rethinking of the appraisal of logical positivism. One part of this new revisionism is recognition that certain critical opinions of logical positivism were dubious. For example, Friedman believes the view that the logical positivism was a philosophical 'foundationalism' to be a 'total perversion' (1999: 3).

result of the application of positivism, humanity would acquire the absolute truths of reality, one of which was that a 'new political philosophy' (1853, vol. 2: 105) based upon conservative maintenance of 'order' was absolutely the way to go. This political philosophy, most fully developed in a *Systeme de Politique Positive*, was based upon a 'Religion of Humanity'; where 'a "Positivist Priesthood" (…) ran the educational system and served as both the scientific authorities and censors' (Harp 1995: 128). Comte fancied himself this religion's Pope, the 'High Priest of Humanity'.

Positivist absolutism did not pay much attention to what scientists had been actually doing. Sciences exhibited a rapid differentiation between 1500 and 1800. At the time of Sir Francis Bacon (1561-1626), all science was pretty much undifferentiated into one, 'natural philosophy'. However, by 1800 natural philosophy had differentiated into a gaggle of particular sciences toddling off in their own directions; including, to mention only the more developed disciplines, astronomy, a lively family of different fields of physics, a number of fields of chemistry, a number of fields of biology, various medical sciences, and geology. Equally, these sciences advanced, at least in part, by developing methods of observation applicable to their own objects of study. For example, astronomical knowledge was transformed by invention of first reflecting, then refracting telescopes, and finally by being blasted into space, while biological knowledge owed its growth, in some measure, to development first of the light microscope and then the electron microscope.

Further, claims that science produced absolutely and eternally true theory disregards the many scientists who are thorough-going skeptics (especially concerning the other bloke's work). There is doubt over the degree to which particular generalizations are, or are not, supported by evidence. Where support is available for a generalization, claims are cautiously made that it is only true, relative only to the body of evidence supporting it. Such truths are further qualified by the recognition that changed times and places may make one day's truth another's untruth. Among the middle classes in America, in the middle of the twentieth century, where norms put 'the little woman' in the kitchen, there might have been truth to the generalization that the normative culture concerning gender influenced women's reluctance to enter the labor market. However, in the space that would become America, in the middle of the first century A.D., this generalization would be risible; owing to the absence of America, middle classes, and labor markets. So for most scientists reality is out there, hard to know, and the job is to get some evidence that does, or does not, support a generalization about that reality. Given the preceding, it is sensible to move beyond Comte's positivism and, when one does this, begin to formulate post-positivist views.

A continuum of post-positivist positions exists. At either end of this continuum are anti-science and pro-science standpoints. Philosophers of science have generally been pro-science. Towards the center of the continuum are 'assessor' positions; filled by those who are not so much pro- or anti-science, but who are interested in identifying strengths and weaknesses of science. Many postmodernists, especially those prone to rhetorical extremes, have been anti-scientists.[6] They have been especially hostile to science's goal of producing reasonably true theories. Theory, according to one postmodernist, is 'lightheaded' (Sheridan 1980: 213). It is 'alienated, disparate, dissonant', according to another (Der Derian 1989: 6).

Many of the anti-scientists and assessors in this continuum share a constructivist standpoint with regard to the study of human phenomena. This approach, enormously varied, believes that most human actualities are social constructions. Science, according to social constructivists, 'is necessarily a social product' whose theories are constructed by '(…) the culture, race, nationality, religion, gender, social class, or economic interest of the scientist (…)' (Trachtman and Perrucci 2000: 4).[7] If this is the case, then, according to Haraway, social constructivists believe '(…) that official ideologies about objective and scientific method are particularly bad guides to how scientific knowledge is actually *made*' (1991: 184, emphasis in the original). However, none of the anti-scientific post-positivists offer a *better* way of knowing reality than science.[8] This being the case, given the successes scientific theory has had in explaining reality, science remains a sensible way of constructing understanding of reality. This brings us to Vulcan.

Vulcan was the Roman god of fire and smiths. He was not a hoity-toity god, being depicted in statues and paintings as a worker – sturdy, short, homely, sometimes lame. However, make no mistake about it. Out of this lame worker's furnace came things that are made, even the tiger. The post-positivism I conjure is of craftspersons in the fiery furnace of their

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[6] Not all postmodernism is anti-science. However, much is. Rosenau (1992) discusses these complexities. Karl Popper, Imre Lakatos, and R.W. Miller have been important pro-science, post-positivist thinkers. Their work is usefully discussed in Chalmers (1982). W.V. Quine (1987, 1992) has been a fine assessor of science's strengths and weaknesses.

[7] A useful introduction to social constructivism can be found in Potter (1996). Professions of 'strong' or 'radical' versions of constructivism are in Knorr-Cetina (1993) and Glasersfeld (1984). Kukla (2000) discusses constructivism as applied to the analysis of science.

[8] Generally, anti-science post-positivists do not attempt to show how a way of knowing reality might surpass that of science. Rather, they are content to assert that in some way science is flawed. Elsewhere I have sought to show that in a number of instances, especially in anthropology, these assertions go unsupported by evidence (Reyna 1994). Winch (1958), argued rigorously that a science of social science was untenable. However, in the concluding remarks to *The Idea of a Social Science*, the text in which he argued this point, he told readers that he was only interested in the 'broad outlines' of social science and so '(…) made no attempt (…) to consider the undoubted differences which exist between particular kinds of social study, such as sociology, political theory, economics, and so on' (1958: 36). Such an admission seems pretty positivist. Like Comte, Winch downplays learning about differences in sciences. He is only interested in the 'broad' picture. In fact, he only considers J.S. Mills, Pareto, and Weber. A concern here is whether Winch has observed enough social inquiry to warrant the conclusion that a science of society is absolutely untenable.

imaginations constructing theory. A *vulcaniste's* understanding of science is an insider's reflexivity. It is the view of practitioners of particular sciences, as they reflect upon what they do, to imagine how to do it a bit better. Let us explore what might be meant by an 'insider's reflexivity'.

Recently a tradition of science studies, or science and technology studies (STS) has emerged that examines people practicing science. One branch of STS, known as the sociology of scientific knowledge (SSK), has a sub-branch that specializes in the anthropology of science.[9] These studies have been animated by social constructivism. There has been a suggestion, especially from more fervent postmodernists, that SSK's findings that theory is socially constructed mean that it is no more epistemologically privileged than any other socially constructed narrative. A *vulcaniste* would see this matter differently. After all, anybody who actually makes things knows: some constructions *are* better than others.

From a *vulcaniste* perspective, STS and SSK studies, as well as those of philosophers of science, are outsiders' accounts. Bruno Latour and Steve Woolgar, in *Laboratory Life*, a founding text in the anthropology of science approach, recognized that their research was that of 'outside observers' (1979: 20). They had investigated scientists as if they were some exotic 'tribe', and they acknowledged that they were 'painfully aware of the enormous distance' between themselves and their 'informants' constructions' (Ibid: 256). Nevertheless, they believed that their outsider status was of 'utility' because it provided 'analytic distance' (Ibid: 278). Of course, assuming the outsider position is to conduct fieldwork in the manner of the colonial anthropologists and, recently, there has been debate over the relative merits of insider/outsider ethnographic strategies. There might be a number of reasons for taking an outsiders' approach. Not the least of which is that from the 'analytic distance' gained by studying 'them', one might learn a lot about 'us'; a point made by J.-J. Rousseau in *Discourse on the Origin and Foundations of Inequality* (1754), where he argued that by studying others '(…) we would thus learn to know our own (…)' (Lévi-Strauss 1976: 34). Nevertheless, a case can also be made for insider accounts.

A *vulcaniste* is an insider at the forge of creativity. Philosophers of science, STS, and SSK scholars are outsiders, peering in at those doing the actual work. I am reminded here of Edouard Manet's (1863) painting *Le Déjeuner sur l'herbe*. The scene is of four people at a picnic by a stream. The painting is charged with subjugated realities of gender and power.

[9] A useful overview of science studies can be found in Hess (1997) Biagioli (1999). STS might be thought of as the institutional base, consisting of departments and centers, of science studies. SKS, whose heyday was roughly 1975-1990, has been very varied. There is an 'Edinburgh school' (Bloor 1991; Barnes 1974), a 'special relativism' branch (Collins 1985); and a feminist wing (Haraway 1989; Harding 1991). The 'anthropology of science' approach began with Latour and Woolgar (1979) and includes Martin (1974), Traweek (1988), Rabinow (1997), and Knorr-Cetina (1981).

Two of the picnickers are fully dressed, bourgeois dandies. The other two are women lacking varying amounts of clothing. One lady, partially dressed, washes herself in the stream. The other sits buck naked beside one of the men. The second dandy, cane clasped in hand, languidly peers toward the exposed breasts, and sensuous fleshiness, of the woman. What do these two outsiders *really know* about the women? The *vulcaniste* is the insider doing work. The two women working at being women at the picnic are *vulcanistes*. Because they do the work, they *know* about it. Because they do the work, they *care* about it. So the *vulcaniste*, to improve the quality of what is being done, reflects upon what went well and what did not. This reflection is a monitoring of everyday life. It is the two women reflecting upon their picnic. It is scientists reflecting on their investigations. Such monitoring is reflexivity (Giddens 1984).

There is more to being an insider or outsider that is especially relevant to a difficulty with the outsider status of social constructivists. Consider the following. In mid-life I became the single parent of three young sons. We were a tiny social speck, struggling to make do as best we could. I felt pretty naked as outsiders – colleagues, therapists, school and court officials – amused themselves with us. They were keen to advise: 'Feed them more vegetables, for God's sake'; 'Oh my God, at least dress them properly'; 'You need extra help'; or 'You need to make more money to take better care of the kids'. These outsiders were interlopers in a double sense. First, they did not actually do anything to make the family work better. Second, they kept advising about things that were strictly speaking *outside* of the family, like the amount of help there was, my income level, or vegetables. Certainly, these things influenced how well the family worked, but they were not the actual workings of the family.

The social constructivists tend to be outsiders to science in this double sense. They do not actually do science, and they notify scientists that their truth is constructed by outside influences – ideology, gender, funding levels, government policy, etc. These outside influences are important, and I offer a way of applying knowledge of them to the making of truth in other essays. However, just as the outsiders in my family case were gung ho to tell us about conditions that influenced our family, and do nothing of the work of making it run; so, similarly, outsider social constructivists report external conditions influencing the making of truth, but do not work at making truth. *Vulcanistes* are insiders in the sense that they are creators. They construct things. They are Manet's women, constructing gender; a person, struggling to construct a family; scientists, constructing truth. Indeed, there are outside or external influences but, regardless of these, the insider has to do the construction. So a *vulcaniste* reflexive monitoring of science is figuring out, under certain external circumstances, what you did to get the truth to get a better truth the next time you go for it.

Let us shift the focus of the conversation a bit. A few pages back science was spoken of as an art. This may be anathema to many. After all the two are antimonies?

So does it make any sense to talk of the art of science? Art is about *quality*. It is the quality of things made that humans use. This is not a snob view. It is a craftsperson's recognition that some things made are better than others. A sculptor labors to make better statues, a musician better music. Quality is due in some measure to skill. Different things crafted, different arts; different arts, different skills. The skill of an artist is something only imperfectly known. Sometimes it is spoken of as the writer's 'muse' or 'genius'.

The Barma of Chad, among whom I have conducted fieldwork, are instructive here. They think of a person who does something well as a *mala*. Thus a good horseman is a *malasinda*, a good builder of house is a *malatadkudji*. One translation of *mala* is 'a master', in the sense of a Zen master. So a *malatadkudji* is a 'masterbuilder'. But there seems to be something more to the term *mala*. It is associated with *mal*, which means 'mysterious or unnatural power'; a power that can be associated with witchcraft. So a Barma craftsperson's skill is envisioned as a magical power. This poses the question, what is a person who is a *mala*, or one who has a 'muse' or is 'genius'? One place to look for an answer to this question is to the part of a person that does the making. Metaphorically, this is the forge; literally, it is the brain. The magical power, the *mala*, of artistic skill is forged in creative imagination, and the study of how cognition and emotion in the brain forge skill is important to a *vulcaniste* approach to the art of science. What does the scientific artist make? What is the art of science?

The 'mastery' of a *mala*science is skill at the making of theory. It is a double mastery; skill at generalization and validation. Generalization is the art of imagining generalizations. Validation is the art of judging generalizations by analyzing their truth. Science, then, is mastery of the creative imagination forging two practical arts together – validation into generalization; generalization into validation; etc. – to produce a truly tempered blade of theory. We shall need to explore further what is meant by generalization and validation in order to understand theorizing as the forging of two practices into one. However, before doing this, reflect upon the following. A *vulcaniste* scientist, who happens to be an anthropologist, as s/he sits naked doing her theorizing, with outsider dandies looking on, knows that s/he should know something of the art of forging truth. This reflection leads us to explore what anthropologists, and other social scientists, do about making truth.

Truth Matters

> '(…) the responsibility of a writer as a moral agent is to try to bring the truth about matters of human significance to an audience that can do something about them' (Noam Chomsky, 2001).

Chomsky's 'writer', our *vulcaniste*, knows to do; i.e., knows how to acquire truth, so that this knowledge can be used to do important things for people. Below I document that there has been a petrifaction of the will to know among some social and cultural anthropologists to bring truth. The section contemplates petrifaction and ends with the recognition that truth matters.

Knowledge of truth addresses ontic and epistemic inquiries. An 'ontic' question concerns what is something. Hence, ontically investigators ask: What *is* truth? An 'epistemic' question is concerned with how knowledge of what is can be acquired. So epistemically investigators query: What *do you have to do* to know the truth? How have anthropologists tackled these questions? Many anthropologists, especially the more postmodern ones, are social constructivists. Among some social constructivists truth comes in for some rough handling. It is a 'terrorism' (Rosenau 1992: 78) that, according to Baudrillard, 'doesn't exist' (1986: 141); or, as Ashmore puts it, 'scientific knowledge does not constitute truth because it is socially constructed' (2001: 12882). Denial of the very existence of the existence of truth or of the possibility of the scientist acquiring it suggests that anthropologists might not be overly concerned with the topic. The Social Science Information Highway (SOSIG), is an information retrieval service that can be found on the internet. It provides a way of gauging how anthropologists have worked on the ontic and epistemic questions concerning truth. SOSIG produced only two references when asked to search for texts on the topic 'anthropology and truth'; and one of these was an article that promised to reveal the 'truth' of an ethnic group's claim to be Jewish.

Recently two books have been written to defend scientific anthropology against postmodern attacks – *Science, Reason and Anthropology* (1997) by James Lett and *Reclaiming a Scientific Anthropology* (1997) by Lawrence Kuznar. These books might be expected to review the literature concerning anthropological views on truth because science is concerned with establishing the truth of generalizations. Striking, then, in both volumes is how little the topic is discussed. Lett declares that he is 'persuaded by philosophers who favor a pragmatic definition of truth' (1997: 24); but gives no indication of the arguments that convinced him, and how such a view of truth might be applied in anthropology. Kuznar, for his part, quotes approvingly Marvin Harris' statement that began this text, that science deals in 'partial truths',

and insists that scientists can ‘make no claim to ultimate truths’ (Kuznar 1997: 48). But neither Harris nor Kuznar explain what is meant by ‘partial’ truths, nor how one might go about establishing them. Further, neither text supplies references to an anthropological literature dealing, from a scientific perspective, with either the ontological or the epistemological aspects of truth.

Pertti and Gretel Pelto authored *Anthropological Research* (1978), an important textbook on the application of scientific methodology in anthropology. It contains no discussion of truth. H. Russell Bernard wrote *Research Methods in Cultural Anthropology* (1988). A decade after the Pelto’s work, it became an important textbook of scientific methodology in the discipline. It too has no discussion of truth. Naroll and Cohen’s, *A Handbook of Method in Cultural Anthropology* (1973), the most extensive survey of methodology in the discipline, makes little mention of truth; as is also the case with Johnson’s (1978) introduction to quantitative methods in cultural anthropology. The point of the preceding is simple. Even the anthropological friends of science do not discuss the nature of truth. Perhaps, this is because anthropologists, as Kuznar puts it, seem ‘willing to leave’ these ‘debates to the philosophers (…)’ (1997: 40).

Let us explore briefly some postmodern anthropologists and their approach to truth. The title of Renato Rosaldo’s *Culture and Truth* (1989) suggests that there will be an extensive discussion of truth. However, truth is so insignificant a topic in the text that it does not merit a single mention in the index. The term is never defined; a difficulty because there are over two millennia of different understandings of it, and it would help readers if Rosaldo told them how he uses the term. Rosaldo seems ignorant that there has been a correspondence theory of truth. He betrays no familiarity with any other theory of truth. Reading *Culture and Truth* leaves me undecided as to whether Rosaldo is unaware of the existence of such theories, or simply believes them to be irrelevant. If the latter is the case, it would have been appropriate to explain why.

