Reality for Cybernauts

Sergio Sismondo
September 1997

Introduction : virtual reality as a metaphysical laboratory

Virtual Reality (VR) is a wonderfully successful misnomer. To the extent that VR is reality, there is little virtual about it.

I should qualify those claims right away : virtual reality is virtual in the derivative sense in which "virtual" has come to be a synonym for computer-based, but that sense is a result rather than a precondition of VR's cultural success. VR has provided a path from an old meaning of "virtual" to a new one. The old meaning, what we could call virtual-1, is : in effect, but not actual. The meaning that is new to the last decades of the 20th century is virtual-2 : simulated on or mediated by a computer.

Many cybernauts have realized that VR is not merely virtually-1 real -- an oxymoron ? -- and therefore are arguing that it is virtual-2 reality, real but computer-based. In so doing they have not merely added a new meaning to the term "virtual", but have revamped talk of reality. At a time when skeptical humanists and others are more and more cautious about reality, VR enthusiasts are giving new life to words like "real" and "reality", using them constantly, and with a variety of meanings. The best VR is described as "really real" and is contrasted with "real reality", yet neither phrase fully makes sense without at least some confusion about meanings of "real". At the same time, some cyberphiles and cybercritics have been proclaiming the death of reality. If we could create environments that have the look and feel that we expect from everyday reality, what is left of the "real" thing ? Why should we care about it ?

Michael Heim says that "with its virtual environments and simulated worlds, cyberspace is a metaphysical laboratory, a tool for examining our very sense of reality" (83). Heim may be right that cyberspace -- or in my case VR -- is a metaphysical laboratory, but his laboratory is largely unbuilt. Currently-available VR, for example, is more crude as a metaphysical laboratory than are our imaginations, literature, and thought experiments. For my purposes the limitations of existing VR are unimportant : my intention here is, following Heim, to use VR to examine "our very sense of reality", but in that I want to look at our use of the term "reality" and the presuppositions of that use. Along the way I take issue with some of the wilder claims about VR's effects on reality.

Although there is no one consistent picture of reality implicit in talk about VR, there are at least some common images. Some of those images are exactly what are needed to revamp talk of reality, and some are misguided. Some VR talk, for example, reinforces an impoverished sense of reality in its dominating images of levels and degrees; my preferred images are more chaotic and multi-dimensional. In order to show why we should prefer some images of reality, in the second half of this essay I put forward a general account of reality talk. That account makes space for (though does not guarantee) the reality of VR, and much more besides.

For my project here we do not have to be full-fledged cybernauts. That is a good thing, because this essay is written by yet another interloper into VR. I haven't made the tours of labs where systems like RB2 ("Reality Built for Two") or gadgets like the DataGlove have been developed. I spend little of my time browsing *Mondo 2000*

, and have tested out only the most publicly available virtual environments, computer games like *Doom*, and high-tech video games like *Dactyl Nightmare*. Donning the latter's 3-D video helmet and battling its schematic pterodactyls even put me off-balance and made me slightly nauseous. All of that should place me as a text-based critic whose access to VR and cyberculture is largely through the guidance of texts. Therefore my text displays many signs of my interloper status, in the form of references to the canonizers and the canonized agents of the history of VR.

The virtualization of reality ?

> Our point is thus a very elementary one : true, the computer-generated "virtual reality" is a semblance, it does foreclose the Real; but what we experience as the "true, hard, external reality" is based upon exactly the same exclusion. The ultimate lesson of "virtual reality" is the virtualization of the very "true" reality : by the mirage of "virtual reality", the "true" reality itself is posited as a semblance of itself, as a pure symbolic edifice. (Zizek 44)

For some cybernauts (and their critics) VR promises (or threatens) to limit or even eliminate the claims of the material to its status as reality. At Britain's first VR conference in 1991, as Benjamin Woolley describes it, speakers such as chair Tony Feldman repeatedly claimed that because of the power of technology to simulate and otherwise artificialize objects, "reality is no longer secure, no longer something we can simply assume to be there" (5).

At their simplest, such arguments have been around since people first asked whether they could be dreaming reality. Descartes' almost paranoid musings, reconstituted as Meditations, are probably the best known sustained questioning of our evidence for the reality of our everyday world. Descartes asked, could he be dreaming it all ? Or, since we all know how to tell the difference between waking and dreaming, could a powerful Deceiver be systematically and consistently creating our experiences, convincing us of the reality of a completely fictional material world ? We know the results of Descartes' questions : although he made valiant efforts to prove the reality of the world around him, most of his readers have been unconvinced. His efforts to vanquish skepticism reinforced it by demonstrating its resilience. Of course while it has been resilient, universal skepticism has rarely had much force. This is not merely because of our naive ordinary faith in the material world : pragmatists have argued that doubts such as might lead to a Cartesian Deceiver themselves require some justification. It might simply be unreasonable to follow Descartes in doubting everything, even if only for a few minutes.

For some of its enthusiasts, VR provides grounds for such a doubt. In the passage above, Slavoj Zizek appears to be taken by a new, or future, capacity to question the reality of non-virtual reality. VR will provide the skeptic's reinstatement of the Cartesian Deceiver by creating sensations indistinguishable from ordinary, everyday sensations. What we call "real" will become simply one world to live in among many, and a relatively conservative and unimaginative one at that. Timothy Druckrey claims, reading these lines of Zizek, that "what is so fascinating about the issues of immersion and virtual reality is the way in which it substantiates the problem of representation itself" (8).