James Clifford called his text that began the essays in *Writing Culture* (1986), ‘Introduction: Partial Truths’. There has been, as we shall see, interest by philosophers, logicians, and scientists, in what are variously called ‘approximate truths’, ‘truthlikeness’, ‘verisimilitude’. Such truths appear partial. Harris had insisted that truths were partial. So Clifford’s ‘Partial Truths’ sub-title suggests that he may share with Harris a belief in this sort of truth. However, a reading of his text reveals obliviousness to arguments among truth-seekers in favor of approximate truth.

Rather, what Clifford’s readers get are pronouncements. They are told, ‘Ethnographic truths are thus inherently *partial* (…)’ (1986: 7; emphasis in the original). The word ‘thus’ in

sentences indicates that something happened earlier in the text warranting the conclusion that follows the word 'thus'. So a reader expects the text to provide some reason why. Now Clifford never specifies what 'truth' and 'partial' truth might be. So it is not clear what he is talking about. However, in the paragraph before the one where readers are told that 'ethnographic truths are partial' there is a sentence that appears to serve the function of warranting why this is the case. The sentence is, '(…) the best ethnographic texts – serious true fictions – are systems, or economies, of truth' (Ibid: 7). Regarding this statement, a rather sweeping generalization, the reader might ask, how does Clifford know? But Clifford gives no reason for the assertion. With Clifford pronouncement warrants pronouncement.

Pronouncements, it will be recalled, are sentences whose substance is simply accepted. Such sentences are aptly termed '*diktats*'. Arguments that proceed, as does Clifford's, by warranting their conclusions with *diktats* are dictatorial. Clifford seems to recognize this when he says, 'Because once accepted' anthropologists will have 'a rigorous sense of partiality' that 'can be a source of representational tact' (Ibid: 7). Having 'tact' is being polite. 'Partiality' is being biased in favor of something. So what Clifford seems to suggest is: Go ahead and just accept his views and, then, aspire to producing politely biased texts? This is not a contribution to discussions of truth.

There is a view concerning truth that a number of postmodern anthropologists share with the SSK thinkers; a view expressed by Rabinow that 'truth' has 'its social location' (1996: 54). This is to say that truth, in some manner, is constructed by economic, political, and cultural forces. Such a view is shared by Rosaldo and Clifford in the texts we examined. I certainly agree with it; but, frankly, it is old news and it is not news about the nature of truth. Since the time of Francis Bacon's *Novam Organum* (1620), with its notion that 'idols of the mind' caused error, there has been an explicit recognition that truths can be influenced by social forces. Further, given that truth is susceptible to manipulation, the key problem of those interested in the social construction of truth is with accounting for how the manipulation occurs.[10] However, and this is the critical point, the recognition that truth can be directed tells investigators nothing about the nature of truth *per se*. Rather, it tells them that the biasing of truth is probable.

[10] Bacon's idols were illusions or untruths. The key idol where social forces operated was that of the 'market', where knowledge was 'formed by the reciprocal intercourse and society of man with man' (1620, I: 399-44). Elsewhere, Reyna and Schiller (1998), in an issue of the journal *Identities* devoted to the topic, suggested that Michel Foucault's 'regimes of truth' approach, with modification, offered one useful possibility for analyzing the social manipulation of truth.

One of the ways that anthropologists socially construct truth is to investigate different populations' conceptualization of their notions of truth.[11] The analysis here is not directed to answering the question 'what is truth'. Rather the goal of the analysis is to answer the query, 'What is the Zande, or Navaho, etc., view of truth'? One sees problems for this approach, which can be explained by examining how one graduate anthropology program actually institutionalizes it. This is at the University of Hawaii in Manoa.

The department has posted a description of its program on the internet, which announces that it has a 'discursive practice approach'. The program description further announces that, 'A signature move in a discursive practice approach is to "bracket" such matters as mind, truth, reality, morality, and commonsense (…)' (Dept of Anthropology, Hawaii: 2003). The term 'bracket' comes from phenomenology and refers to setting something aside. So the Department sets aside investigation of what mind, truth, etc. might be. This means, as the program description still further explains, that 'Instead of focusing on how things "really" are, or should be, we attend to how truth and morality are established, negotiated, maintained, and challenged in discourse' (Ibid). Such an attitude to truth and morality is very much an outsiders' approach. Ethnographers from outside a community travel to it and record its discourse – as negotiated, etc. – concerning truth and morality. Otherwise put, the ethnographers will make observations of native writing and speech; not to come to any understanding of what might be true or good, but to simply get the discourse. This is a prescription for observational bloat. Ethnographers' texts will be puffy with pages of 'she said this about truth', 'he said that about it', 'they both wrote this and that', and on and on. Not only is this a recipe for bloat, it is patronizing!

Why are the professors in the Department of Anthropology patronizing? They may not care what truth and morality "really" are. But many of the folk they study want to know how to speak truthfully. They want to know what is really good. Actually, for time out of mind, these are among humanity's enduring questions. But the ethnographers know that the search for what is truth and morality is "really" best set aside. They know what is really important, better than the natives they study and, for that matter, better than most of the serious thinkers over the last three millennia. This seems patronizing.

[11] The Anthropological Index Online (AIO) is a database containing articles from a large sample of anthropology periodicals. AIO was asked to provide articles dealing with the topic 'anthropology and truth' for the years 1957-2002. A total of ninety articles were retrieved. Only a very few of these dealt with the ontics or epistemics of truth. Some dealt with the truth of particular substantive issues; e.g., who was right in the Mead/Freeman debate? Some were from other disciplines than anthropology. There is a lively interest in Foucault's approach to truth. However, the largest category of articles was those that dealt with what particular ethnic groups thought about truth.

But it is more. Bracketing out truth can be dangerous to your health. The fate of humanity depends in some measure upon knowing the truth about certain questions, especially in the face of political efforts to obscure it. For example, President George W. Bush, at the Azores Summit press conference on March 16th, 2003, told reporters '(…) tomorrow is a moment of truth for the world (…)'; posing the question, what was the President's truth? It seemed to be, according to him that, 'The dictator of Iraq and his weapons of mass destruction are a threat to the security of free nations' (*NYT* Sept. 17, 2003). How was Iraq 'a threat'? First, and foremost, it was because of its nuclear weapons potential. Mr. Bush had warned people in the fall of 2003, 'Iraq is reconstituting its nuclear-weapons program (…)' (Commondreams.org 3/3/2003: 1). However, according to three months of inspections by the United Nations, Iraq had 'not reconstituted' nuclear weapons development (Ibid). Further, it was recognized at the time that at least some of the evidence the President used to substantiate his claim was faked (CNN.com 3/14/2003: 1). The truth of the matter was that prior to March 16, 2003, Iraq had no nuclear weapons.

A second way the President said that Iraq was a 'threat' was because it was in cahoots with al-Qaida, the guerilla organization that had attacked the U.S. on 9/11. This charge was made by the Secretary of State Colin Powell during a February 5, 2003, meeting of the UN Security Council in which he offered 'proof'. However, Powell's 'proof' convinced nobody (Commondreams.org 2/10/2003: 1). Rather, a report written by researchers at the Joan B. Kroc Institute for International Peace Studies at the University of Notre Dame summarized what many in the intelligence community on both sides of the Atlantic believed at the time. In this report, Melvin Goodman, a former CIA analyst, said, '"I've talked to my sources at the CIA and all of them are saying evidence [of a link between al-Qaida and Saddam] is simply not there"' (2003: 11; insert added for clarity). The Secretary of State also said at his February presentation to the Security Council that Iraq was a 'threat' because it had chemical and biological weapons of mass destruction. However, Mr. Powell offered no compelling evidence for his assertion, only 'a farrago of dubious claims' (Commondreams.org 2/10/2003: 1). The Notre Dame report put the matter as follows, 'UN inspectors destroyed all of Iraq's known chemical and biological weapons production facilities. In the past two months UN monitors have conducted more than 300 inspections of possible chemical, biological and missile sites in Iraq and have found no evidence or documentation confirming the existence of the alleged chemical and biological stockpiles' (Kroc Institute 2003: 7).

The reality is that the U.S. spent in the order of $343 billion on its military in 2003 (BBC News 3/12/03). Iraq spends about $1.2 million per year according to U.S. State Department sources (Kroc Institute 2003: 5). Iraq was crushed in the first Gulf War in a matter of weeks

with very few U.S. casualties. Since that time an enormous amount of Iraqi military capacity has been destroyed. The Iraqi army was about 1.2 million people prior to the first Gulf War. It was down to 250,000 at the start of the second Gulf War. There were much fewer Iraqi artillery pieces, planes, or tanks than during the first Gulf War. Iraq was crushed in the second Gulf War in a matter of weeks. A fine butchery was had by the American military.

Two stances towards truth have been presented in this section. The first is that of Chomsky, who believes that it is the responsibility of thinkers to 'bring' truth on issues 'of human significance'. The second is that of those who bracket out truth. Their bracketing is dangerous because without truth there is nothing to challenge the powerfuls' constructions of reality. The President of the United States' 'moment of truth' was the falsehood that Iraq was a 'threat'. But if you got your Ph.D. by bracketing out truth, you would never know that the petrifying bodies of Iraqis were butchered for false reasons.

There are questions that are 'significant'; dangerous ones, upon which the lives of people hang. Because of this, truth matters. However, given the just documented anthropological petrifaction of the will to truth, it can be said: Truth matters, but not to anthropologists, and that's the matter. A little petrifaction goes a long way. Readers of this text from human sciences other than anthropology may reflect, 'Anthropologists really ignore truth'. True. However, readers from other human sciences would do well to look to the quality of their own constructions of truth.

As for anthropology, I believe it to be time for anthropologists to explore what Zeus, or his Roman equivalent, Jupiter, 'understood'. Zeus/Jupiter knew about Vulcan. Vulcan knew how to make things. Perhaps, one thing Zeus/Jupiter 'understood' was: Forget Hermes! Look to Vulcan to construct things, even truths. So the next two sections are *vulcaniste*. They consider what needs to be done to construct truths. Discussion starts by analyzing generalizations, what it is that is supposed to be made true.

II. Generalization

> '**Reality**: everything there is'
> (*Glossary of Epistemology/Philosophy of Science*)

A few words about reality and representation are helpful in establishing how the notion of generalization is employed in a *vulcanique* science. Reality, as the above quotation reminds us, is what is; posing the question, what is what is? Here we have a problem. Immanuel Kant made a distinction during the Enlightenment that remains valid. He said, largely in *Kritik der Reinen Vernunft* (1781), that there are noumena ('things-in-themselves') and phenomena

('things-as-they-appear'). The former is reality, the later experience. Kant further made clear that what people know directly are phenomena – their experience of appearance – not noumena – the reality of appearance. Bertrand Russell discussed a humble piece of furniture to make it clear just how tricky appearance could be:

> '(…) let us concentrate attention on the table. To the eye it is oblong, brown and shiny, to the touch it is smooth and cool and hard; when I tap it it gives out a wooden sound. Any one who sees and feels and hears the table will agree with this description (…); but as soon as we try to be more precise our troubles begin. Although I believe that the table is "really" of the same color all over, the parts that reflect the light look much brighter than the other parts (…).
> (…) the same thing applies to the texture. With the naked eye one can see (…) the table looks smooth (…). If we looked at it through a microscope, we would see roughness and hills and valleys (…)' (Russell 1959: 2-3).

So humans have no direct idea what reality is.

We only know what reality does to us. What reality does is to contact the body where the organs of the senses are to start the firing of neural circuitry of these senses. Reality does something to the body and the body transforms this something into a pattern of firing of the nerves involved in perception. These patterns of neural impulses move to the cerebral cortex where they are, among other things, presented as sensations – images, sounds, smells, tastes, feels – of the original reality. So the term 'sensation' is used in a neurobiological sense as the nervous system's representation of what is. Thus, the *vulcaniste* revises the progressive education maxim that 'people learn by doing' to read 'people learn by being done to.'

There are a number of understandings of representation. The one employed in the text is a modification along neurobiological lines of cognitive science view of representations, 'A symbol or process that *stands for* something else' (Dunlop and Fetzer 1993: 111; emphasis in the original). A problem with this definition is that it is unclear what the phrase 'stands for' means.[12] So I prefer to specify that 'stands for' means 'taking X and presenting it as Y'; with human symbolic, i.e., conceptual, representation being taking some reality X and, through the operation of the brain, presenting it as Y symbols.

So, for example, the sound waves out in reality, say of a dog's bark, contact the ears. Here they begin a journey along neural networks of representation. First, the sound waves become the particular pattern of neural firings made by barking. This pattern follows the auditory nerve to the auditory cortex, where it becomes another pattern of firing in that cortical region that becomes the sensation of the reality of barking. The neural firings of that sensation of

[12] There is a second, common definition of representation as correspondence. For example, Jackson says, 'What is common to all cases of representation is a correspondence between various states of what does the representing and the various states of what is represented' (2001: 12863). However, what *is* correspondence? Does it mean 'stand for'? How much does X have to 'stand for' Y before it corresponds to it?

barking move along neurons to other brain regions in the associational cortex, where they initiate new firing patterns that associate barking with the word 'barking'. At this point, the representation has assumed a conceptual status.

In order to further explicate the nature of generalizations, additional knowledge of the representational properties of concepts is needed. This knowledge concerns what will be termed levels of representational focus, where the brain comes to represent sensation at increasing abstract and general focal points. The explanation of what is meant by representation focus will lead to a *vulcaniste* claim that explanation is about constructing bigger and bigger conceptual and generalization pictures.[13]

Concept Pictures: Representational focus

One has to get high to get bigger pictures. What this means depends upon recognition that representation occurs in hierarchies. The organs of perception take reality and present it as patterns of neural firing. The various perceptual cortices take these patterns of firing and represent them as sensations. Generalizations involve higher order representations. 'Higher order' representation is different re-presentation of a sensation. Generalizations do their re-representations of sensations in language form. Languages do their re-representational work with concepts that are parts of generalizations. Concepts are discussed in this section; generalizations in the next. The concern with concepts is with being able to explicate how their different levels of representation can be imagined as making concept pictures with increasingly more distant focal points. It is an understanding of representational focus that makes it possible to get high.

'Concepts' are symbols. There are quantitative and qualitative concepts; with the former doing their representational work using numerical symbols, and the latter theirs with verbal ones. Scientists investigate reality. Even human scientists trafficking in *geist* or *mentalité* ultimately must examine the actuality of the interior reality of subjectivity; because if they do not study the reality of subjectivity, they study something else that is not reality, which gets one into the realm of the unreal; which is like sleeping with an imaginary person; unsatisfactory. Now sensations are peoples' only information about reality. So the concepts

[13] The early Wittgenstein had a picture theory of meaning, repudiated by the late Wittgenstein. In some sense, the view of concepts and generalizations as pictures presented in the text aims at solving a problem with which Wittgenstein wrestled in propounding this theory. In *Notebooks* he said, 'The difficulty of my theory of logical portrayal was that of finding a connection between signs on paper and a situation outside in the world. I always said that truth is a relation between the proposition and the situation, but could never pick out such a relation' (1961: 19e-20e). I believe this 'relation' to be a series of material, neurobiological events that connect the 'situation' in reality to the nervous system to the brain where the situation is pictured first as sensation, next as concept, and finally as generalization

vulcanistes care about are different sorts of re-representations of sensations. This means that scientists are ever so keen on getting high; for reasons further explicated in the following section.

Abstraction and Generality

How 'high' the order of a concept is depends upon its abstraction and generality (or scope). Intuitively, abstractness is about the closeness of a concept to reality. Abstract concepts are pretty high above the world. A 'red flower' gets one near to the reality of a red flower. Newtonian 'force', which is 'mass times acceleration', is not so very close to a car slamming into a tree. The 'closeness' of reality to a concept representing it, refers to how much thought has to take place between the observation of the reality and arrival at the concept.

In this optic the 'abstractness' of a concept may be defined as the number of cognitive processes that are performed in the brain on sensational representations of reality to arrive at the concept. The more cognitive brain operations that have to be performed, the more abstract the concept.[14] You see Dick. Your brain immediately sizes up his height. You see Tom, Dick, and Harry. Your brain has to go to work. It adds up their individual heights, divides by their total number, and multiplies by one-hundred to get their average stature. 'Mean height' is more abstract than 'height'.

A word might be interjected here about the relationship between abstraction and experience near and distant terms. The psychoanalyst Heinz Kohut developed the idea of 'experience-near' and '-distant' concepts. The anthropologist Clifford Geertz diffused them broadly. A *vulcaniste* conceptualizes the terms differently than does Geertz. For Geertz,

> 'An experience-near concept is, roughly one that someone (…) might himself naturally and effortlessly use to define what he or his fellows see, feel, think, imagine, and so on (…). An experience-distant concept is one that specialists of one sort or another (…) employ to forward their scientific, philosophical, or practical aims. "Love" is an experience-near concept, "object cathexis" is an experience-distant one' (Geertz 1983: 57).