It is hard to be too impressed by such sophomoric skepticism, even if it is widespread. It is little more than an advertisement for VR technologies and VR as a cultural icon, or, for those who are uncomfortable with the disappearance of a hard "reality", an anti-advertisement : consider Mark Slouka's recent *War of the Worlds: Cyberspace and the High-Tech Assault on Reality*. Certainly commentators like Druckrey and Zizek are not talking about available technologies -- the simulators found in corners of the post-industrial world -- because

those are little more than poor 3-D video games, expensive but crude, and are less capable of sustaining one's attention than most 2-D video games of a decade ago.

I will return to the question of whether VR will ever be able to deceive its participants completely; however, my main point is not to express pessimism about technologies. Rather, I'm interested in examining our sense of reality. Any thought that VR will be the twenty-first century Deceiver, providing grounds for a universalized skepticism, appears to take reality as the object of possible sensory experiences. Most of the major problems that VR researchers are working on have to do with visual and tactile realism : they are working to create better video displays, faster calculations that will lead to faster responses to users' actions, and improvements and extensions of the DataGlove that will allow users to feel more of their virtual environment. In this way VR is following in the footsteps of the Cartesian Deceiver -- and begins to provide the grounds for a universalized skepticism -- because what it aims to deceive us about is material reality, our paradigmatic reality.

VR's model reality

> True virtual reality may not be attainable with any technology we create. (Zeltzer, qtd. in Heim 123)

David Zeltzer, of the MIT Media Lab, doesn't like to use the term "virtual reality" to refer to his creations, preferring instead "virtual worlds" and "virtual environments". This stems less from uneasiness with the term "reality" than from an uneasiness about his tools. "The Holodeck [a Star Trek VR system] may forever remain fiction. Nonetheless, virtual reality serves as the Holy Grail of the research" (Zeltzer, qtd. in Heim 123). We may never be able to re-create the full experience of working with and in the material world using computers, video, speakers, data suits, etc. Unlike some VR enthusiasts, Zeltzer recognizes the richness of ordinary sense experiences, and the difficulties with the technology in reproducing this richness.

More importantly for my purposes, Zeltzer makes explicit the goals, even if unattainable, for VR : the technology is supposed to recreate the type of experiences we have of the material world. VR is therefore a virtual material reality, a computerized simulation of mountains, trees, buildings, bodies, and flies. VR aims to create human-centered spaces which users can explore, containing objects to manipulate. These spaces are wrapped around users and adjust to their efforts at motion, so that they always remain at centers or origins. VR is a simulation that takes as its starting point the everyday space that we experience ourselves moving in, and our everyday world of moderately small to moderately large material objects. This is probably so obvious a starting point that it is important to point out some alternatives, such very real things as institutions, ideas, and cultures, none of which is neatly bounded in 3-D space. Some of these things are being re-created in cyberspace more generally, but are not the focus of virtual reality. For the purposes of VR, reality is paradigmatically a spatial and material system.

At this point I want to mark a difference between cyberspace and virtual reality. Cyberspace, as used in, for example, Michael Benedikt's *Cyberspace: First Steps,* is the more inclusive category, a label for any computer-generated or computer-mediated environment that is accessible by multiple users, including environments that are in no way imitations of material realities. In fact, many of the contributors to Benedikt's volume are explicitly attempting to describe novel architectures for such spaces. Some of their work is fascinating for its sophisticated interdisciplinarity, combining readings of science fiction, mathematics, psychology, data management, and architecture. For my purposes it is interesting that these authors generally avoid the term "virtual reality", suggesting that they recognize constraints and limitations of "realities" that can be more easily evaded by "spaces".

Reality as a singular closed system

> Quadriplegics live, virtually, through the actions of others. Perhaps, life would be more fulfilling if they were also offered the opportunity to directly control their environment through telerobotic tools for independent living. Virtual telerobotic environments for the rest of us could bring reality to these individuals. (Leifer et al., qtd. in Rheingold 264)
>
> When VR becomes widely available, it will not be seen as a medium used within physical reality, but rather as an additional reality. VR opens up a new continent of ideas and possibilities. (VPL Research product brochure, qtd. in Pimentel & Teixeira 53)
>
> It is an apolitical fantasy of escape. Historical accounts of virtual reality tell us that one of the initial project's slogans was "reality isn't enough anymore", but psychoanalytic accounts would more likely tell us that the slogan should be read in its inverse form -- that is, "reality is too much right now". (Sobchack 20)

Whether reality is too much or not enough, most VR enthusiasts and their critics agree in taking the reality/irreality boundary to be a relatively sharp one -- even while they are trying to blur it or are claiming that the technology will change that distinction fundamentally. And thus they agree in their image of reality as a closed system and neat package, much like the systems that are being built. The VR designing firm VPL Research is creating not parts of the world or new views of the world, but worlds themselves, alternatives to the world we know as real. Non-virtual reality is singular in the past and present; it is the three-dimensional space that we live in and will continue to live in until VR creates new spaces. The creation of new spaces, though, introduces questions about the geometry of reality.

Consider, for example, the following statements, all taken from Howard Rheingold's *Virtual Reality* : "The reality level is rising by the month" (214); "How much reality do you get for all that money ?" (166); "Reality has always been too small for human imagination" (Laurel, qtd. in Rheingold 391); "a new plane of reality that will thrill everybody" (Lanier, qtd. in Rheingold 155); "A laser microscanner will paint realities directly on the retina" (Furness, qtd. in Rheingold 194). VR enthusiasts are united in believing that new technologies will increase the quantity of reality available, but they do not agree on how that increase will be measured. Will we be able to buy reality, as if by the kilo or the yard ? Will we be enlarging it ? Or adding new planes to it ? Or creating new realities, plural ? Their disagreement stems from the fact that we don't know much about the current geometry of reality and realities, conceived of as objects, stuff, or measurable quantities. Perhaps "worlds" share the geometry of realities; importantly, we often use "world" in much the same way as we use

"reality". The idea that reality comes in planes, for example, may be descended from a medieval picture of layered worlds, from ours down to Hell and up to Heaven; each has its own rules, logic and inhabitants, though individuals also move or are moved among worlds depending upon their powers and virtues. If a reality is a world, this gives us both the sense of space and the sense of substance.

Reality is an odd substance, though it shouldn't be surprising that VR researchers can think of it as one. According to the self-image and hype of the VR community, researchers are not merely in the business of creating 3-D video games or creating simulations of environments, but are creating real worlds to work in, play in, and explore. VR researchers are trying to make reality or realities, and to make something is to make some thing. But even though the common perception has it that reality is a singular closed system, and the VR community treats reality as a substance to be manufactured, we don't know whether it is best pictured in planes, as more amorphous stuff, or as an indivisible unit. A good account of reality should develop and make sense of as many of these metaphors as possible, to allow us to understand how reality is planar, or how the reality level of VR is rising.

The body as foundation and target of VR

> With virtual realities upon us, we may find it increasingly difficult to distinguish between our "natural" selves and the electronic extensions. (de Kerckhove 177)
>
> I think one of the striking things about a virtual world system in which you have the pliancy, the ability to change the content of the world easily, is that the distinction between your own body and the rest of the world is slippery. (Lanier & Biocca, qtd. in de Kerckhove 203)

VRs are ideally tactile environments, full of sensual experiences. More centrally, the technology makes use of body knowledge, our ability to respond physically to situations, to communicate using more than our vocal chords or the tips of our fingers. VR treats us as fully embodied creatures and then stimulates and trains our bodies in ways that are appropriate to the virtual environment. Until now the most convincing of virtual environments have been the US military's flight simulators; they place the pilot-in-training in an artificial cockpit, complete with visual displays that respond with subtlety to physical commands. Other activities that involve high levels of risk, skill, and money -- medicine is an obvious domain -- will probably be similarly simulated over the coming decades. And one other prominent attempt to produce and use body knowledge is the simulation, using VR techniques, of the tinker-toy models chemists use to gain insight into the structure and properties of molecules. VR revalidates, in a high-tech setting, body knowledge, and thus takes us away from a logocentric mode, away from some of our modern ideals of rational control and communication.

Yet cyberculture is the culmination of those same modern ideals in its recognition and attempted erasure of the limitations of bodies. Dominant metaphors make bodies soft and weak compared to silicon-based entities. William Gibson's futuristic characters are exemplary in this, displaying cybernauts' contempt for flesh, or "meat", as it is often called (I should clarify, however, that Gibson's "Matrix" is not a VR, even though it has some cultural continuity with VR). Gibson's best bodies are largely artificial, enhanced through muscle implants and rigorous physical training; Molly, of *Neuromancer* and *Mona Lisa Overdrive* fame, is the favorite, a feminine cyborg for hire, complete with rewired nerves that speed up reaction times and razor-sharp retractable claws that slice through too-slow meat. Gibson's other freaks abandon their bodies, sometimes for long trips on the net, and other times for good. Molly's counterpart Case also has a tight, wired body, but because of the neglect that comes from too much drugs and too many hours exploring the Matrix. Lise of Gibson's short story

"The Winter Market" is a down-and-out mindscape artist held together and dragged through life by a polycarbon prosthetic. When she makes it big she can afford to abandon the prosthetic and what is left of her body in favor of a fully electronic simulation of herself. This is not a fascination peculiar to Gibson. In the 1992 film *The Lawnmower Man* the central character abandons his body for an electronic life. Among cyberspace residents he is an oddity, because he abandons an exemplary body, flawed only in its materiality. Abandoning the body, or at least the flawed bodies we are saddled with, is an ideal built into VR. Meat holds cybernauts back, limiting their informational excursions. The virtualization of the body, then, is a goal in part because the body represents an unfortunate link to a material reality that "isn't enough anymore". Virtualizing the body is a special case of the virtualization of reality as a whole.

Margaret Morse's fascinating paper "What do Cyborgs Eat ?" points out that the construction of the cyborg body represents an accommodation of the human to the machine (see also Stone). This accommodation leaks from the pages of cyberpunk novels into everyday culture in the form of an anorexic ethic of not eating. For cyborgs the smart drug -- "a kind of lubricant or 'tune-up' for wetware" (Morse 161) -- or some other goal-specific nourishment replaces food, because human-machine interactions demand a machine-like performance from mind and body. Although Morse's call for reversing this human-machine relationship suggests a nostalgia for human autonomy, it is rooted in a realization that meat-based systems are not infinitely flexible, that cyborgs need to eat. This is an important limitation of VRs : as long as they are realities designed for humans, they are limited by the needs of our soft bodies. Overcoming these limitations is central to cybernautic fantasies, but before VR can serve as a surrogate Deceiver it will have to deceive the body. Technicians will have to answer Morse's question, "What do cyborgs eat ?", to allow users to live in VR and not just to visit it. Just as we know the difference between dreams and waking experiences, because we dip in and out of dreamworlds, we are likely to know the difference between VR and less artificial experiences until we no longer have to dip in and out of VR. Fooling the body is perhaps just the hardest case of a more general problem of robustness : it is unlikely that VR technologies in the foreseeable future will deceive us in their realism, and therefore David Zeltzer is almost certainly right that Zizek's Virtual Deceiver is a Holy Grail, an unreachable goal.