Though Geertz carefully advised that one of these concepts should not '(…) be preferred over the other' (Ibid: 57) there has been a widespread acceptance that anthropological understanding is based upon 'experience-near' concepts and that confinement to experience-distant concepts leaves analysts '(…) stranded in abstractions (…)'(Ibid: 57).

[14] The discussion of abstraction in the text is rudimentary. Readers should consult Wallace (1971) for an accessible introduction to the topic. Kaplan's (1964) approach is a useful philosophy of science approach to abstraction. Feyerabend (2000) offers an antisystemic and Fine (2002) a Fregean view of abstraction.

A concern with this sort of a definition of experience-near and -distant concepts has to do with the fact that it obscures making distinctions concerning the abstractness of a notion. An experience-near concept is one that the subject, an insider, uses. An experience-distant concept is one that the observer, an outsider, uses. However, insiders wield some pretty abstract concepts. 'Democracy', 'freedom', and for that matter 'love' come naturally and effortlessly out of the mouths of insider Americans. Such concepts, however, are pretty abstract. Conversely, outsiders, such as skilled ethnographers, are quite prone to conceptualizing love in terms of intimate body gestures and democracy by the existence of the vote; with body gestures and voting being less abstract and experience-near than love and democracy. Thus, a *vulcaniste* comprehends experience-near and -distant concepts not in terms of whether insiders or outsiders use them, but epistemically, in terms of their degree of abstraction. Less abstract terms might be thought of experience-near, more abstract ones as experience-distant. Let us consider the generality of concepts.

The 'generality' of a concept is the amount of reality included in it. 'Color' is more general than 'red'. The 'amount' covered by a concept can be thought of in terms of substantive and spatiotemporal breadth. 'Substantive breadth' is the number of topics to which a concept refers. The substantive breadth of 'kinship' is greater than that of 'mother'; because with the former concept the topic of conversation can be any related person, while with the later one all you can talk about is mommies. 'Spatiotemporal breadth' is the amount of space and time covered by a concept. 'U.S. history' is more general than 'U.S. Civil War history'. The latter concept refers only to realities that bear upon the topic of the Civil War, which occurred between 1861 and 1865, and was restricted to the southern and middle Atlantic regions of the U.S. The former concept refers to any reality having to do with any topic in all of U.S. history between 1776 and the present, and which has occurred throughout the world.

Highly abstract and general concepts allow scientists to represent vast canvasses of space and time. There is a *vulcanique* aesthetic here. Beautiful science is the art of using a little to know a lot; a handful of enormously abstract and general concepts are used to explain vast stretches of reality.[15] A very few color forms in *Crows Over Cornfields*, perhaps Van Gogh's last painting, re-present summer's fields; the very few symbols in Isaac Newton's Second Law of Motion, 'force equals mass times acceleration', re-represent much of what goes on in all places and times in the universe.

[15] Quine recognized that there was an aesthetic in science when he said, 'Scientists in pursuing truth also seek beauty of an austere kind in the elegance of a theory' (1987: 17).

Sensational and Theoretical Concepts

Given the preceding discussion of abstraction and generality, two further sorts of concepts can be distinguished that are helpful for explicating orders of representation. This first type is experience-distant and is a fairly abstract and general re-representation in qualitative or quantitative symbols of sensational presentations of reality. These concepts will be termed 'theoretical' because, as noted below, theory is an artifact of abstract and general notions. The second sort of a concept to be distinguished is experience-near and is called 'sensational'.

This distinction between sensational and theoretical terms in certain ways appears to parallel a logical positivist distinction between 'observational' and 'technical' terms (Hempel 1972). Readers, burdened by tiresome jargon, may resist altering the more familiar logical positivist terminology. However, I share with David Hume and Immanuel Kant, in the Enlightenment, and Henri Poincaré and Ernst Mach, at the end of the 19th century, a belief that sensations are the atoms of knowledge. It is they that are produced by observation, and they that are the 'building blocks' of further knowledge (Overbye 2000: 101). Further, it seems that technical terms can be untheoretical. 'Trigger' is a technical term relevant to guns, but it is low in abstraction and generality. So the notions of sensational and theoretical concepts seem reasonable, because the logical positivist's 'observational term' misses the point of the atom of concept formation, while their 'technical term' obscures the need to distinguish concepts are at different levels of abstraction and generality. Let us further explore sensational concepts. Knowledge of this term requires knowing the meaning of an additional one, empirical referent.

Scientifically useful theoretical concepts have empirical referents. A 'referent' is that to which a concept refers. Some referents may be in reality. An 'empirical referent' is the observable reality referred to by a concept. The actuality of a cat is the empirical referent of the concept 'cat'. Let us put empirical referents within their context. Empirical referents occur within 'objects of study', spatiotemporal chunks of reality explained by theory. Objects of study may be relatively small – a few Nuer exchanging cattle before and after marriage in the 1920s; or large – the evolution of culture in all places and times as studied by 19th century unilinear evolutionists such as E.B. Tylor and L.H. Morgan.[16]

[16] Whether or not objects of study are studied is influenced by conjunctures of economics, politics, and ideology. Colonialism was not an object of study in social anthropology as long as the sun still shone on Britannia's empire. The sun sets and everybody streaks to make colonialism an object of study. Totalitarianism, a nasty thing, was an object of study in mainstream U.S. political science during the Cold War; when it helped to confirm that the Soviet Union was malevolent. Totalitarianism has not been an object of study in mainstream U.S. political science during the second Bush administration; when it might signal the possibility that the U.S. was drifting in dangerous directions.

An examination of certain of Ferdinand de Saussure's views is useful at this juncture, because they suggest the impossibility of knowing empirical referents. Saussure, whose *Course in General Linguistics* (1907) is a founding text both of semiotics and French structuralism, argued a linguistic relativism, where what people knew were not empirical referents but information relative to systems of concepts that constituted the arbitrary structures of language. Now, if humans do not know empirical referents, then they cannot know even indirectly reality. De Saussure's position '(…) accords the extratextual referent no place (…)' (Havercroft 1998: 538), and consequently will be shown to be 'sign-pathetic'.

De Saussure's term for concept is 'sign', which is composed of signifiers and signified. 'Signifiers' are the sounds in spoken language or the sound-images in a written language of signs. 'Signifieds' are the ideas or concepts of the signifiers; with these ideas being other signs. 'Cat', then, is a signifier of the signified, 'any of the several members of the family *Felidae*'. The signified gives the signifier its meaning, but this meaning is specified in terms of other signs not empirical referents.

Further, de Saussure insisted upon the arbitrariness of the sign. This meant three things. First there was no *natural* connection between the signifier and the signified. Second, there were capricious *conventions* that tie the signifier to the signified. For example, it does appear pretty arbitrary that by convention in U.S. English, 'beaver' is not a signifier for 'the *Felidae*', while 'pussy' is; even as, at the same time, both 'beaver' and 'pussy' are both signifiers for 'female homo sapiens genitalia'. Third, convention ties signs to signs. Consider, an example pertaining to certain signs in English and French of flowing water. The English signs are 'river' and 'stream'. The French ones are '*fleuve*' and '*rivière*'. The four terms appear to have roughly the same meaning but there are differences. In English, 'rivers' are larger bodies of flowing water; 'streams' are smaller. In French, '*fleuves*', regardless of their size flow into the sea; '*rivières*' flow into *fleuves*. The differences in meaning of the signifieds of these four signs are arbitrary. Why is it in English that the convention distinguishing flowing water pertains to size; while in France it is about what goes into what? The preceding appears to justify the conclusion that signs are determined not by facts in reality, but by linguistic convention.

However, you do not have to go to this convention. For example, you could turn to Gottlob Frege, a mathematician and philosopher writing roughly concurrently with de Saussure. He advocated, especially in *On Sense and Reference* (1892), the extratextual analysis of signs; because, as explained by Pelham, he believed, 'Each name in a language indicates an object, and this object is the meaning (*Bedeutung*, sometimes translated as *reference* or *denotation*) of the name' (1998: 251). This is done by not restricting oneself to investigating what a sign's

signified means in terms of other signs' signifieds, but by comparing what the signified of a sign asserts exists in reality with what is observed to be in reality. Does some flowing water run into other flowing water that runs into the sea? Yes, this is observed. Are there smaller and larger bodies of flowing water? Yes, this too is observed. So, all four signs are useful when more exactly representing reality.

A division of labor might be appropriate here. Let the semioticist be 'sign-pathetic'; and exclusively engrossed in the reality that is signs and their relationships to each other. However, the *vulcaniste* is a Fregian and has other work. S/he is interested in the relationships between signs and other realities, i.e., of signs to their empirical referents. S/he recognizes that such referents are only known by what they do to the body. S/he is aware that some signs' relationships to reality are inaccurate or ambiguous. 'Cats' do not bark. 'Phlogiston' does not exist. What is the empirical referent of the postmodern concept 'rhizome'? The *vulcaniste* is eager to develop ways to weed out inaccurate signs and to replace these with sensational and theoretical concepts that can be identified inter-subjectively by empirical referents that do certain things to the body. Next these concepts are further elaborated upon to assist with this chore. How are empirical referents in objects of study apprehended?

The reality of empirical referents is known by the states of re-presentation(s) that result from measurements of observations within objects of study. 'States of representation' are things happening in reality that can be observed and represented. 'Dog awake' and 'dog asleep' are different states of the reality of a dog. 'Sensational concepts' are symbols able to express the states of representations resulting from measurements of observations of sensations of reality. Sensational concepts must be able to measure variations in reality, and it is for this reason that they have often been termed 'variables'. Now here is a crucial point: Sensational and theoretical concepts can be conceptualized to be related to each other in different orders of abstraction and generality. This is done by making sensational concepts specific, less general and/or abstract instances of theoretical concepts. Another way of expressing this is to say that such sensational concepts are the sub-sets of a particular set of a theoretical concept. For example, a 'chair' is a sensational concept that is a particular instance of the slightly more theoretical one of 'furniture'. It is important to grasp that theoretical and sensational concepts perform different functions. Sensational concepts 'paint the picture' of a space in reality. Theoretical concepts join that reality with other, related realities. 'Chair' paints the picture of a reality that is a chair. 'Furniture' joins the reality of chairs with those of tables, beds, bookcases, etc. Just how this joining occurs depends upon an understanding of observation and measurement.

Observation and Measurement

'Observing' is the operation of that part of the nervous system involved in the production of sensation and, as such, it is the sensing of what reality does to you. It is looking, hearing, smelling, etc. Observing results in a first order of representation in the hierarchy of conceptual representation; where reality is presented as sensation. 'Measuring' is '(…) any procedure whereby observations are systematically assigned symbols (…)' (Wallace 1971: 37). In *vulcaniste* terms it is the operation of the other parts of the nervous system that assign symbolic, or conceptual, status to sensations. For example, start with a reality, a person making noise. Observing is an operation of aural neural networks that produce the first order sensation of sound. Measuring is the further operation of neural networks throughout the cortex that assigns the sensational concept 'talking' to the sensations of sound. First there is a first order of representation produced by observation that results in sensation. Then, there is a second order of representation that results in sensational concepts.

Measurements may be qualitative or quantitative; that is, observations may be assigned word or number status. Qualitative measurements may be nominal or ordinal. In 'nominal' measurements, whatever has been observed is assigned to a mutually and exclusive category, with no ordering between the categories implied. 'Men' versus 'women', 'cats' versus 'dogs' are nominal measurements. In 'ordinal' measurements, whatever has been observed is classified in categories that are part of some series of rank ordering, though unspecified is how much of a difference exists between the specific ranks, or categories, in the graduation. For example, prestige might be measured as 'high' or 'low'; class as 'upper', 'middle', or 'lower'.

A virtue of quantitative measurements that classify observations into numerical categories is that they allow analysts to appreciate how much different measurements vary from each other. Quantitative measurements exhibit some type of an interval scale. Interval measurements have all the information of those that are nominal or ordinal. They are mutually exclusive. They show rank order. However, they add an additional bit of information; which is how much distance exists between the different categories in the order. For example, a Fahrenheit scale offers interval measurements of temperature. A day that peaks at 104 degrees is not only hotter than one that peaks at 80 degrees. It is a full 24 degrees hotter, a real scorcher.

Measurement involves the performance of two chores. The first of these is constructing the different categorizations – the actual symbols or concepts that stand for different observations – which constitute a system of measurement. The second chore is formulating procedural rules for applying a system of measurement to observations. Temperature is measured either by applying the canons of the Celsius or the Fahrenheit system. Cultural symbols manifest in

words are ready-made systems of measurement with implicit procedural rules for their use. Scientists tend to make their own systems and procedures of measurement, where the rules of application are explicit.

A distinction may be made between preliminary and subsequent measurements. A ‘preliminary’ measurement is one where some observation is first given symbolic status. ‘Subsequent’ measurements are those that take preliminary measurements and, according to the rules of some system of measurement re-represent them as some more abstract symbol. A preliminary measurement of some reality might be into the nominal categories of ‘men’ and ‘women’. Subsequent measurements of men and women might record that they have different mean annual incomes. It is deciding that heat will be measured in terms of ‘temperature’. Let us move to higher levels of representation.

Higher levels are termed *re*-representational because they take lower order representations and represent them again. This work is done by ‘conceptualization’, where brain systems perform higher level cognitive functions that take sensational concepts and transform them into theoretical concepts; or take theoretical concepts and transform them into sensational ones. Loosely speaking conceptualization is ‘calculating’ the appropriate theoretical term for sensational concepts or visa versa, but what precisely this means in terms of brain function remains to be discovered.

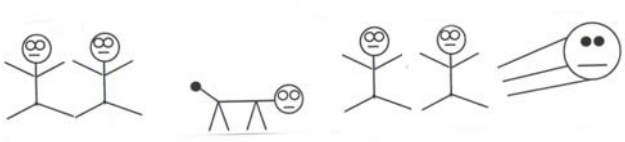
Two sorts of calculating occur. One where there are *explicit*, inter-subjectively agreed-upon rules of measurement that specify transforming sensational into theoretical concepts. One can make preliminary measurements of the heights of individuals. The rules for calculating averages can, then, be applied to transform the individual heights into the average height of the population. A second sort of calculating occurs when there are *implicit*, inter-subjectively agreed upon measurement rules that are of some ambiguity and which guide transforming sensational into theoretical concepts. For example, the notion of ‘democracy’ is a fairly abstract theoretical concept, one for which there are rather indeterminate rules as to what preliminary and subsequent measurements exist for deciding whether an object of study is a democracy. The preceding discussion of abstraction and generalization, sensational and theoretical concepts, and of observation and measurement has been rudimentary but, nevertheless, provides enough information to allow us to finish impressing upon readers the virtues of getting high.

Consider observing a two-legged creature wagging its lips. This is a first order observation of the sensation of sound, which is a second order sensational concept of ‘talk’. Subsequent measurement of the talk might establish that the person is talking neo-liberal chatter, which is ‘ideological discourse’, a third order representation that is a theoretical concept. Thus,

sensations, sensational concepts, and theoretical concepts might be imagined as resembling different focal points in a representational focusing system. The focal points in this are increasingly abstract and general representations of reality.

Figure 1: **Representing Reality** [1]

Levels Function	**Representation/Level**	**Epistemic Practice**	**Type of Knowledge**	**Cognitive Brain**
III	Re-representation	Subsequent measurement	Theoretical concept	Brain *re-represents* sensational concepts as some not directly observable, theoretical concepts
II	Representation	Preliminary measurement	Sensational concept	Brain *represents* sensational concepts as some directly observable, sensational concepts
I	Presentation	Observation	Sensation	Brain *presents* some chunk of reality as sensation
Reality				



[1] This figure may be "read" from left to right with the 3rd, 4th, 5th columns explaining what happens in the first two columns; that is different epistemic practices utilizing different cognitive brain functions produce different levels of representation of reality.

At the base of the diagram, running horizontally is reality. The layers above reality are its different representations. The next level, the first focal point of representation, is that of 'presentation', where the perceptual apparatus of the nervous system makes observations which are presented as sensations. The following level, the second focal point of representation, is that of 'representation' itself, where more cognitive parts of the nervous system make preliminary measurements of sensations, and classify them as different states of sensational concepts. The succeeding level, the third focal point of representation, is that of '*re*-representation'; where other parts of the nervous system dealing with higher cognitive functioning perform subsequent measurements, ones that are moderately abstract and general, that further conceptualize the states of sensational concepts, classifying them as some sort of a theoretical concept. In principle, the levels continue as more abstract and general subsequent measurements re-conceptualize theoretical concepts, replacing them with still more abstract and general *re-re*-representations. Let us further specify what is meant when concepts are imagined as pictures.

Concepts as Pictures

At this point it is possible to specify what sorts of pictures are made by different concepts. These pictures are defined in terms of three distinctive properties. Conceptual pictures of interest to scientists are ultimately representations of sensations. They are recordings of reality. Observe a handsome statue, the empirical referent. Record that reality as a sensational picture of it. But remember that this picture is not a picture of what reality *is*, but of what reality *does* to the nervous system; though the nervous system's job is to represent reality well, so people can make their way in it. So a first property of conceptual pictures is that they are accounts of what reality does. What reality does is the connection between concept pictures and being. If a concept cannot be in some way related to reality triggering a sensation, then it either deals with no reality or one that is not knowable. Science progresses in part by making the unknowable knowable, which is learning how to make sensationless being sensational. Germs were sensationless prior to the microscope, sensational afterwards.

The second property of concept pictures has to do with the fact that they can be formed at different levels; with these levels being in different types of focus. First there is some sensational concept, which is pretty realistic and sticks to a few things. Its focus is set at 'close up', better to catch detail. Second there is a theoretical concept, which is more abstract and pictures more things. Its focus is set at 'medium distance', better to picture a broad sweep of things. Finally, there may be a second still more theoretical concept that is still more abstract and pictures still more things. Its focus is 'telescopic', better to get a still more inclusive picture of things. Imagine the conceptual focusing as beginning with a reality named Harry. The trouble with Harry is that he is your 'Dad', a sensational concept. This is a first close-up shot of the Harry reality. The fact that Dad is a 'lineal relative' is a theoretical concept of moderate generality. This is a second 'medium distance exposure' of the Harry reality. The fact that Harry is a lineal kin in an 'Eskimo kinship terminology' is a theoretical concept of greater abstraction and generality. This might be thought of as a truly telescopic focus on a Harry reality. This second property of concept pictures is that they are focused to provide short, medium, and long views of reality. These different focuses on the same reality might be thought of as providing higher and higher pictures of the complexity that is reality. It is in this sense that getting high is a critical part of the art of science. It is the imagination recognizing truly abstract and general concepts that ultimately picture reality, i.e., connect with what reality does to the body.

A third property of concept pictures is that they move. This happens because different sensational concepts may be in the picture of the same theoretical concept. For example, 'shooting self', 'swearing', and 'stealing' are all different representations, i.e., pictures of the

theoretical concept ‘deviance’. Varying sensational concepts representing a theoretical concept might be thought of as its different ‘instances’. So when picturing a theoretical concept one moves among its various instances. Sometimes this picturing of a theoretical concept will show it moving in particular directions; that is, the different sensational concept representations of a particular theoretical concept may be measured as graduations of that theoretical concept. Temperature may move from ‘hotter’ to ‘colder’. Contradictions may ‘intensify’ or ‘relax’. Inequality may ‘increase’ or ‘decrease’. When concept pictures move in this manner, they will be said to be different ‘states’ of the representation. Thus a third property of concept pictures is that they move from state to state of their different instances. In sum, a *vulcaniste* picture of reality is composed of concepts, representations of what reality does to the nervous system; and what is done can be focused and moving. Concept pictures get bigger and bigger and are shown in different galleries. Generalization, theory, and explanation need specification in order to grasp the sense of the preceding sentence.

Bigger and Bigger Pictures: Generalization, theory, and explanation

> ‘(…) the aim of science is not things in themselves, as the dogmatists in their simplicity imagine, but the relations between things; outside of these relations there is no reality knowable’ (Henri Poincaré 1902: xxiv).

Poincaré, superb mathematician, physicist, and epistemologist, flourished at the end of the 19th century and ‘was the last man who seemed to know everything’ (Overbye 2000: 101). One of the things the polymath knew, presumably from his study of Kant, was that science was not knowledge of things in themselves, but of the ‘relations between things’. The conceptual tool for expressing such relations is the generalization. Once the nature of generalization is comprehended, it is possible to account for both theory and explanation; and once these are grasped it is possible to appreciate the big picture of science.

Generalizations are a particular type of structure, that of a relational statement. The parts in this structure are theoretical concepts. The relationships are whatever relations can be imagined between the theoretical concepts. For example, Durkheim’s *Suicide* (1898) proposed the relational statement,

(1) Deviance is inversely related to social integration.

In this relational statement ‘deviance’ and ‘social integration’ are theoretical concepts that are related inversely (where when one concept increases in value, the other decreases). *Vulcanistes* are especially interested in relational statements where the concepts exhibit causal

relationships. The notion of causality was important in pre-positivist science, became less important as positivism became more important in the late 19th century and first half of the 20th century, and has become important again in some post-positivist philosophies of science (Miller 1987). I have elsewhere (Reyna 2002a) presented a 'knotty' approach to the topic, influenced by Wesley Salmon's (1984, 1998) insistence that causal processes involve 'physical' connections between causes and effects.[17] Durkheim's view of the relationship between deviance and social integration can be restated causally as,

(2) Conditions of lesser social integration cause greater deviance.

The preceding discussion allows us to formally propose that 'generalizations' are relational statements containing theoretical concepts, which have their sensational concepts that measure observations of sensations of what happens in reality. Generalizations, so understood, must satisfy four conditions: (1) they must contain at least two theoretical concepts, (2) these must have empirical referents, (3) that must exhibit at least one relationship, and (4) the relationship(s) between them must be checkable to discover whether what the statement asserts to happen in reality is observed to happen as asserted. Clearly, a generalization, composed of at least two concept pictures, is a big picture. However, it is possible to distinguish different varieties of generalization and these varieties, when displayed together, may be imagined as still larger, triptych pictures.

Three sorts of generalizations are usually distinguished. The first are 'empirical generalizations': generalizations that are relatively low in generality and abstraction and that are derived more or less directly from observations. For example, measurements had been made in 19th century France of how people died. These measurements were derived from observations of people from different religions. Durkheim asserted in *Suicide*, on the basis of these, that 'Catholics commit suicide less frequently than Protestants'. This statement had two concepts, 'religion' and 'suicide', that were fairly low in abstraction and generality. So Durkheim's insight is an empirical generalization because, in addition to its relatively modest abstraction and generality, it is derived from the results of observation.

'Theories' are a second sort of generalization that are high in generality and abstraction, and involve a conceptualization applying inductive logic to pre-existing empirical generalizations.[18] Durkheim thought about his empirical generalization and had the acumen to grasp that suicide is a particular instance of a more general concept of 'deviance''. Similarly,

[17] The view that scientific explanation involves causation has been made by Bunge (1959), Dowe (1992), Harré and Madden (1975), Kitcher (1989), Scriven (1975), and Suppes (1970).

[18] This is a first, and narrower, use of theory. A second usage is proposed following discussion of the three sorts of generalizations.

he thought about the differences between Catholicism and Protestantism and believed they held their congregants with different degrees of intimacy to the congregation. Protestants were left more to fend for themselves. So he had the further insight to decide that Protestants were less well integrated into their religion than Catholics. Here was a second, rather abstract concept, that of 'integration'. Finally, he knew from his empirical generalization concerning religious affiliation and suicide that people who were more integrated committed less suicide. This knowledge allowed him to express the relationship between integration and deviance as an inverse one; which gave him the previously noted second theoretical statement.

'Hypothesizes' are a third sort of generalization that, like empirical generalizations, are lower in generality and abstraction than theories, and which involve conceptualization utilizing deductive inference from existing theories. For example, one that Durkheim never imagined, it might be deduced that loud prolonged belching at inappropriate times is a form of deviance. Equally, it might be deduced that children from divorced families were less integrated than their counterparts from undivorced families. From these deductions, and recalling the relationship between deviance and integration in the theory, it might be hypothesized that 'children from divorced families will belch a lot more at the dinner table than those from undivorced families'. The concepts in this statement are less abstract and general than in the theoretical one, but they are produced purely by calculation (in the form of deduction), and so have no observations bearing upon them. Hence the statement is a hypothesis. Now it is possible to grasp the bigger, big picture; that of the triptych.

This big picture is constructed by displaying the three generalization pictures together. Each generalization picture is taken from a different focal point of the same reality. In Durkheim's empirical generalization, the image is of Catholics, Protestants, and their suicides. In his theory, induced from the empirical generalization, the image is an elegant abstraction of deviance linked with social integration. In the hypothesis, deduced from the theory, the image is a rowdy one of kids belching in the midst of distressed, divorced parents. Together these generalization pictures form a triptych. Threefold representations at different levels of focus of what reality does to the body, which is to make sensations; and further representations of the body's record of which sensations are linked with other sensations. These generalization triptychs constructed by scientific artists, as Poincaré said, are about 'relations between things' with the actual things only known by what they do to you. These bigger pictures tend to be shown together with other related pictures in what might be thought of as a theoretical gallery.

A ‘theoretical gallery’ is a broad conceptual formation that includes different generalization triptychs sharing specific ontological standpoints and methodological tastes.[19] For example, some thinkers operate out of more materialist and others out of more idealist theoretical frameworks. Materialists – most scientists – believe that ontologically all reality is pretty much material; while idealists – Plato, Hegel and U.S. cultural anthropologists – think that ideas govern; with materialists favoring methodologies that observe objective realities and idealists preferring those that get at subjective being. Structural functionalism, Marxism, French structuralism, and the ‘afterology’ (Sahlins 2002) of postmodernism were, and are, theoretical galleries. Different theoretical frameworks may have their specific theories. For example, French structuralism had Lacanian, Barthian, Lévi-Straussian, and Althusserian theory. So a *vulcaniste* might talk of concept pictures, generalization pictures, generalization triptychs all hung in different theoretical galleries. What is the value of such theoretical artwork? A discussion of explanation is required to answer this question.

Description and Explanation

Generalization pictures arranged in generalization triptychs offer explanations of reality. How this is the case requires a distinction between description and explanation. This is important to anthropologists because, ‘Much anthropological research is descriptive’ (Simon 1969: 53). Unfortunately, there is an epistemological silence in anthropology concerning description. It is a sociologist, Julian Simon, who tells ethnographers that they are descriptive. Typical of the manner in which anthropologists have approached description is found in Ward Goodenough’s *Description and Comparison in Cultural Anthropology* (1970). Though the term ‘description’ is in the title, there is actually very little about it in the text. When description does enter into the narrative it does so as follows, ‘A major problem for anthropology, then, is how to describe other peoples’ cultures (…). The problem is not unlike describing a game, a very complicated one’ (Ibid: 104). The quotation asserts that anthropology has a ‘problem’; how to ‘describe other (…) cultures’, which is like ‘describing a game’. I see another problem for anthropology, a more fundamental one. Goodenough does not pose the question that lies behind the question, ‘how do you describe culture’? This

[19] Readers may wonder why the term theoretical gallery is used in the text instead of ‘metanarrative’ (Lyotard 1978) or ‘paradigm’ (Kuhn 1962). Lyotard’s term seems vague. Science, the Bible, and Marxism are all cited as metanarratives. Now, I never met a narrative that was the same as another narrative; and science, Marxism, and the Bible are profoundly different conceptual formations. So what is important to understand is how *different* narratives qualify as instances of common metanarratives. However, the *geist* of Lyotard is to say they are all just ‘big stories’. Kuhn’s notion of paradigm has faced similar controversy (see especially Popper 1970 and Davidson 1984). It is a ‘new fuzziness’ (Glymour 1980). A still useful introduction to these debates, where Kuhn responds to critics, is Lakatos and Musgrave (1970).

question is what is description? Ignorant of description, how can you ever know if you are doing it? What follows is a heuristic definition of description.[20]

A 'description' is representation of what is – in terms, of course, of whatever it is does – that is indifferent to relationships between the concepts picturing the empirical referent. What is a 'man'? Look at the hairy reality. It does something to you; sensations form, followed by sensational concepts. A 'man' is a bipedal empirical referent with a dick. A description may include a number of such representations. These may co-occur. For example, 'men in the U.S. are often aggressive'. There are three co-occurring concepts in this description: 'men', bipedals with dicks; the 'U.S', a country in the northern hemisphere; and 'aggression', disposition to acts of violence.

Robert Lowie's account of a chief in *The Crow Indians* (1935) is a classic example of ethnographic description as defined above:

> 'But how shall we conceive the ancient "chief"? The native term *batsé tse* (probably from *batsé*, "man", and *í tse*, "good, valiant") denotes the standing that goes with military achievement, but need not imply any governmental functions. There were four normal types of credible exploit: leadership of a successful raid; capturing a horse picketed within a hostile camp; being first to touch an enemy (the "coup" in the narrower sense); and snatching a foeman's bow or gun. A man who had scored at least once on each of these counts ranked as a *batsé tse*' (Lowie 1935: 5).

Description may be extremely complex. This is good. It means that more of reality is represented. Ethnography's virtue is that it is the fullest sort of description in the human sciences; and the texts of Margaret Mead among the Arapesh, Meyer Fortes on the Tallensi, or E.E. Evans-Pritchard concerning the Nuer are among the fullest descriptions of human populations ever made. Further, the ethnographies of kinship terminologies conducted by ethnoscientists like Goodenough (1970) and Loundesbury (1964) were arguably the most detailed descriptions ever acquired of a single object of study within populations.

Description gets the facts. [A fuller discussion of facts waits in the next section.] But description is description so long as it sticks simply to representing co-occurrences in some object of study. Explanation, on the other hand, answers an additional question; *why* is what is? Lowie described the *batsé tse* as a man of military achievement. However, he did not explain why. Just what is explanation?

Salamon argues '(…) that two grand traditions emerged' with regard to explanation (1998: 69). The first of these was of the opinion that 'explanation consists of deductive or inductive

[20] Current theory of description still derives from Russell's (1994) debate with Frege (1892) concerning the topic that is reviewed in Kaplan (1970).

subsumption of that which is to be explained (…) under one or more laws of nature' (Ibid). This is what is known as a covering-law account of explanation. The second tradition, of which Salamon is a distinguished member, ties explanation to causality. I am not certain that the two traditions have to be all that different. Salamon's 'laws' are what is termed generalization in this text; and why something is described as explained is because it is an instance of some more general and abstract generalization; and this generalization may, or may not, be causal.

Let us illustrate this view starting with an example offered by Hempel (1966). Suppose that you were in a chemistry laboratory, and the flame of a particular Bunsen burner was described to have turned yellow. Why? In a covering-law approach the explanation consists of two parts: the *explanans*, that which does the explaining; and the *explanandum*, that which is explained. The *explanandum* in this instance is that, 'The Bunsen burner turned yellow.' The *explanans* consists of at least one or more broad in scope and abstract generalizations. These are the covering-laws. Further, there are propositions that logically connect the covering-law with the *explanandum*. For example, the explanation of why the Bunsen burner flame turned yellow is:

1. All Bunsen flames turn yellow when sodium compounds are placed in them.
2. All rock salt consists of a sodium compound.
3. A piece of rock salt was placed in the Bunsen flame
4. Therefore, the Bunsen flame turned yellow.

The first three propositions comprise the *explanans*. The first is the covering-law. The second two propositions are conditions that obtained just prior to the flame's changing color. It is these two conditions that 'subsume' the *explanandum* in the covering-law.

However, Hempel's example might also be expressed in causal terms. If this were the case, the explanation would look as follows:

1. Placement of sodium compounds always causes Bunsen flames to turn yellow.
2. All rock salt consists of a sodium compound.
3. A piece of rock salt was placed in the Bunsen flame
4. Therefore, the Bunsen flame turned yellow.

Again, the first three propositions are the *explanans*. The first is a covering-law. It is an expression of what events must be antecedent to cause events, the effects, that are subsequent.

The second two propositions specify that these events happened prior to the flames changing color; so that the fourth proposition, the *explanandum*, is warranted.

A similar causal explanation might be proposed to account for U.S. male aggressiveness. The explanation begins by noting that aggression is learned. You can teach a dog to be a ruffian, or a wimp. Men are like dogs. Teach them to be violent, they are violent. This is because humans learn their culture. Cultural learning is called enculturation. The mass media in the U.S. – T.V., radio, movies, newspapers, and the like – are important for enculturation. There are no namby-pamby stories from Hollywood or FOX News about the American guy as a sensitive intellectual. Rather, everywhere on the U.S. mass media the 'good man' is a violent creature, a Rambo; and everywhere in America real men lie on their couches, stuffing their oral orifices with junk foods, consuming Rambo-like epics. So the following causal explanation might be proposed to account for the Rambo-*ification* of the American male:

1. Enculturation that embodies belief that a good man is an aggressive man causes aggressive men.
2. The U.S. mass media enculturated belief that the good man is the aggressive man.
3. U.S. men spend considerable time being enculturated by the mass media.
4. Therefore, U.S. males tend to be aggressive.