Simulations and artificial realities

Zizek's observation that VR virtualizes reality is more complicated than Druckrey or I (in paragraphs 7-10 above) gave him credit for. He carefully distinguishes between the "Real" and "reality" : whereas the "Real" is the hard kernel that we must posit as resisting metaphorization, "reality" refers to our experiences. And our experiences, following Lacan, are framed by our fantasies. Zizek is modifying and extending the idea that categories are prior to experiences, where the relevant categories are many, varied, and pliable. In particular, he takes sex as paradigmatic reality and "sex" as a paradigmatic category. Our experience of sex with a flesh-and-blood partner, he claims, is experienced as sex to the extent that it matches our fantasies, sex with imagined partners. Rather than being a poor copy of real sex, masturbation is the model of which sex is the copy. If we take sex as paradigmatic, then our experience of the "true, hard, external reality" can only be based on virtualizations of that reality. Zizek is not claiming, then, that VR will conform itself to experiences so closely as to provide a new Deceiver, but that VR will produce new types of experiences of non-virtual realities. In this respect VR will be like many other aggressive technologies and media, especially film, Zizek's main focus.

Of course sex is an odd choice for paradigmatic reality, being more obviously responsive to our fantasies than most other things we take to be real. But the argument does not depend in any important way on that choice : a more cautious version of Zizek's argument could accept our standard paradigms, the material world and its objects. Experiences of some virtual reality might still tend to produce new types of experiences of the paradigm. After long sessions of playing a computer video game, my driving -- in my true, hard, external car --

changes, and in ways that are easy to detect. I am more inclined to pose challenges, to take advantage of openings in the road. This is one small way in which the artificial changes the boundaries of the real.

Myron Krueger raises a similar point :

> But what of a world in which every action is rehearsed in simulation before it is taken, as was the case for pilots during the Gulf war ? Will real action lose its immediacy when it is but a recapitulation of simulated activity ? (Heim ix)

Krueger's concern about immediacy is a concern about those boundaries. If we try to make our experiences of "true reality" mimic our experiences of simulated reality, as the US military attempted in the Gulf War, then we may be giving up some of the immediacy of those experiences of "true reality". In the case of the Gulf War, a lack of immediacy was exactly the object, helping to distance the participants from the objects of their attacks; this may be, as Paul Virilio would suggest, only the most recent and most successful use of representional technologies to mediate and contain experiences of battle (50). As experiences lose their immediacy, what we experience loses some of its status as reality -- reality seems less real.

Simulations and authenticity

> [S]imulation threatens the difference between the "true" and the "false", the "real" and the "imaginary". (Baudrillard, Simulacra 3)

Virtual reality is a simulation of space and objects in space, but, as Jean Baudrillard has pointed out, simulations are odd entities. Whereas a representation, at least since the demise of the picture theory of language, need not resemble the objects or relations it represents : at its core a representation is a coded description, expression, or portrayal; a simulation, by contrast, re-creates some of the characteristics of that which it simulates, even while it is a copy or fake. For this reason simulation threatens the difference between the real and the irreal.

Like Zizek, Baudrillard starts from an interesting and complex set of examples to make his point vivid : religious icons, Disneyland, ethnology protecting the isolation of a society, and illnesses, particularly mental illnesses. "Whoever fakes an illness can simply stay in bed and make everyone believe he is ill. Whoever simulates an illness produces in himself some of the symptoms" (Littré, qtd in Baudrillard, Simulacra 3). Simulations are fakes, but they are fakes made by appropriating qualities of the real. They are thus themselves real -- though Baudrillard prefers to say that they are "hyperreal" because he conceives reality in terms of depth, stasis and authenticity. The reality of simulations is a second way in which VR enthusiasts are right in their claims that VR is changing the boundaries of the real. To the extent that VR has qualities of reality it can become a reality.

Just before the beginning of the 1991 Gulf War, Baudrillard wrote a now almost infamous article insisting that the war in the Gulf would not occur ("La guerre du Golfe n'aura pas lieu", published in the Manchester Guardian as "The Reality Gulf"). In part this insistence reflected his firm belief in deterrence, and in part it reflected his belief that coming out of the standoff there were only many-layered images of war, images which bore no resemblance to actual wars, though they did resemble some Hollywood films. For Baudrillard Saddam Hussein was, through his use of hostages, engaged in a simulation of war. As if to insist that his first article not

be read as a simple mistake, during and after the war he wrote and published two more installments -- the three were later published together under the title, "La guerre du Golfe n'a pas eu lieu". Despite the soldiers, the bombs, the deaths, Baudrillard insists that what happened was not a war, but rather a simulation of a war, or a hyperreal war. Unlike past wars, fought primarily for territory or political control, the Gulf War was fought primarily for the sake of images. A war for the sake of images, Baudrillard claims, is not authentic, but a simulacrum.

For Baudrillard, like many others, reality has to be in some way authentic or natural. It is arguable, though, that his concern with authenticity is dated, at least for those of us who have always lived in artificial surroundings. His concern that reality has disappeared depends upon a nostalgic view of reality as profound. Because much of our environment, from the Simpsons to supermarkets, has no pretension to naturalness or authenticity -- and we recognize this in part because of the work of commentators like Baudrillard -- these criteria can now be disengaged from reality. If we live among simulacra, images which do not pretend to refer, then so be it : reality has ceased to be necessarily authentic. All that is added in calling these simulacra "hyperreal" is attention to their artificiality, the deliberateness of their invention. A modern supermarket is a crafted environment that bears no resemblance to the markets which were its ancestors. A successful television show refers to itself, its counterparts, and its immediate ancestors, not to some external reality. External reality refers to it.