So far we have been browsing in theoretical galleries to understand the art of constructing pictures of reality as it is. This is only part of the art. A second part is to confront reality pictured, with reality observed. It is time to learn about this art which involves validation and which constructs approximate and hard truths.

III. Validation and Hard Truth

> 'The besetting sin of interpretive approaches (…) is that they tend to (…) escape systematic modes of assessment. You either grasp an interpretation or you do not, see the point or you do not, accept it or you do not' (Geertz 1973: 24).

It helps to orient the discussion of validation by inquiring, what does anthropology already know about it? Perhaps the time when anthropologists validated most was in the early days of the 20th century. Then, U.S. Boasian anthropology and British social anthropology attacked a perceived to be common foe, 19th century social evolutionary theory (Reyna 2001). Both schools took evolutionary generalizations – especially concerning race, in the Boasian instance and social institutions like matriarchy, in that of the social anthropologists – and

sought to validate them. Both were delighted when the generalizations were invalidated, because it warranted their own views. Later in the late 1950s and throughout the 1960s, those who succeeded Boas at Columbia, the cultural materialists, tried to validate generalizations. However, neither they, nor their predecessors, created a formal tradition that pondered the question, 'What is validation?' Validation has not been practiced since the end of the 1960s in U.S. cultural anthropology by those who took the interpretive turn. Interpretation, as Geertz (1973: 24) put it, escapes 'systematic modes of assessment'. You 'either (…) see the point or you do not'. So discussion in anthropology of validation rightfully starts at the beginning; and at the beginning is a concern for bloat. A few observations about bloat are offered below.

Towards a *New* Ethnography: Bloating versus confrontation

The art of science is to create theoretical pictures of how reality works and, then, to reflect upon just how true these are. Theoretical concepts paint the picture with some abstraction and generality. Sensational concepts are needed to reflect upon the quality of these pictures. Validation is confrontation between whether what generalizations say goes on in reality is observed to go on. 'Facts' or 'data' are the states of sensational concepts produced by observation that are required to make such judgment. 'Peeping Baconianism' is the compilation of facts for facts' sake, observations for observations' sake, irrelevant to validation of generalization. Sir Francis Bacon, the early modern champion of science, is thought to have recommended a science that overwhelmingly relied upon observation. Hence, Baconian science involves 'peeping' at the expense of generalization.

Peeping Baconianism is promoted by some interpretive anthropologists, following Clifford Geertz's suggestion, that anthropology is ethnography, and 'ethnography is thick description' (1973: 9-10). George Marcus, for example, says that ethnography is 'at the heart' of the cultural anthropological enterprise (1994: 42). This ethnography should be dialogic. There should be the ethnographer's observations as well as those of the observed other. Marcus further boasts that such ethnography's 'advantage' is that 'it functions well without a theoretical paradigm' (Ibid: 44). Ethnography – univocal or polyvocal – lacking theory is pages and pages of statements full of sensational statements to the effect, 'I see this. You see that. Oh look, I see it too.' Such peeping from a v*ulcanique* perspective is observational bloat; where texts balloon with signs to the effect that 'I observe, I observe;' in the absence of

understanding why. Geertz, for this reason, of which he was oblivious, was correct in labeling such description as 'thick'.[21]

Conversely, generalization done for the sake of generalization, untested by validation, is 'babeling Panglossism.' Pangloss was the tutor of Candide, the hero of Voltaire's droll fable of the same name. Pangloss was always babbling a theory that this or that is 'an indispensable element in the best of worlds' (Voltaire 1759: 26); a theory which Voltaire has his readers observe is absurd. Let us acquire some local (anthropological) knowledge of one such Pangloss.

Steven Tyler is an ethnographer, who like Geertz and Marcus, is keen to do ethnography because he believes science is 'degraded' and should be replaced by ethnography, '(…) the discourse of the postmodern world' (Tyler 1986: 123). Tyler, explaining this discourse to readers, offers what might be said to be a pretty theoretical view of the topic. He asserts:

> 'An ethnography is a fantasy, but it is not, like these, a fiction, for the idea of fiction entails a locus of judgment outside the fiction, whereas an ethnography weaves a locus of judgment within itself, and that locus, that evocation of reality, is also a fantasy. It is not a reality fantasy like 'Dallas', nor a fantasy reality like the DSM III; it is a reality fantasy of a fantasy reality. That is to say, it is realism, the evocation of a possible world of reality already known to us in fantasy' (Ibid: 139).

Pangloss would have nodded in admiration of this quotation. 'Idea of fiction', 'reality fantasy', 'fantasy reality', 'locus of judgment', 'realism', 'evocation' – these are highly theoretical terms. However, what are their sensational concepts that lead to their empirical referents? Why is 'Dallas', an old American television series, a 'reality fantasy'? Could it not be a 'fantasy reality'? How would one know? What in the world is Professor Tyler talking about? A *vulcaniste* views such babblings as theoretical bloat. Texts ballooned with messages to the effect: 'this is why things are, "reality fantasy"; this is why things are, "fantasy reality"'. All in the absence of observation, and any clue as to how to make observation, that things actually are the way they are asserted. Now reader, examine social and cultural thought. If you see: Bloat, bloat, bloat – observational and theoretical – everywhere; this is the beginning of recognition of the need for validation.

An example of how validation works is given in the next few paragraphs. It will help to clarify the understanding of validation as confrontation. Let us imagine a Baconian weatherperson who makes billions of measurements of heat throughout the world, and does nothing more with them than write them down; advanced observational bloat. Now

[21] Discussion of problems with Geertz's use of thick description can be found in Descombes (2002) and Bazin (2003).

contemplate a second, Panglossian weatherperson, given to generalizations like, ‘heat is due to God’s will’, or ‘temperature is due to variations in distance from the equator’, disregarding observing anything going on anywhere; advanced theoretical bloat. Finally, contrast these two bloated creatures with a *vulcaniste*.

S/he might begin by remarking that God is ineffable, Its will unobservable; which means the theoretical concept of ‘God’s will’ lacks empirical referents, so forget It. Then, the *vulcaniste* might note that the theoretical concept ‘temperature’ has a sensational concept, that of the ‘Celsius scale’, which measures observations of the reality that produces heat. Further, s/he could comment that the theoretical concept ‘distance’ has a sensational concept ‘degrees of latitude’, which measures observations of how far north or south one is from the equator. So the *vulcaniste* might suggest, ‘Go with the second generalization. It can be validated.’ Measurements of 50 degrees Celsius at 50 degrees north latitude would be out of the (theoretical) picture. Measurements of minus zero degrees Celsius at 50 degrees north latititude would be in the (theoretical) picture. So the *vulcaniste* trudges to 50 degrees north latitude, peeks at the thermometer, measures the temperature at minus 50 degrees Celsius. This is a confrontation of the theoretical picture with the observed reality.

Validation is confrontation. Let me explain this further. Recently, I went back after three decades of absence due to civil war, to the spot where I first did fieldwork. Before I went back I had a picture in my mind of what it would look like. There would be men sitting on mats, in the shade of a tree, surrounding their old leader, the *Galadima*. After I went back, I confronted this idea with its reality. There *were* men sitting on mats under a tree with their new *Galadima*. Validation is the confrontation of what a generalization says goes on in reality with what goes on there. Durkheim had the theoretical generalization that ‘weak social integration causes deviance’. Observing the activities of members of a divorced family confronts this generalization with its reality. If this family’s children spend their time belching then the confrontation is positive. Reality works the way the generalization pictured it. There is no theoretical bloat.

Now we are at the ‘heart’ of the matter concerning ethnography. Geertz, Marcus, and Tyler said that it was anthropology. But it is unclear what ‘it’ is. Ethnography as thick description, the evocation of fantasy realities of reality fantasies, may be peeping Baconianism, possibly babeling Panglossism; pretty ineffable. Forget it! Ethnography for a *vulcaniste* is the practice of validation: Hard work, where the ethnographer confronts social, cultural, and biological realities with generalizations about these. Such ethnography, because anthropologists have not done much systematic validation, is a *new* ethnography. Details of this ethnography are

sketched below; details that disclose how hard work can be rewarded with hard truths. Discussion begins by posing a question that must be asked.

The Question that Must Be Asked

> '"Hey God, what is Truth"?
> "No idea", replies God. "Get lost."' (*Radical American Comic*)
>
> 'I don't even believe the truth anymore' (Attributed to former FBI Director, J. Edgar Hoover)
>
> 'The man who tells you truth does not exist is asking you not to believe him. So don't' (Roger Scruton, *Modern Philosophy*)

We shall get to these three quotations, but picture the following. Picture 1: A handsome generalization-picture and a beautiful reality do it. They have a down and dirty confrontational tryst. Picture 2, afterwards, when the generalization-picture and reality are smoking cigarettes, reality turns to generalization and sweetly inquires, 'Honey, tell me the truth, was it *good* for you?' This is the question that must be asked. It is the question of how do you know if a confrontation between generalization and reality is a good one; which is really the question, how you can tell if a generalization is true? The question must be asked because; why do it, if it is no good? So it is time to introduce a *vulcaniste* approach to truth. This approach is based upon a notion of approximate truth. The discovery of such truth tells you just how 'good' a confrontation was; and the best sort of an approximate truth is a hard one. However, before presenting the concept of approximate truth, let us document troubles with the parent concept, truth.

Truth is a concept, about which some believe, 'all is not well' (Quine 1987: 216). So even in the comic strips, as the opening quotation of this section makes clear, God tells folk to buzz off when asked about truth. A former FBI Director did not even believe it when he had it. Though, as Roger Scruton indicates, you had better believe in it. Truth's malady is that existing theories of the nature of truth do not seem to work. There have been an enormous number of theories of truth, which fall into three major types.

These are correspondence, coherence, and pragmatic doctrines of truth.[22] Correspondence

[22] A history of the concept of truth can be found in Fernández-Armesto (1997). Recent discussions of the vicissitudes of truth are in Kirkham (1992), Putnam (1981), Quine (1992) and Schmitt (1995). Introduction to correspondence theories can be found in Newman (2002), to coherence theories in Walker (1990) and Alcoff (1996), and to pragmatic theories in Peirce (1955) and James (1907). I am aware that I am over-simplifying the different schools of thought and slighting some, such as Tarski's semantic theory (1956) or the deflationary theories of Ramsey (1927) and Horwich (1990). My rationale for doing so is that they are not especially useful for the approach to approximate truth developed in the text.

theories of truth, the oldest and the most pleasing to commonsense, have it that statements qualify as true, if they correspond to reality. The statement 'U.S. males are aggressive' is true when the reality of U.S. males 'corresponds' to the picture of them in the statement. Coherence theories define truth '(…) as a property of a set of beliefs that are mutually reinforcing (or "hang together") while satisfying conditions of logical consistency (…) and of deductive closure (…)' (Fetzer and Almeder 1993: 134). Pragmatism holds that a proposition is true if it is useful to believe; or as Charles S. Pierce put it, '(…) truth consists in future serviceableness to our ends' (1958: 381).

Quine rejects the correspondence theory as 'vague', and he asks, 'What part of true sentences is meant to correspond to what on the part of reality' (1987: 213). About the coherence theory, Quine is even more dismissive, calling it 'an irrational rationalism' based upon the 'absurd' view 'that the infinite totality of possible statements admits of one overall distribution of yeses and noes that is logically consistent' (Ibid: 212). Pragmatic views of truth will play a role in a *vulcaniste* notion of approximate truth. Pragmatism is complex and varied. There are problems with certain of its positions. Let us document some of these.

The first problem is that it may be useful for someone to believe a statement and equally useful for someone else to disbelieve it. For example, Iraqi found it useful to believe that their American invaders in 2003 were an 'occupying force'. The American invaders, for their part, disbelieved this; finding helpful to believe that they were a 'liberating force'. The difficulty here is that if truth is solely useful utilities, then there is no way to distinguish between the truthfulness of different beliefs. A second problem with such pragmatism is that some beliefs may be undeniably useful though – under other criteria – they are false. For example, many Americans find it suits their purposes to accept as true a Christian, creationist account of the variety of life forms of earth, even though this belief goes unsupported by evidence.

A currently chic pragmatic view of truth is that of Richard Rorty. This view affirms that truth is that which investigators find useful to agree upon. Truth for Rorty is 'solidarity', shared among a community of like-minded, of '(…) what is good for us to believe' (1991: 22). This seems ethnocentric. Truth is what our group believes; and Rorty is careful to tell his readers that this is his point, 'I have been arguing that we pragmatists should grasp the ethnocentric horn of this dilemma. We should say that we must, in practice, privilege our own group (…)' (Ibid: 29).

There is a big problem. What if 'our (...) group' is Nazi? After all, there was a general consensus among Nazis that the Jews were an inferior race. Can you take seriously a position that accepts such a statement as true? Fernández-Armesto remarks of Rorty's view:

> ‘In practice, saying that truth is ‘truth for us’ is no different from saying it is ”truth for me”, since there can be no limit on the potential number of communities of belief. Rorty, for example, belongs by self-ascription to the community of conventionally liberal, politically correct, secularist professors. Since he is explicit – even emphatic – in rejecting the beliefs of other communities (…) his ‘pragmatism’ amounts to a preference for his own inclinations’ (Fernández-Armesto 1997: 181).

A virtue of the approach to truth developed below is that it comes with procedures for showing that one’s own preferences may be untrue. In order to develop this approach, let us look at how thinkers have reacted to the problems with the theories of truth.

There have been two general responses to truth’s problems. The first of these, as we saw with some postmodernists and cultural anthropologists, has been to jettison it. The second response, has been recognition that what those critiquing theories of truth are showing is that *particular* explanations of truth do not work, not that there is no truth. This has led those making this second response to reaffirm that, ‘The task of speaking truth is an infinite labor (…)’ (Foucault 1989: 308).

One way of performing this labor has been to continue in the search for a compelling theory of truth. Alston (1996), for example, has a formidable revision of the correspondence theory.[23] Another way to labor for truth has been to formulate doctrines of ‘verisimilitude’ (Popper 1963), ‘truthlikeness’ (Niiniluoto 1987), and most frequently ‘approximate truth’ (Boyd 1973, 1984; Putnam 1975; and Weston 1990). An attractiveness of this second approach is simple. It is easier to apprehend with some rigor the approximate truth of statement than its absolute truth. Further, the specification of what truth is approximately like, allows scientific practice to arrive at more truthful statements about reality than other approaches flying innocent of any notion of truth; all the while waiting for the Alston’s of this world to do their work.[24] So the labor, hopefully not infinite, of constructing an approach to a view of approximate truth begins.

Approximate Truth I: Some basics

Generalizations are judged to be ‘approximately true’ if they can be shown to reliably and accurately picture reality, even though the exact truth of that reality remains a mystery. The key to understanding this view of approximate truth is grasping what is meant by the terms

[23] There have been a number of recent defenders of the correspondence theory of truth beside Alston. These include David (1994), Newman (2002), O’Connor (1975), and Searle (1997).
[24] There has been grumbling from some about the various conceptualizations of approximate truth (Resnick 1992). Laudan, for example, has called them ‘mumbo jumbo’ (1981: 32).

reliability, accuracy, and picture. The outlook developed towards these below is beholden to C.S. Peirce's and William James versions of pragmatic truth and to Ronald Laymon's view that approximate truth is to be understood in terms of statements' 'confirmational history' (Laymon 1985: 159). However, before proceeding further, let us ditch the term 'confirmation' and, while we are about it, that of 'verification'.

Validation, confirmation, and verification have tended to be roughly equated. A person validates, confirms, or verifies a generalization's truth. However, confirmation seems inappropriate because of its popular connotations. It has *too* final a ring. If you are a Catholic, you get confirmed, and it is over and done with. If a theory has been confirmed, it is over and done with. It is true. The same objection applies to the term 'verification', which has often been understood '(…) as complete and definitive establishment of truth (…)' (Carnap 1937: 48). The problem, as Carnap observed in the 1930s, is '(…) *no complete verification is possible'* (Ibid 49, emphasis in the original).[25] So the term 'validation' seems preferable, because it implies that a theory can be validated as approximately true, even though it has not been confirmed or verified as the truth. Practices that lead to validation will be said to have their histories; so validation will be seen as the establishment of these histories. Just what these are remains to be formulated; but, before doing so, let us consider falsification.

Falsification is associated with Karl Popper, and his views might be interpreted as relaxing the need to validate. Let us understand how such a construal might have arisen. The concept of falsifiability was developed to address what Popper believed to be weaknesses in the validation of theory.[26] The weakness was that, it is easy to obtain confirmation, or verification, for nearly every theory – if you look for it. This is problematical because if every theory has its validation, every theory is true, which is untrue. Now the preceding seems to suggest that Popper was recommending falsification over validation. This, I believe, was not Popper's intent.