A Platonic critic

> Reality is still there, though not in the material realm of the physical universe where the modern era assumed it to be. In my attempt to distinguish between simulation and imitation, the virtual and the artificial, I have tried to provide a glimpse of where that reality may be, in the formal, abstract domain revealed by mathematics and computation. [T]he computer has, through its simulative powers, provided what I regard as reassuring evidence that it is still there. (Woolley 254)

Benjamin Woolley is unimpressed by VR and unimpressed by arguments for the disappearance of reality. In his *Virtual Worlds* he presents us with a litany of sexy new technologies, mathematical and scientific theories, and postmodernist arguments, though his message is consistently anti-euphoric : as the subtitle to the book advertises, his exploration is a Journey in Hype and Hyperreality. Whereas VR enthusiasts tend to see the technology as breaking new frontiers and re-arranging consciousness, Woolley prefers to draw attention to VR's more mundane roots in flight simulators. He points to the failures of artificial intelligence research to live up to early promises; he wonders why we should care about chaos theory, why we should have cared about catastrophe theory during its heyday; he argues that the Internet is only the latest network; and he insists that Baudrillard's Gulf War that did not take place most definitely took place, even if it was shaped by the demands of computers, other high-tech devices, and audiences expecting a Hollywood war.

Woolley is still fascinated by these over-hyped postmodern cultural developments, even if he wants to expose the modernity at their cores. While he doesn't accept Baudrillard's conclusions, he is bothered by the same developments that Baudrillard celebrates, in part because the two critics share an image of reality. The material world is becoming increasingly artificial and inauthentic; it imitates -- though rarely lives up to -- our ideals. And these changes are disturbing not just because of the type of change they are, but because they highlight the instability of the material world. Artificiality and instability are both symptoms of irreality, because for Woolley that which is most real is natural and enduring, not artificial and fleeting.

Umberto Eco, who was disappointed with the real Mississippi, claims that "Disneyland [with its riverboats] tells

us that technology can give us more reality than nature can" (44). Woolley is similarly disappointed with his real Mississippis, but doesn't find their improvement in technology, at least not directly. Rather he looks to mathematical physics and its kin for an authentic world, because mathematical physics is the most revered of sciences, and science is the attempt to uncover reality. The physicists' world, a world of mathematized laws and snapshots, apparently satisfies Woolley's requirements of reality, because it is objective, natural and enduring -- Woolley would not be too happy with recent discussions in the field of Science & Technology studies (see Sismondo). The physicists' world is objective both in the sense that it is (assumed to be) external to us, discovered rather than invented, and in the sense that science is our best example of objective knowledge. If the book of nature is written in the language of mathematics, then the physicists' world is as natural as is possible. And it is enduring because even when laws describe change they are always structural, always identifying what remains the same through time, or through some other variable.

For Woolley, computer simulations spread artificiality, but they also reinforce his position. Along with physics the simulation power of computers tells us that the book of nature is written in mathematics, because simulations are done mathematically : the more that can be simulated the more nature is shown to roughly instantiate a Platonic reality. Woolley's reality is Platonic because it is an abstraction away from the world as we experience it, an ideal description of the forms and structures that lie behind or underneath our experience. He would be uncomfortable, though, with the Platonic notion that ours is only an imperfect copy of a more real world of forms, because he thinks that that ideal reality is found embedded in the natural world.

This version of reality is quite austere, limited to the structures of the natural world that can be described mathematically. Austerity is a calculated impoverishment, though like most austerity programs Woolley's follows some traditional paths. As I've claimed, the attention of VR enthusiasts and their critics is on the material world, rather than the social world : even though interaction is a goal of VR, the real world of institutions is usually forgotten, or even deliberately excluded. Partly because of that exclusion commentators such as Woolley and Baudrillard see reality as static -- this is not to say that material reality is static, but it is often conceived in terms of what remains invariant.

"Real" deflated

> I want to take a closer look at this little word "real". I propose, if you like, to discuss the Nature of Reality -- a genuinely important topic, though in general I don't much like making this claim. (Austin 62)

Talk of and around VR, then, provides us with a number of characteristics of reality. One option is to dismiss this mess as the product of overzealous enthusiasts and critics, and to retreat to a reductive and monovalent account of reality, such as a materialist account or Woolley's physicalist one. I think that that is the wrong option to take. Even putting VR aside, reality is too multifaceted, or there are too many types of realities, to be shoehorned into a reductive account. Instead, in the rest of this essay I reorganize and unify characteristics of realities in a flexible deflationary account. I want to understand reality in terms that recognize the insights and temptations of different cybernauts' images of reality, even those that I criticize, like Baudrillard's authenticity criterion. My account is deflationary in the sense that it flatly denies an ultimate reality, though not so deflationary as to deny characteristics that realities might have.

A currently fashionable, though not popular, account of what is real in philosophical circles stems from J.L. Austin's simple and elegant analysis of our concept of "real" in his *Sense and Sensibilia* (1962). Writing before

the language-expanding days of the 1960s, Austin could easily argue that "real" gets its meaning from its use as an adjective : it only makes grammatical sense if it modifies an explicit or implicit object. You might have a real Roy Liechtenstein painting or a fake one, or an imitation or print. You could have seen a real Peregrine Falcon, or have been mistaken, having seen a Pigeon Hawk from a distance. Or I, arriving in the middle of your story, might think that you are talking about a real Peregrine, while you are talking about a striking film of one, or a dreamt one. What is important here is that "real" draws a contrast to one or another form of unreality. A real X is nothing more than an X, though in saying that it is a real X we emphasize that it isn't merely something that looks like or feels like an X, something that could be confused for or used as if it were an X. Thus Austin could claim that the negative of "real" -- the different forms of being unreal -- shapes the usage of the positive, not the other way around. What is real depends upon the illusions or artificialities that we want to distinguish, isolate, or avoid in some particular context. Real is therefore context-dependent.

"Reality", Austin presumes, marks the same or a closely derivative contrast. To my mind one advantage of such an account of reality is that multi-dimensionality jumps out of it immediately, eliminating any possibility of a singular, ultimate reality. Austin uses a number of different examples, but the one that he uses most to show multi-dimensionality is color. The real color of some object can be the color it appears to most observers in ordinary light. But the "real color of her hair" usually refers to its natural color, not the color it appears. The problems for real colors don't stop there, as Austin asks about, among other things, the real color of the sun, of a chameleon, and of a pointilliste painting which creates a green effect through combinations of blue and yellow dots.

The case of art makes multi-dimensionality particularly clear. One can see a real Liechtenstein painting (or a print of a Liechtenstein, materially real in itself) and still ask, is it real art ? For that matter, is it a real frame of a comic strip, or a fake one ? Or one could see a fake Liechtenstein that is nonetheless both a real painting and real art; perhaps it is a comment on Liechtenstein, or simply an interesting derivative. The planes of real Liechtensteins, real works of art, real paintings, real comics, and the like intersect, and may have considerable overlap, but they also go off in their own directions. There are multiple realities, and any particular thing both is and is not real, depending on the reality one is concerned about. Like real things, reality is context-sensitive. This casts serious doubt on whether we could ever arrive at a substantive account of reality beyond Austin's.

We shouldn't assume, though, that Austin's discussion of "real" translates unproblematically into an account of "reality"; in fact to assume so would run counter to the spirit of his analysis, in spite of his coy suggestion that he is discussing the "Nature of Reality". Austin's focus on uses of "real" rather than "reality" has the advantage that the former is used much more often and in a wider variety of circumstances than the latter. But "reality" is an abstraction from and nominalization of "real", and as such affords some slightly different characteristics. Whereas Austin could correctly claim that "real" was "substantive-hungry" (primarily an adjective), "reality" is itself substantive. And "reality" is much less dependent upon its negative uses than "real", though its opposition to such non-reality as fantasy, dreaming, and hallucinating is still quite important. The translation from adjectives (and adverbs, such as "really") to nouns does not go perfectly smoothly. Talk around VR can help to map out some of the bumps and twists in that translation, through the distinctions that VR researchers are trying to make when they claim that VR is virtual-2 (computer-based) rather than virtual-1 (in effect) reality.

Paradigms and property-clusters

The main lesson of Austin's analysis is that there is no one concept of the "real", that the word takes on meaning in relation to context and the ways of being unreal in context. Thus if we want to look for meanings of "real" we should, among other things, look to those negatives of real. Austin's partial list includes the adjectives artificial,

fake, false, bogus, makeshift, dummy, synthetic, and toy, and the nouns dream, illusion, mirage, and hallucination (71). This list is not complete, and could grow longer with the growth of methods of simulation, representation, and reproduction. If we suppose that reality is a systematic set of real things, then reading his list should convince us to give up hope on an ultimate reality. At the same time such a list provides an interesting cluster of properties of the real and the unreal. To a large extent this cluster of properties also applies to reality and unreality.

One way that property clusters hang together is seen in accounts of meaning in terms of paradigms or prototypes, and their extension. The set of paradigmatic games -- Wittgenstein used this example to criticize an essentialist conception of meaning -- might include a counter game, like backgammon, and a more active game, like tag. Other games have some of the characteristics of the paradigmatic ones : to classify a new activity as a game is to make a, supposedly principled, extension from the paradigm. Such a picture would allow us to make sense of the fact that solitaire and football are both games even though they have little in common. For a large and complicated class like games, paradigms and their extensions might have become quite complicated, as paradigms have shifted, and new extensions have suggested some quite unobvious other ones. If a paradigm story can be told about reality, it is probably simpler than the story one would tell about games, because we have had relatively little occasion to talk about realities. Nonetheless, it would be a story that leaves a flexibility, openness, and pluralism to reality. I have already indicated how my story about reality would go : our most obvious paradigm reality is the three-dimensional space we live in, along with the most natural of the material objects it contains. This is the reality that we most often refer to when we use the phrase, "in reality".

The phenomenological tradition has a similar understanding of paradigmatic reality. For example :

> The world of working as a whole stands out as paramount over against the many other sub-universes of reality. It is the world of physical things, including my body; it is the realm of my locomotions and bodily operations; it offers resistances which require effort to overcome; it places tasks before me, permits me to carry through my plans, and enables me to succeed or to fail in my attempt to obtain my purposes. By my working acts I gear into the outer world, I engage it. (Schutz 226-7)

Phenomenologists such as Alfred Schutz and Edmund Husserl build philosophical systems on the basis of assumptions implicit in the way that we deal with perceptions. Husserl and Schutz pare their available philosophical resources down to the level of perception, and then attempt to rebuild some of the richness of our world, particularly some of our understanding of the objectivity of our world, out of their remaining resources. "Reality" poses a special problem for phenomenologists, because before it is possible to ground objectivity in subjectivity one has to be able to distinguish among perceived worlds, to distinguish between the everyday world that will become the locus for objectivity and a dreamt world. That it is a special problem does not make it a particularly difficult one, because phenomenologists are content to draw on, articulate, and refine the resources that are normally used to distinguish everyday reality and dreams. But their pared-down resources do not allow them to say in advance that dreamed worlds are anything less than fully real, and thus they are easily drawn to talk about multiple realities (Schutz 207-59).