Popper developed the notion of falsifiability because, as he later recalled, he 'wished to distinguish between science and pseudoscience (…)' (1963: iv), which meant he sought to make this distinction a criterion. Falsifiability was this criterion. A generalization pictures reality in a certain manner. By virtue of its picturing in one manner, reality should not turn out to be pictured in some other manner. If reality does turn out some other way, alien to how it is

[25] Carnap's critique of verification went as follows: 'Even if each single instance (…)' of a generalization were '(…) verifiable, the number of instances to which (…)' it refers 'is infinite and, therefore, can never be exhausted by our observations which are always finite in number' (1953: 48).

[26] Popper first developed the ideas that became falsification in 1919. These were published in *Logik der Forschung* (1935). He later wrote of why they were developed (1963). Discussion of the value of falsification can be found in Grünbaum (1976), Lakatos (1970) and Putnam (1974).

pictured in the generalization, then the generalization's picture is false. It has been falsified. Thus, the criteria of falsifiability are:

(1) If a generalization can be compatible with some observations of reality, and incompatible with other observations, then it is falsifiable;
(2) If a generalization is compatible with all observations of reality then it is unfalsifiable.

Popper believed psychoanalysis to be unfalsifiable and, hence, pseudoscience. Freud never specified what evidence would provide facts that were incompatible with his theory. Rather, no matter what a person did, it was in someway caused by something in Freud's theory; be it repression, displacement, the Id, the Ego, the Super Ego, the Oedipal Complex, the Jocasta Complex, etc. Freud's theory, according to Popper is not wrong. In fact, it can never be wrong and, for this reason, it is pseudoscience.

On the other hand, Popper thought Einstein's theory of relativity to be falsifiable and, thereby, science. Specifically, the theory of relativity predicted, as Popper expressed it, that light from a stationary distant star whose apparent position was close to the sun would strike the earth from a direction that it would seem to be slightly shifted away from the sun. The theory was falsifiable because two sorts of facts could be observed: either the star was shifted way, the theory's validation; or it was not, its falsification. Because stars are not visible during daylight, these observations could only be made during a solar eclipse. Because solar eclipses are relatively rare, astronomers had to travel considerable lengths to find one. In 1919, Arthur Eddington, Plumian Chair of Astronomy at Cambridge University, traveled to Principe Island off the coast of West Africa, and managed to photograph such an eclipse. Most of his plates were spoiled. However, he confided to his diary on June 3rd that '(…) one plate I measured gave a result agreeing with Einstein' (Eddington 2001: 1). Popper said that he, and his friends, were delighted with Eddington's eclipse findings which brought the first major confirmation of Einstein's theory. But, the point of Popper and his friends' thrill is the not recognition that scientists should stop confirming, or as I prefer, validating, their theories. Rather, it is recognition that validation is only really possible if it is done on generalizations that meet the criterion of falsifiability. After all, you cannot validate something that can never be false. Let us return to formulating a notion of approximate truth.

From a *vulcaniste* perspective, approximate truth is something made (known). What are made are validation histories of falsifiable generalizations. Specifically, it will be shown that the approximate truth of generalizations depends upon their validation histories. Generalizations in these histories attain different levels in validation hierarchies; levels

determined by the number of steps climbed in the evidential ladders of individual validation episodes that compose the validation history of the generalization. It is time to bring Peirce and James onstage to assist with the arguing of this assertion.

Both gentlemen were pragmatists (though some in high position at Harvard University regarded Peirce as no gentleman). Both insisted that ideas were to be ultimately judged in terms of their 'concrete consequences' (James 1907: 44). However, there were nuanced differences between their pragmatisms, including their approaches to truth. I shall suggest that James has a sort of 'mental-image' and Peirce a 'consensus' view of truth; and that James assists us to understand the accuracy of generalizations, while Peirce helps us with their reliability. The position to be argued is that the higher the levels in validation hierarchies, the more reliable and accurate a generalization, the greater its approximate truth.

James' view of truth, presented in 'Pragmatism's Conception of Truth', is based upon a person forming 'mental-images'; images that in my view of things are pictures. James, to explain his outlook, leads readers through a hypothetical vignette. He imagines,

> 'If I am lost in the woods and starved, and find what looks like a cow path, it is of the utmost importance that I should think of a human habitation at the end of it, for if I do so and follow it, I save myself' (1907: 134).

The picture here is the concept of 'a human habitation'. With this firmly in readers' minds, James continues his example by saying,

> 'Following our mental image of a house along the cow path, we actually come to see the house; we get the image's full verification. *Such simply and fully verified leadings are certainly the original and prototypes of the truth process*' (Ibid 13, emphasis in the original).

Learning the truth is making a picture of the house and then finding it; or, more generally, making a picture of reality and, then, finding that reality.

How do you do this? According to James' example, you follow the 'cow path'; prompting the further question, just what did he have in mind with his talk of bovine corridors? This question was answered a few pages on in the essay when James said, 'Truth for us is simply a collective name for verification processes (…) pursued because it pays to pursue them. Truth is made (…)' (Ibid: 143). So cow paths are verification processes – raising the question, what are such processes? I suggest below that verification processes, which I prefer to term validation histories, involve a connection between generalization-pictures and reality; and that the nature of this connection determines the accuracy of the generalization-pictures.

Let us begin with the connection part of this argument. This involves explaining how a generalization pictures reality, and why greater accuracy improves the quality of the picture. Generalizations are theoretical concepts and their relationships. These relationships state that certain things will happen in reality. Recall this reality is never known directly. However, it is known indirectly by what it does to observers' senses and it is the sensational concepts of theoretical concepts which measure observations of what reality does. It is critical to understand that reality does do things to the senses. This means that people are *connected* with reality. What generalizations assert, then, are what reality will do as measured by particular states of particular sensational concepts.

Demonstration of 'connection' involves comparison that requires observation of observations. Specifically, connection is observation of observations of reality where sensational concepts are in the states that generalizations assert they will have. This determination occurs by comparing whether the reality pictured in the generalization is the reality measured in the observation. Imagine two snapshots. One is a picture of reality provided by a generalization. The other is a picture of that same reality provided by observation. In this optic, connection is how alike picture 1 is to picture 2. If sensational concepts in the observational picture are in the states the generalization-picture says they should be in, then there is a connection between what the generalization says should be the reality and the observed reality; if no, there is no connection. Falsification has occurred.

Validation histories are records of connections made. Remember the sort of connections being discussed are ultimately physical attachments of observers with the reality they observe. Approximate truth is constructed by compiling records of such connections. But validation histories of such connections are made not by getting closer and closer to reality, whatever that might be, but by checking if what reality does to the senses is what the generalization pictures it will do. However, not all connections are equal. This brings us to blurred concept or generalization-pictures. Blur is bad.

This is because blur reduces accuracy making it difficult to connect observation pictures with generalization-pictures of reality. An example from the arts may help to get across this notion. The Russian avant-garde painter of the early 20th century, Kazimir Malevich, painted a painting called 'Black Square' (1929). It was a square canvass painted black. Not much to it, a limited representation, pretty much a blur. 'Blurriness' epistemically is a situation where the concepts in a generalization do not clearly specify the effect of reality on the senses. This means that the observer does not know what a generalization should do to her or his senses; and so does not know what the connections will be that validate or falsify the picture. Blurriness intuitively is being drunk and unable to see straight. It is bopping into a gallery and

seeing this weird picture and thinking, 'Far out, I am *really* sloshed; I could swear that picture was a black square.'

At least three sorts of blurriness can be found in concepts. Vagueness is a first type of blurriness. C.S. Peirce proposed what has become a central understanding of vagueness, stating:

> 'A concept is vague when there are possible states of things concerning which it is *intrinsically uncertain* whether, had they been contemplated by the speaker; he would have regarded them as excluded or allowed by the proposition' (Peirce 1902: 748)

Something is 'intrinsically uncertain' if it is unknowable whether it is, or is not, an empirical referent of a concept or a relationship.[27] To illustrate, consider the following generalization that comes with no additional information:

> Economics importantly influences social life.

There are two concepts in the generalization, 'economics' and 'social life'. There is one relationship, 'importantly influences'. The term 'economics' roughly means 'production, distribution, and consumption of goods and services', and the query could be posed, what in economics does the influencing? Similarly, the term 'social life' is rather vast, and the question could equally be asked, what in social life gets influenced? Finally, it seems sensible to wonder concerning the relationship supposedly enjoyed by these two concepts, what qualifies an influence as important? The point of the preceding is that the two concepts and the relationship in the generalization are vague. It might be suggested that theoretical concepts are always vaguer due to their abstraction and generality. However, vagueness is reduced, if there are rules that take investigators from sensations to their sensational concepts and there are further rules that take them on to their theoretical concepts, and vice-versa.

A second sort of blurriness is due to ambiguity. This is where there are two or more clearly different senses of a concept and, hence, potential confusion as to which sense applies. For example, the word 'funny' in English can mean either a 'person who is humorous' or a 'person who is a bit crazy'; and sometimes it is hard to distinguish an amusing person from one who is wacko. Increasing the blurriness of reality is the fact that many common cultural concepts are both vague and ambiguous. For example, the English kin term 'child' is ambiguous between 'offspring' and 'immature offspring'. Further, the latter reading of 'child' is vague because it is uncertain when an offspring ceases to be immature.

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[27] Vagueness is discussed in Keefe and Smith (1996) and Sorenson (2001).

A third type of blurriness has to do with the poverty of empirical referents for concepts. Here the problem is that there are no, or very few, empirical referents. These it will be recalled are the reality to which an observation refers. If a concept lacks specification of the being it is about, then it is impoverished because sensations, and concepts derived from sensations, cannot be assigned to reality. Sometimes such poverty is hidden in a blizzard of words. Gilles Deleuze and Felix Guattari, for example, worked in *A Thousand Plateau's* (1987) with a notion of 'rhizome'; a concept they pressed into service in social theory from plant biology. They explain rhizome as follows:

> 'Let us summarize the principal characteristics of a rhizome: unlike trees or their roots, the rhizome connects any point to any other point, and its traits are not necessarily linked to traits of the same nature; it brings into play very different regimes of signs, and even non-sign states. The rhizome is reducible neither to the One nor the multiple. It is not the one that becomes Two or even directly three, four, five, etc. It is not a multiple derived from the One, or to which One is added (n+1). It is composed not of units but of dimensions or rather directions in motion. It has neither beginning nor end, but always a middle (*milieu*) from which it overspills. It constitutes linear multiplicities with n dimensions having neither subject nor object, which can be laid out on a plane of consistency, and from which the One is always subtracted (n-1)' (Deleuze and Guattari 1987: 19).

This definition of rhizome works as follows. The first five sentences in the definition tell readers what the rhizome is not, thereby providing them with no empirical referent for the concept. The sixth sentence asserts something about the rhizome. It is 'linear multiplicities with n dimensions having neither subject nor object'. These can be 'laid out on a plane of consistency' where 'the One' is always subtracted '(n-1)'. A person who wishes to use this concept of rhizome is given not idea how s/he might observe these 'linear multiplicities' where 'the One' is 'subtracted'. So the concept of rhizome is impoverished because it is impossible to guess what in the world Deleuze and Guattari are talking about.

So, the accuracy of a connection between concept and reality is inversely related to the blurriness of a generalization picture. Thus, when James said that truth involved images he should have made it clear that he was interested in those that were less blurry because, then, a more accurate connection could be established between picture and reality. How does an observer eliminate blur? This is an enormous question. One does not wave a wand and accuracy replaces blur. But certainly, an enduring habit of *vulcaniste* practice must be mobilization of all efforts to remove vagueness, ambiguity, and poverty from concepts. This is a practical art, further discussed in the text, where researchers learn by doing; that is, they take particular generalization-pictures and confront them with their realities and see, among other things, whether these realities are just a blur and cannot be confronted.

Let us recapitulate the discussion of approximate truth up to this point. Generalizations are judged to be approximately true if they reliably and accurately picture reality. This judgment is made by confrontation of the generalization with reality. Confrontation involves measuring the connection between the generalization and reality. The connection is said to be at least partially positive if what the generalization asserts to happen in the reality is accurately observed to occur in it. A *vulcaniste* is half way to establishing the approximate truth of a generalization if as much of its blurriness has been removed from it as possible. It remains only to establish its reliability. However, before doing so, let us consider the role of evidence and data in approximate truth, because some skepticism has developed concerning the utility of these in validating generalizations.

Evidence and Data

Validation is confrontation. Confrontation is checking for connection. What are evidence, findings, facts, and data in this optic? 'Evidence' is measurements that indicate the states of sensational concepts that picture the theoretical concepts of generalizations. 'Findings' are the results of these measurements. Findings and evidence reveal the connection between reality and its pictures. Findings may include 'positive evidence', where measurements indicate that the states of the sensational concepts connect to reality in the way that the generalization says they should. Findings may also include 'negative evidence', where measurements indicate that the states of the sensational concepts do not connect to reality in the way the generalization says they should. Colloquially speaking, evidence concerning generalization involves 'getting the facts of the matter'. Less colloquially, the 'facts' are information about how the observer's body connects with reality; because they are lower level *re*-presentations of the brain's presentation of sensation, which is what reality does to the nervous system. When it is said that the 'facts fit', this means the findings have provided positive connection concerning a generalization and reality. If there is any positive evidence from a single confrontation, there is reason to believe that a generalization has *some* approximate truth. A single confrontation is the beginning of a generalization acquiring a validation history.

Some in philosophy 'teach' that there is 'no genuine fact of the matter' to warrant validation (Smith 1989: 90).[28] Partisans of this opinion might be said to be 'validation skeptics'. Such a position has almost become hegemonic in postmodern U.S. cultural anthropology, in the sense that it is taken-for-granted. For example, Daniel Little, writing in the *Anthropology Newsletter*, a broadsheet where anthropologists get their facts, asserted that, 'getting the facts' is problematic because:

[28] Review of the literature concerning fact in philosophy can be found in Heal (1989) and Hochberg (1978).

> ‘There are no pure “facts”, but only facts as couched in one conceptual scheme or another. There are no pure observations, but rather observations couched in theory-laden vocabulary. Theories bring with them their own empirical criteria, which bias the findings in support of them. The relations between observation and theory are hopelessly circular, with theories generating the observations that supposedly support them’ (Little 1995: 2).

This quotation seems to be hegemony by *diktat*. The *Newsletter’s* readers are informed that ‘There are no “pure” facts’, so ‘findings’ exhibit ‘bias’; which does compromise validation. Let us challenge the quotation, examining: 1. whether validation is compromised by impurities, 2. which are due to being ‘couched in’ ‘theory-laden’ conceptualization, and 3. that ultimately this means that theories, not reality, generates observations.

The claim that there are no ‘pure’ facts seems an emotional irrelevance. ‘Emotional’, because calling something impure is a rhetorical stimulant. ‘Pure’ things, like Brahmans, are exalted and good. ‘Impure’ things, like untouchables, are filthy and bad. Saying that facts are not pure insinuates that they are ugly untouchables. But the validation skeptic will insist, emotional pyrotechnics aside, a case *can* be made that facts are impure. Such an argument makes four assertions from which a fifth conclusion is drawn. These are:

1. Facts are states of sensational concepts resulting from measurements of observations;
2. Some such states indicate that what a generalization says occurs in reality is observed to occur;
3. Such facts are ‘couched in’ what I term theoretical concepts, and validation skeptics tend to call ‘theory-laden vocabulary’;
4. Something is ‘pure’, if it is ‘free from anything different, inferior, or contaminating (…)’ (*Random House Dictionary* 1967: 1166);
5. Therefore, facts are impure because they are ‘couched in’, i.e., contaminated by, a ‘conceptual scheme’ that is ‘theory-laden’.

This is an argument that is heavy on blur. It insinuates that facts have ‘couched’ with conceptual schemes that are theory-laden. The blur results from the fact that the argument rests on a metaphor that is both vague and ambiguous. Facts are supposed to ‘couch’ with conceptual schemes. The ambiguity here is that if you get somebody on the couch you may have sex with them, psychoanalyze them, or literally just get them on a sofa. So when you couch a fact in a theory-laden vocabulary, do you (a) put it on a sofa, (b) observe the fact’s penis in the vagina of the theory, or (c) talk to it about repression? Who knows? And this is

where the vagueness comes in. There is no specification of what it means for a fact to couch with a theoretical term.

Possibly facts could be said to be couched in theoretical terms if they are sensational concepts that are sub-sets of theoretical concepts. If this is the case, then this is not a problem for validation. Rather it is what makes validation possible because the two types of concepts serve different, complementary functions that are necessary for validation. A 'theory-laden vocabulary' is one based upon theoretical concepts. These function to picture lots of reality. Remember, theoretical concepts are about getting high: the more 'theory-laden' the vocabulary, the higher the abstraction and generality of the concepts, the more reality pictured. Sensational concepts serve another function. They record what reality does to sense organs; thereby connecting reality to concept. The different things reality can do to sense organs are the different states of a sensational concept. Some of the states of a sensational concept indicate that reality does things the way the theoretical concept pictures they will occur. Other states of a sensation concept indicate that reality is not working the way it is theoretically pictured. The fact that a sensational concept is 'couched in' a theoretical one is what makes validation possible. There *is* a 'bias' here. It is bias to validate generalizations with sensational concepts that are in the sub-sets of the sets of the theoretical concepts in the generalization. To do otherwise would be to validate the generalization 'carnivores eat meat' by observing the diet of a cow.