Paradigmatic reality, in combination with other uses of the term and the debate around the status of VR, gives rise to a cluster of properties that a reality might have. These properties give us some touchstones for determining whether something is or is not a reality, or conversely, define normal extensions of the paradigm into new situations. My incomplete list of such properties has it that reality might be material, three-dimensional, immediate, engaging, objective, enduring, robust, natural, manipulable, interactive, and systematic. As the term "reality" is being used today, realities should have some, but not necessarily all, of these properties. The sections that follow briefly describe these properties, and justify them as properties of realities.

An aside on the social world : considering how objective and important the social world is, it is perhaps surprising that it is not more central to our paradigm. It is objective because, although it can be affected, it is usually experienced as a given, fixed in place by the actions of innumerable other actors. At most times change comes slowly to institutions like the legal system, gender and class structures, your local bank, and holiday traditions, because they are held in check by people's expectations and the sanctions that occur when expectations are violated. Their objectivity is a product of their externality, their location outside of particular individuals and their actions. But this is what makes them real, things that we can count on at least as much as we can count on bits of material reality. Less firm are such small institutions as close friendships and other interpersonal relations. We routinely distinguish between real friendships and surface ones, or ones that can't be found outside of very limited contexts; our criteria have to do with robustness, or their liveliness under pressure.

Material, three-dimensional

I've already argued that VR researchers take materiality and three-dimensionality as the core of reality. Reality's materiality is what makes VR virtual reality, and VR's three-dimensionality is what makes it virtual reality. But interest in those properties of everyday reality is not restricted to VR researchers : materiality and three-dimensionality are important properties marking a good chunk of everyday reality. For my purposes here I am more interested in focusing attention on other properties of potential realities.

Engaging, immediate

> By leaving the world more abstract, versus building in more realism, Mark could draw users deeper in. Abstraction isn't a reason to reject VR worlds as being unrealistic. (Pimentel & Teixeira 151)

Realism can be unrealistic. This conundrum derives from a description of the efforts of Mark Bolas, President of Fake Space Labs, to create engaging spaces, spaces into which people can easily become immersed. Engaging spaces are ones in which people can lose a sense of their normal material and social environments, usually by forgetting or ignoring the mechanisms producing their experiences -- something which some well-crafted literature, film, and theatre accomplishes (Laurel, Computers 15-16). Bolas, along with most VR researchers, initially tried to make his environments into copies of material environments; in his case they were copies of offices. But the detail intended to help his virtual offices mimic material ones didn't help to make them engaging. This suggests that, at least at the level to which Bolas could accomplish it, mimicry was the wrong strategy. Instead Bolas found that people could immerse themselves more easily into environments that were quite different from their accustomed ones. Rather than using space-filling programs to create texture he left the pieces of his virtual offices as unadorned polygons. Mimicry calls material environments into play, while anti-mimicry allows users to leave behind their material settings. Mimicry suggests mediation, because it is a representation. Anti-mimicry can create immediacy, because it is a presentation.

Immediacy and engagement are related goals of all VR inventors, who want to draw users into the worlds that they create; they are even goals for such an anti-euphoric commentator as Brenda Laurel, who wants to encourage computer interface designers to create spaces in which "the representation is all there is" (Laurel, Computers 17). Immediacy and engagement are also criteria for the reality of virtual environments, among the features that make some VR "really real". Clearly our paradigms of reality meet these criteria. Our experiences of material reality are what define immediacy, and most of us are immersed in and engaged with paradigm realities most of the time. What is interesting about Bolas's work is that he discovered that these goals are separable from faithful representation -- what we normally call realism -- and they are separable from the other

features of paradigm realities; this separability is something film-makers have often recognized. To make immediate and engaging environments one may be better off making them quite different from ordinary material reality. Therefore Bolas's research concretely suggests that the qualities of reality are decomposable.

Objective, enduring, robust

Dreaming, fantasizing, hallucinating, and simply being wrong are some of the common ways that people leave reality. Hallmarks of the unreality of these flights are, I would claim, their subjectivity, their lack of materiality, and their transience. Paradigmatic reality is objective because it is felt and seen by many people, or could be, while paradigmatic unrealities like dreams or hallucinations are by definition subjective, being internal to the dreamer or hallucinator. In part the objectivity of reality is caused by its materiality and endurance : reality is hard and lasting while unreality is soft and fleeting. To find out whether you are dreaming you pinch yourself, and test the hardness of the world you are in. Reality bites. Even the social world is hard when real.

As I am using it, robustness is a close kin to endurance and objectivity. Robustness is the ability to persevere through a variety of contexts and circumstances. The distinction between experimental artifact and experimental reality is usually made in terms of robustness. It is also a criterion we might use to discover the reality of various parts of the social world. Peter Berger and Thomas Luckmann create a unitary definition of social reality around robustness when they say that what is real is what cannot be "wished away" (3); a related unitary definition is that what is real is "what resists all attempts to change it" (Taylor 353). Although I would reject all such unitary definitions, they can be put to use in the creation of a more multi-dimensional picture.