The assertion that 'observation and theory are hopelessly circular, with theories generating the observations that supposedly support them' is incorrect. Circular argument is, 'Proof or evidence involving premises which assume the conclusion which is to be established' (Runes 1962: 56). For example, why not conclude, 'Therefore, Malinowski's journal is true because it contains his personal thoughts'. The argument establishing this conclusion would be circular if it were premised upon the statement, 'Malinowski's journal contains his true personal thoughts'. Observation and theory would be involved in circular argument if there were two premises stating,

1. Theories generate observations that support theories.
2. Therefore, theories generate observations that support theory.

Absurd; let us turn to a more plausible position.

Such a position begins by recognizing that theories *do not* generate observations. The word 'generate' means 'cause'. Observations are sensings of reality in the observers' nervous system. Clearly, reality, in the form of light waves, sound waves, or something else, contacting a sense organ is a cause of the sensations. Then at the level of measurement

sensations will be classified as particular states of sensational concepts. This is not to deny that sensational concepts of theoretical concepts direct the observer where to observe, thereby selecting where observations will be made. But pinpointing where to observe is just what the observer needs when validating. After all, you do not look at Uranus when studying diseases of the respiratory system. It is the reality of smoking cigarettes that causes observations of lung cancer, not theory-laden concepts.

Given the preceding, perhaps the following non-circular argument accounts for the relationship of observation to theory,

1. Reality generates observation.
2. Observation results in positive evidence where it consists in states of sensational concepts that indicate reality operates in ways pictured by a generalization.
3. Theory enjoys some validation if there is some positive evidence regarding it.
4. Therefore, validation of theory requires observation which makes possible positive evidence.

So it does not seem to be the case that ‘observation and theory are highly circular’. However, validation skeptics have proposed another challenge to the belief that generalizations are not really decided on the basis of fact. This challenge accepts that facts determine the acceptance of generalizations but, then, adds that the facts themselves are decided by a process of negotiation.

This claim is made by Bruno Latour and Steve Woolgar in *Laboratory Life* (1979: 134). The concept of negotiation is vague and ambiguous because it is uncertain what social actions are negotiation, though it is certain that a person may negotiate ‘a curve’ as well as a ‘peace-treaty’. However, there is a use of the term in symbolic interactionist social theory, where it stands for social interactions out of which meanings arise (see Blumer 1986). Latour and Woolgar appear to employ negotiation in this sense. Negotiation for them seems to be social interactions that set meanings of measurements, specifically whether they will or will not have meaning as facts. Further, they appear to believe that the fate of these negotiations depend upon micro-political processes influencing individual scientists, which micro-politics is influenced by macro-political realities such as funding and/or ideology.

Facts *can* be negotiated in this sense. Consider the following example. There is a generalization to the effect that, ‘democracies do not make war against democracies’. This

generalization is accepted as true by some in mainstream U.S. social science.[29] The generalization has political and moral implications favorable to democracy; because the more democracies there are, the less war there will be; a good thing. However, the theoretical concept 'democracy' is ambiguous, vague, and vast in scope. This means that a number of different sensational concepts could be appropriate to it. For example, the existence of a 'voting system' for political office is generally seen as a sensational concept that specifies whether a polity is, or is not, a democracy. Actually, in conventional U.S. political science, only certain types of voting systems really qualify as democratic: those in Africa do not, they are corrupt; those in the U.S. do, they are not corrupt. The sensational concept 'U.S. style voting system' has two states. Either a polity has or lacks a voting system.

A problem arises for the generalization that democracies do not fight each other with this understanding of democracy; because in 1954 and 1970 the U.S. government, covertly made war against the governments of Guatemala and Chile. These countries had governments elected by voting systems. Some might carp that their voting systems were not so democratic; not properly American. But this is balderdash. So, when voting system is made a sensational concept that indicates the existence of democracy, the facts of the matter are that democracies warred against another in 1954 and 1970. In this instance, the findings are negative.

However, another sensational concept can be proposed to indicate whether a polity is, or is not, democratic. This is 'the ability of citizens, regardless of wealth, to influence political decisions'. There might be two states of this term. Either rich folk are more likely to influence decision-making, in which case a polity is an oligarchy; or everybody equally influences decision-making, in which case a polity is a democracy. The degree to which the wealthy have more influence in political decision-making in the U.S. is a contested issue. There is a body of findings indicating the U.S. to be rather oligarchic.[30] However, if using the second sensational concept, the U.S. is not a democracy, then the finding regarding the generalization that 'democracies do not war against democracies' is quite different. The fact of the matter, now, is that a non-democracy (the U.S.) attacked a democracy (Chile). This finding constitutes positive evidence in favor of the generalization. The point here is that what are

[29] The generalization that democracies do not war against each other, at least very often, originated in Kant's *Perpetual Peace* (1795). Support in favor of the view has been forthcoming (see, for example, Lake 1992, and Mintz and Geva 1993), even in anthropology (Ember, Ember and Russett 1992). There have been some negative views that pose the question: Is this 'Kant or Cant' (Layne 1992).

[30] The literature supporting the belief that the U.S. is oligarchic ranges from muck-raking best-sellers like Greg Palast's *The Best Democracy Money Can Buy* (2003) to left-of-center classics like C. Wright Mill's, *The Power Elite* (1956). U.S. liberal academics cannot bear to admit to oligarchy. Thus, Samuel Huntington announces that, 'American political institutions are more (…) democratic than those of any other major society (…)' (1982: 14). However, in the same article in which this quotation appears he is quite willing to acknowledge that some in the Right believe the U.S. is an oligarchy, stating, 'Traditional conservatives may also perceive and take comfort in the realities of power (…) that exist in the United States behind the façade and rhetoric of equality' (Ibid: 12).

considered to be the facts depends upon which sensational concepts are negotiated to be those used to validate a generalization.

But, this does not mean that reality does not cause the sensations whose measurement is the substance of facts. What is negotiated is what sensational concepts are chosen to represent a theoretical concept. When it is said that facts are negotiated it means that under different sensational concepts different observations will qualify as being a sensation base that provides positive or negative evidence, i.e., the facts. It does not mean that the substance of the fact itself, i.e., the sensations in the observations, is subject to negotiation. Here reality intrudes and makes the sensations that make the observations that are the basis of fact. Negotiation of sensational concepts selects where to observe. Observation produces the substance of what is observed.

So the important question is: How does an investigator distinguish between better and worse sensational concepts? A better sensational concept is an accurate one. Three minimal criteria need to be satisfied for accuracy. A sensational concept should be a notion within the sub-set of the set of the theoretical concept. Further, it should have states that are capable of being observed. Finally, a sensational concept is better the more of the reality of a theoretical concept it allows to be observed. The first two criteria are important because they insure that the observations made are of the reality pictured in the theoretical concepts. The third criterion is important because it allows a more complete set of sensations to be produced concerning the reality pictured in the theoretical concept. Taken together, the three criteria contribute to more accurate concepts. Fear that facts are 'theory-laden' or that they are negotiated should not be used to rationalize diversion from a central work of *vulcanistes*; the making of accurate concepts. Now, let us return to developing a *vulcaniste* approach to approximate truth. We left this labor after suggesting there is reason to believe that a generalization has some approximate truth if there is positive evidence from at least one confrontation. But how can one have greater confidence in this truth?

Approximate Truth II: Reliability, validation histories, and hard truths

The search for greater confidence in truths is the search for approximately truer generalizations. Other things being equal, provided that there is accuracy, a generalization is approximately truer the higher its validation history places it on a validation hierarchy. Approximate truths with the highest placement on validation hierarchies are known as 'hard truths'. The notions of validation history and hierarchy need to be explained in order to grasp the meaning of this assertion. However, their explication depends upon a further exposition;

that of Peirce's views upon the role of agreement in truth. It is to this latter exposition that attention now turns.

Peirce wrote an article entitled *How to Make Our Ideas Clear* where he ventured, 'The opinion which is fated to be ultimately agreed to by all who investigate is what we mean by truth (…)' (1958b: 133). So truth is what is 'agreed to' by those 'who investigate'. Pretty clear? This position seems parent to Rorty's previously discussed view that truth is what a community of us agrees upon. There is, however, a difference between Peirce and Rorty's views. Rorty's truth seems to be a conspiracy theory. It is what groups scheme to believe as true. Peirce's truth is what a group is 'fated' to believe, and fate is determined by 'external things'. This view is clarified by considering some of the letters Peirce wrote when older.

Peirce had a correspondence, towards the end of his life, with Lady Viola Welby, who shared his interest in semiotics. In the course of their communication, Peirce reviewed and summarized his position, and in a 1909 letter to Lady Welby concerning truth he explained that reality,

> '(…) is such that whatever is true of it is not true because some individual person's thought or some individual groups of persons' thoughts attributes its predicate to its subject, but is true, no matter what any person or groups of persons may think *about it'* (Peirce 1958: 419; emphasis in original).

There appears to be a contradiction in Peirce's views on truth. He wrote in 1878 that truth was what was 'agreed to' by those 'who investigate'. However, three decades later, he informed Lady Welby that something was true 'no matter what any (…) groups of persons may think (…).' How does one resolve the apparently contradictory statements of 1878 and 1909? One way of doing so is to simply ignore the 1907 letter. This appears to have been the road traveled by Rorty.

Another interpretation, one that I find more compelling, returns to other, earlier statements in which Peirce talks of both truth and agreement. These statements can be found in, *Critical Discussion of Berkeley's Idealism* (Pierce 1958a [1871]). Here he said,

> 'There is, then, to every question a true answer, a final conclusion, to which the opinion of every man is constantly gravitating. He may for a time recede from it, but give him more experience and time for consideration, and he will finally approach it' (Peirce 1958a: 81-82).

This quotation concerns individuals, and asserts that a person will find truth given 'more experience and (…) consideration'. A few sentences on in the same paragraph he puts individuals into groups and it is here that the question of agreement is broached. Peirce stated,

> ‘On many questions the final agreement is already reached, on all it will be reached if enough time is given. The arbitrary will or other individual peculiarities of a sufficiently large number of minds may postpone the general agreement in the opinion indefinitely; but it cannot affect what the character of that opinion shall be when it is reached. The final opinion, then, is independent (…) of how you, or I, or any number of men think’ (Ibid: 82).

Peirce’s position, if one puts the two previous quotations together, is that given ‘enough time’, there will be a concurrence concerning truth of what a group of individuals’ ‘experience’ and give ‘consideration’. It is this which is the ‘agreement’ that Peirce is talking about.

Why will such agreement come about? This question is answered in the paragraph following that of the previous quotation, where Peirce says,

> ‘(…) to assert that there are external things which can be known only as exerting a power on our sense, is nothing different from asserting that there is a general *drift* in the history of human thought which lead it to one general agreement, one catholic consent. And any truth more perfect than this (…) is a fiction of metaphysics’ (Ibid: 82, emphasis in the original).

Thus, Peirce’s understanding of agreement is not some gentleman’s conspiracy, where the truth is anything a community confabulates. Rather truth is what a particular community, that of ‘investigators’, is ‘fated’ to believe following their investigations. Fate is not understood here as superstition or chance. Rather it is ‘(…) that which is sure to come true (…)’; as, for example, Peirce reminds us, ‘We are all fated to die’ (Peirce 1958b: 133). How do investigators know the true fate of things?

The answer to this question leads to Peircian agreement and a new view of commonsense. Ultimately, this knowledge is through ‘experience and (…) consideration’. One investigator has ‘experience and (…) consideration’ of one reality, and observes that something always happens there. Another investigator has ‘experience and (…) consideration’ of the same reality, and observes the same something happens. Still other investigators have the same ‘experience and (…) consideration’ of the same reality, and the same something happens. This is Peircian agreement: investigators’ concurrence that the same somethings occur in the same experienced realities. Why does this agreement occur?

Because, according to Peirce, each individual investigator, experiencing the same reality, comes up against the same ‘external things’ that exert ‘a power’ over the ‘sense’. The implication here is that given ‘enough time’ investigators will recognize that the same ‘external things’ have the same ‘power’ over ‘sense’. So each individual becomes part of a community defined by the agreement of the senses. One person observing another for ‘enough time’ senses that the other will die. A second person, observing someone for ‘enough time’ senses that someone will die. Every Person who observes Every Other Person for ‘enough

time' eventually senses it. The agreement here comes from observations that produce commonsenses; and this 'commonsense' is agreement about that which is fated to occur. We die. Otherwise put, finding the truth – or the approximate truth that we are satisfied with – is in some measure a matter of commonsense.

It might be objected that Peirce is forgetting the infinite variety of culture, and that people's sensational terms for their sensations are as varied as these cultures. I would argue that the sensational terms of science are made for their accuracy and their inter-subjective service. They are not, or should not, be infinitely varied; rather they are, or should be, only those terms which, because of the greater accuracy are preferred for measuring sensations as sensational terms. What is going on when investigators are given 'enough time' is that *vulcanistes* are making concepts that are as accurate as possible representations of their senses.

This interpretation of Peircian agreement and truth might be put in our *vulcaniste* terms as follows:

1. Observations of reality cause sensations in the brain. This is Peirce's 'external things exerting a power on our sense'.
2. These sensations, given 'enough time', acquire accurate sensational and theoretical terms. This is what happens if more and more investigators have 'more experience and (…) consideration'.
3. Some sensational and theoretical terms are observed to be connected, so that one set of such terms may be sensed to bring about another set of such terms. This is Peircian truth: where it is known '(...) that which is sure to come true.'
4. Peircian truth depends upon Peircian agreement which is commonsense: large numbers of investigators, utilizing accurate concepts, agreeing that the same causes explain the same effects.
5. This truth is an approximate truth because it is knowledge of the 'power' of 'external things' over 'sense'; not of any truth of those external things in themselves.

Finally, Peircian agreement, commonsense, is about reliability. Reliability concerns how often something said to happen happens. What is supposed to happen with a car is that it drives. If it breaks down a lot, it does not drive as much. It is unreliable. Thus, the more that investigators share a common sense of how 'external things' produce other 'external things', the more reliable is their knowledge. Hard truths, once the best accuracy possible has been achieved, are generalizations with the most commonsense and reliability.

Peirce talked only in the broadest sense of how investigators achieved such agreement. I suggest below that validation histories and hierarchies are tools for investigators in anthropology, or other human sciences, to discover the reliability of their common experience, thereby to arrive at the commonsense necessary for judging the approximate truth of their generalizations. Commonsense will again be about 'getting high'. Though this is a different high from that discussed in the section of the essay concerning generalization. This first high was of fabricating more abstract and more general generalizations. The second high, currently under explication, has to do with position in a validation hierarchy.

Validation History I: The evidential ladder

The 'higher' a generalization is in a validation hierarchy depends upon the amount of commonsense there is concerning it. What the investigators are agreeing about is the particular validation history. A validation history is a record of investigators' confrontations of a generalization with reality. Such a history is based upon 'validation episodes', a particular instance of the confrontation of a generalization with the reality to which it pertains. Specifically, then, a 'validation history' is the record of all the validation episodes made by investigators bearing upon a particular generalization. Their 'agreement' is a quantitative concept. It is the number of times that the findings of validation episodes of different investigators agree. They may agree that their validation episodes provide positive or negative evidence concerning a generalization. The function of validation histories is to establish the reliability of a generalization. The more extensive a generalization's validation history; with the more commonsense of positive findings; the greater it's approximate truth. However, the confrontations in validation episodes may provide different amounts of information about the reality being observed, and the *vulcaniste* ethnographer needs a way of estimating how *much evidence* is provided by particular confrontations. This brings us to the idea of an evidential ladder.

Vulcaniste ethnographers might be thought of as climbing a step-ladder when they acquire more positive evidence validating a generalization. This 'evidential ladder' has steps concerning how much of the reality pictured in a generalization is observed in a confrontation. Specifically, the steps of the ladder involve four criteria for evaluating the amount of positive evidence in a single validation episode. These 'steps' include, first, the degree to which there are observations bearing upon sensational concepts that pertain to *all* the theoretical concepts in the generalization. The second step is whether there is evidence that observations are representative. The third step is whether there is evidence of temporal order. The fourth step concerns the existence of evidence of production.

Representativeness, temporal order, and production need to be explained. ‘Representativeness’ refers to whether the observations have been in some way biased to obscure the sensing of a reality that pertains to a concept. For example, if the concept in use is one of ‘people’ and observation is made only of males, then the observations are biased towards men and against women. Evidence that is either unrepresentative or not known to be representative is incomplete in the sense that it does not provide observations concerning the reality it is biased for or against, or it is unknown what it may be biased against.

Evidence about temporal order and production is data relevant to causality. A causal generalization proposes that events in reality happen in different spaces and times. First something happens in one space; next something else happens in another space; with the first something being antecedent in time and a cause of the second something, which is a subsequent effect. For example, it is widely accepted that a strong punch causes a knockout. ‘Temporal order’ is measurements of observations indicating that the antecedents and consequents are in their proper order. First you see the punch strike, and then you see the man collapse unconscious. Additionally in causal generalizations the causes bring about, i.e., ‘produce’, the effects. ‘Production’ is evidence that shows how it is that a cause is able to produce its effect. Perhaps, a punch brings about a knockout because it induces agitation in the brain. Production is in evidence if there are measurements of brain agitation after the punch and before the knockout. Let us climb the steps on the evidential ladder.

A first step on the ladder would be positive findings concerning some, but not all, of the states of sensational concepts and relationships in a generalization. If such evidence exists, and there is no information concerning representativeness, temporality and production, then the confrontation has boosted the generalization one step up on the evidential ladder. For example, I conducted ethnography to explain low fertility among women in a Chadian ethnic group called the Barma, in the late 1960s and early 1970s (Reyna 1972, 1975). This fieldwork was a validation episode. The episode sought to validate the truth of the following generalization:

> A conjunction of a certain type of procedural culture concerning natality and marriage practices caused a high incidence of pelvic inflammatory disease (PID) which, in turn, caused low fertility.

This generalization suggested that Barma women had few children because they experienced a high incidence of PID, which scarred closed the fallopian tubes preventing conception. Barma women had a high incidence of PID because their procedural culture drove them to want many children. However, men had to pay bridewealth to marry. The costs of bridewealth were high, roughly equivalent to buying a house in the U.S.. So men had to postpone marriage

for a long time until they acquired the bridewealth. During this time they were not celibate. Rather, they tended to sleep with unmarried women from whom they acquired venereal infections. Then they married much younger women, and passed on their illnesses to their wives. Such women, due to these illnesses, either had no children or only a single child. At this point the cultural pro-natalism became relevant. Women with no or only one child were failing their procedural culture. This was a ground for divorce. Divorce sent the women back into a population of women with whom young, unmarried men had sexual relations.

The research provided measurements of the states of sensational concepts that were relevant to the low fertility, the procedural culture relevant to children, and marriage practices. Barma *were* highly pro-natalist. They *did have* high bridewealth. They *did have* a high age differential between men and women. At first marriage, the men were about eleven years older than their wives. Barma women *did have* low fertility. However, there was no evidence, one way or the other, because I could not acquire it, of PID. Thus, this research was a first step of the evidential ladder. Let us climb another rung on the ladder.

If a validation episode includes data concerning the states of sensational concepts bearing on *all* the theoretical concepts in a generalization; if this data is that which the theoretical concepts specify it should be, but there is no information concerning temporal order, productivity, or representativeness; then the validation episode was more positive than is the case in partial validation episodes. The validation episode is a second step on the evidential ladder.

For example, certain anthropologists believe that where people live after marriage (post marital residence) is related to whether there will be clans and lineages in non-state, food producing societies (see Harris 1997: 268-269). Specifically, they generalize:

> Different forms of post-marital residence are a cause of different forms of descent groups.

The argument is that virilocal and/or patrilocal post-marital residence causes patrilineages or patriclans; while uxorilocal or matrilocal post-marital residence causes matrilineages or matriclans. There are two theoretical concepts in this generalization and one relationship. The theoretical concepts are ‘forms of post-marital residence’ and ‘forms of descent groups’. The relationship is one of causation. There are problems validating this generalization because no ethnographer has ever witnessed the emergence of descent groups. Rather, the evidence used to validate it comes from measuring whether in non-state, food-producing societies, particular forms of post-marital residence are found in association with particular forms of descent groups. This evidence comes from a sample of societies that are included in the Human Relations Area Files (HRAF).

Positive evidence supporting the generalization would be measurements that indicate:

1. When the married couples go to live with the husband's kin after marriage then there are kin groups based on patrilineal descent;
2. When the married couples go to live with the wife's kin after marriage, then there are kin groups based upon matrilineal descent.

Tulio Divale and Marvin Harris (1976) provided evidence from the HRAF bearing upon the states of these two concepts.

RELATIONSHIP BETWEEN RESIDENCE AND DESCENT

Postmarital Residence

Kin Groups	**Matrilocal or Uxorilocal**	**Avunculocal**	**Patrilocal or Virilocal**	**Other**	**Total**
Patrilineal	1	0	563	25	588
Matrilineal	53	62	30	19	164

Source: Harris 1990: 268

They generally found, when husbands went to live with their wife's kin after marriage, that people belonged to kin groups where they said they were descended from a founder of the group through a line of females. They also generally found, where wives went to live with their husband's kin after marriage, that people belonged to kin groups where they said they were descended from a founder of the group through a line of males. Such findings indicate that the forms of post-marital residence associated with the forms of descent group are those predicted by the generalization. However, the evidence provided by Harris and Divale provides no measurements as to what came first, the descent groups or the post-marital residence. Nor does it provide evidence about how post marital residence brings about (i.e. produces) descent groups. Finally, there is no knowledge whether the societies included in the HRAF are representative of all the non-state, food producing societies that have ever existed. Thus, the confrontation of the generalization with the facts was positive, but there is no information concerning temporality, productivity, and representativeness. Harris and Divale's validation episode might be said to have moved their generalization a second step up on the evidential ladder. If at some time it was ascertained that the sample of peoples from which the Harris and Divale findings are based is representative of all human populations, then the

validation episode would mount to a third step on the evidential ladder. It is time to be moving on up the ladder.

If in a complete, representative validation episode there is evidence of temporal order, but none of productivity; and if the temporal evidence is positive; then the confrontation is higher on the evidential ladder. Such a validation episode is positive, complete, representative, and exhibits temporality. It is now four steps up on the ladder. Let us consider a generalization this high on the evidential ladder. It has been asserted that regressive taxation is related to social inequality. 'Taxes' are compulsory transfers of money (or other forms of wealth) from private individuals or groups to the state. Taxes are 'regressive' if they take a larger percentage of the incomes of poorer citizens than of richer ones. Governments are said to move to more regressive taxation when they decrease the percentage of income taken from higher income citizens. Some social scientists have offered the following generalization:

> Regressive taxation legislation in advanced capitalist states causes increased social inequality.

The sensational concepts that measure the states of these two theoretical concepts are 'actual votes in the U.S. Congress enacting tax legislation benefiting the rich' and 'actual counts of who gets what amounts of wealth in the U.S.'. A confrontation would produce positive evidence if it was observed that there were votes in the U.S. Congress that benefited the wealthy, and that this was followed by a situation where wealthier people had more wealth and everybody else had the same or less wealth.

Such a confrontation has been made for President Ronald Reagan's administration where it has, indeed, been observed that the U.S. Congress enacted as the laws of the land various regressive taxation measures. For example, the U.S. top-bracket income tax was 70% of taxable income in 1980; declining during the Reagan presidency to 50% in 1983 and 28% in 1988. It is further observed that afterwards a few wealthy people got wealthier, while much of the population had the same or reduced amounts of wealth. For example, average household net worth increased for the wealthiest 1% of households by 42.2% between 1983 and 1998, while average household net worth declined for the poorest 40% of households by 76.3% over the same period (Wolff 2000). Finally, there is temporality in this evidence. First, the tax laws were voted on; then the inequality rose.[31]

It might be suggested that the sample of advanced capitalist states is unrepresentative, because the evidence is drawn only from the U.S. However, there is evidence from advanced

[31] Positive evidence concerning the generalization discussed in the text can be found in Batra (1996) and Phillips (1990).

capitalist states in Europe. Though the evidence is contested, it generally appears that these states had less regressive forms of taxation and lower levels of social inequality in the 1980s and 1990s. This finding is positive vis-à-vis the generalization under consideration and it additionally suggests, with the evidence coming both the U.S. and Europe, that the findings are representative. A validation episode utilizing data from both Europe and the U.S. is likely to be representative, positive, complete, and reveal temporality. It is a fourth step on the evidential ladder.

Finally, it turns out that there is information bearing on productivity in the tax legislation/social inequality generalization. Regressive tax legislation produces inequality by reducing the tax revenue of the wealthy. There is causal production here. Every wealthy person's dollar not lost to taxation produces an additional dollar for that person's wealth. There is evidence that this is exactly what occurred after Reagan's regressive tax legislation; but again there is no conclusive evidence that what happened once in the Reagan years is representative of what would always happen in all instances of regressive tax legislation. If, however, such a study was performed, and if the findings were positive, then, there would be a representative, complete validation episode with evidence concerning temporal order, temporality, and productivity. Such a validation episode is five steps up the evidential ladder.

This section has discussed validation histories in terms of their rspecific constituents, validation episodes. The following section places validation episodes within validation sets that are themselves parts of validation universes.

Validation History II: Validation sets, universes, and hierarchies

A 'validation set' is the set of all validation episodes bearing upon a specific generalization. Validation sets have their 'confrontation records', which are the number and types of positive and negative confrontations among the different validation episodes composing the entire set. The 'type' of a positive confrontation refers to how high on the evidential ladder a generalization has climbed. If the confrontational record of a validation set is entirely positive and if those positive findings tend to be high on the evidential ladder; then the approximate truth of the generalization undergoing validation may be said to be reliable. However, if the positive confrontational record in a validation set consists of but a single validation episode, and if the positive finding is fairly low on the evidential ladder; then the approximate truth of the generalization undergoing validation is tentative.

Explicit formulation of validation sets is not part of current anthropological practice, so it is not possible to specify with any certainty the confrontation records of particular generalizations. However, a generalization was advanced by certain 19th century unilinear

evolutionists concerning whether the 'uncivilized', be they 'savage' or 'barbarian', were lazy. L.H. Morgan, for example, referring to Native Americans, tied the simplicity of their economies to the absence of a 'passion' that drove those in their 'race' to become 'civilized'. Morgan generalized,

> 'The great passion [for economic gain] of civilized man (…) never crossed the Indian mind. It was doubtless the great reason for his continuance in the hunter state, for the desire for gain is one of the earliest manifestations of the progressive mind. It (…) has civilized our race' (1851, insert added for clarity).

Herbert Spencer agreed with Morgan. The 'inferior races' were 'impulsive'; so they 'will half starve rather than work (…)' (1883, vol.1: 66). The scourge of laziness was deplored by colonial administrators determined to get the 'savages' to work for their colonizers. One such administrator in what is today Zambia in East Africa complained that his natives were 'incorrigibly lazy' (in Richards 1939: 398). The generalization here is, 'Members of inferior races are lazy'.

Such a generalization might be thought of as a somewhat premature ejaculation. After all, as Malinowski said in the early 1920s, concerning economics, 'There is no other aspect of primitive life where our knowledge is more scanty (…)' (1922: 84). Social anthropological research altered this situation. Malinowski's own work on the Trobriand economy in both *Argonauts of the Western Pacific* (1922) and *Coral Gardens* (1935); Firth's on Tikopia in *Primitive Polynesian Economy* (1939) and Audrey Richards' on the Bemba in Zambia, about whom the administrator had said such a nasty thing, in *Land, Labour, and Diet* (1939), provided detailed observations on the economies of those said to be of 'inferior races'. These accounts provided validation episodes from which the evolutionary evolutionists' claim that the 'inferior races' were lazy.

For example, Malinowski documented in *Argonauts* that one aspect of Trobriand culture was the belief that certain objects called *vaygu'a* – principally bracelets (*mwali*) and necklaces (*soulava*) – were of immense value and, hence, desirable to possess. He further observed that a particular form of distribution, called the *kula*, in which Trobrianders made long ocean voyages exchanging *vaygu'a*, was an important way by which the Trobrianders could satisfy their goal of acquiring value. In fact, most of the *Argonauts*' text can be read as a documentation of how hard the natives worked (building canoes, sailing canoes, etc.) to acquire value. After reading *Argonauts*, pundits might fault Trobrianders for putting their faith in bangles, but they could not fault them on their work ethic to get those bangles. A tacit criticism in Malinowski's text was that the natives would labor for themselves, not their colonizers.

Malinowski's validation episode observed work among a so called 'inferior race', who even Malinowski called 'savages'. But, and this is crucial, the 'savages' really worked hard; though not at what their colonial dominators wanted them to do. This finding was a negative one concerning the unilinear evolutionary generalization. People of an 'inferior race' did work hard. It might be observed that Firth's and Richard's findings generally supported those of Malinowski. Accordingly, by the 1940s a validation set existed that consisted of at least three validation episodes all of which had negative findings concerning the 'inferior races'/laziness generalization. This meant that the findings of the confrontations were in agreement about the generalization, 'it is approximately untrue that there was a relationship between race and laziness'. Finally, let us consider validation universes and hierarchies.

Up to the present validation has only been concerned with a single generalization. However, it is desirable to validate two, or more, generalizations at the same time. This can be done through the creation of 'validation universes', which are two or more validation sets, for two or more generalizations, dealing with the same reality. This means that the confrontation is one between how different generalizations correspond to the same reality. The construction of validation universes is not part of the conscious, explicit practice of current anthropology. However, to illustrate what such a universe might look like re-consider two dueling generalizations concerning laziness. Remember that there was a unilinear evolutionary contention that, membership in 'inferior races' determines laziness. Recall further that the Malinowskian riposte to this was that,

> Cultural preferences determine value, and that people will be lazy about working for what is unvalued.

These two generalizations deal with roughly the same reality, that of people working. The findings of validation episodes conducted by Malinowski, Firth, and Richards findings, which are fairly anecdotal, and would not be especially high on any evidential ladder are negative for the first generalization and positive for the second.

This leads us to the notion of a validation hierarchy. It is possible, if investigators have carefully calculated the scores on the evidential ladder of validation episodes, to calculate the positive or negative bearing upon a generalization in a validation set. This might be done by adding the evidential ladders' scores for the different validation episodes of a validation set. It is, in principle, possible to do this for every validation set of every generalization in a validation universe. Finally, it is possible to analyze which generalization in which validation set has the highest positive findings. Thus understood, a 'validation hierarchy' is the distribution of validation set scores in a validation universe. Further, the generalization,

assuming equal accuracy for all concepts, with the highest validation set score is the most reliable commonsense says that it is the most approximately true generalization in that validation universe.

Recall the very simple validation universe composed of unilinear evolutionary and Malinowskian accounts of laziness. The score for the validation set concerned with the unilinear evolutionary generalization is likely to be negative; while the score for the validation set bearing upon the Malinowskian generalization is likely to be positive. Thus, in this validation universe the validation hierarchy suggests the Malinowskian view to be approximately truer than that of the unilinear evolutionists. Of course, other validation universes might have other validation hierarchies, and hence, other approximate truths.

Now it is time to conclude the arguments, discover what Zeus understood, and go our separate ways.

What Zeus Understood?

Zeus understood nothing. He could not. He was make-believe. There are no gods: no Hermes, no Jehovah, and no Allah. These are fables. There is only reality: frozen, hot, dark, brilliant, stretching infinitely in space and time, coming at you like a subway out of a tunnel. Humans are a miniscule speck in this reality. Some very powerful humans are, like Plato's Hermes, 'deceivers with words'. These hermeneuts exert themselves to hermetically seal you into a world of enchantment. Enchanted you act according to your beliefs in fables, while the subway bears down upon you. What is to be done?

Forget Zeus, forget Hermes, and forget the human enchanters. Begin to labor at the art of science. Science avoids *diktats* to construct truths. Some constructions are better than others. To build better truths, hold discussions concerning how to forge truth, as we have just done, with James or Peirce, or with others, whom you may prefer. There is a vision of the hero here. S/he is not a warrior, a priest, nor a priest-scientist. S/he is an ethnographer, a worker at the art of the science of truth; in my terms, a *vulcaniste*.

In this essay the work has been about how to construct approximate truth. The art of its making is a reflexivity of a number of people working together. What they make with their reflexivity are generalizations, some of which are theory. Generalizations have been imagined as related representations; generalization-pictures of concept pictures of the same reality at different levels of focus. Generalizations are constructed through validation, which is a matter of commonsense. Commonsense involves establishing validation histories for generalizations. Validation histories are composed of validation episodes, with evidential ladders, that are

parts of validation sets which in turn are parts of validation universes. Different generalizations in a validation universe have different positions in validation hierarchies; and those generalizations that in the commonsense of *vulcanistes* are higher in the firmament of these hierarchies are hard truths. Heroes construct such truths.

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