Manipulable, interactive

Both manipulability and interaction are characteristics that VR designers have attempted to build into their systems. All VR takes as a central goal the manipulation of the virtual environment, usually through direct bodily contact. In this it corresponds to phenomenologists' descriptions of everyday reality. Schutz, for example, calls that reality "a world of working" because it is manipulable, even while it offers resistances. And part of working is working with other people, who are treated as actors in their own right. It is clear that VR should ultimately be multi-user : almost from its beginnings VR's ideals have included the possibility of multiple users interacting -- virtual sex, the safest of sex, is at the forefront of the public imagination of VR. The Reality Built for Two system attracted so much attention because it was a step toward multiple user VR, even while it was expensive (originally US$430,000) and limited. Of course, letting human interactions into one's picture of reality complicates matters, because it simultaneously makes the reality that VR tries to simulate richer, and, following Vivian Sobchak, draws our attention to the escapism implicit in VR euphoria.

Natural

A somewhat more tricky criterion of reality is naturalness. Middle-sized natural objects such as rocks, trees, and flies are paradigmatically real things, and thus Samuel Johnson didn't kick a wall in his attempt to pragmatically refute skepticism about material reality, but rather a rock. A real friendship is one that is natural, not forced. The real color of one's hair is its natural color, before dyeing, tinting, and highlighting. When we contrast a real phenomenon with an experimental artifact we are aiming at naturalness, because although in the laboratory everything is artificial some things are taken as standing in for nature. And when Baudrillard and Woolley respectively celebrate and lament the passing of reality it is in part because of the increasing artificiality of our world, the increasing extent to which everything around us is human-made.

Systematic

We speak of different worlds having their own rules. Therefore I want to end my list of characteristics of reality with a Platonic insight, the insight that reality has qualities of coherence and interconnectedness, or systematicity. It is systematicity that allows us to talk of a reality or a world, for otherwise what would hold it together ? This may seem odd, because we don't necessarily experience our everyday reality as systematic. In the context of VR Brenda Laurel says, for example, that "the well-designed world is, in a sense, the antithesis of realism -- the antithesis of the chaos of everyday life" (Pimentel and Teixeira 157). Yet despite this, design is precisely what Laurel recommends being incorporated into VR and more mundane computer interfaces, drawing from the lesson of theatre (Laurel, Computers 125-61).

Our paradigms of reality, at least since Darwin, are not designed but rather accrue through the workings of chance and mechanistic laws. Nonetheless, chance and those mechanistic laws lend our paradigms a coherence, if only a postulated coherence. Our world can look unified by accepted understandings and explanations of its current state, plus the understandings that we assume could be available. It is partly for this reason that Woolley is attracted to mathematical physics as picking out and describing what is most real : physics claims to present a coherent picture, giving us a relatively small number of rules or laws under which our universe operates, and claiming that those rules are in some sense fundamental.

Conclusions : So what about VR ?

VR promises to have many of these properties of paradigmatic realities. The effort to create three-dimensional worlds is at present what defines VR research. Researchers also hope to make these new environments immediate and engaging. At least some versions are already interactive and manipulable. Most VR will probably be quite systematic, stemming from relatively simple models, conceptions, and programs; the aesthetics of virtual environments also do not encourage contradictions. VR is objective in the sense that one virtual environment can be experienced by many people, though it is questionable that it is objective in the sense of existing in the absence of any perceivers. Yet VR is not natural or material -- the point is to create an illusion of materiality -- and lacks endurance in its dependence upon equipment which are external to the system. The reality of VR, then, depends upon our emphases, and upon how we are willing to project the notion of reality. For many contexts it will be perfectly reasonable to claim that VR researchers are in the business of making realities, but for some others we will want to deny exactly that.

One of my points here is to take the focus off particular characteristics of reality, such as materiality, three-dimensionality, and authenticity. I want to distribute the burden of reality more evenly. For example, if we focus on immediacy and engagement, three-dimensionality appears as one tool to these ends, though perhaps not a particularly interesting one. A child with Nintendo demonstrates that three-dimensionality is hardly needed for total absorption or capture. *Super Mario Brothers* can capture you and take you to a fantastic world, with no more than a 2-D screen and a joystick (as I write this, however, Nintendo is introducing "Virtual Boy", which extends Mario's environments to three dimensions. The player's motions still have to be translated through a joystick and buttons, and therefore to enthusiasts the set would not qualify as a step towards VR; it merely adds a third dimension to a video game). Quite often, film-makers capture audiences in their fictions, allowing viewers to forget the cameras, sets, and other scaffolding that hold up filmic worlds. But the point can be made without any such sophisticated equipment. A chess player explores a completely irreal, artificial environment -- an idiosyncratic, spare, finite, geometric battlefield -- and can become completely engrossed in the events. What is fascinating about 3-D in virtual reality is not 3-D itself, but rather the surprise of it; we are amazed by the technological prowess. In this respect it is not the realism of virtual reality that impresses, but its artificiality. Baudrillard makes a similar point, though for very different reasons : "why would the simulacrum with three

dimensions be closer to the real than the one with two dimensions ? It claims to be, but paradoxically, it has the opposite effect" (Simulacra 107).

If my account is roughly right, then the geometry of reality is complex. If they are planes, for example, realities intersect at multiple points not always on straight lines, although some realities may intersect nowhere even while they are not neatly parallel. The planes are given coherence by some combination of characteristics, which may not be put together in exactly the same way as those of any other plane. We can extend the scope of these planes simply by manufacturing more of the stuff that makes them up, a new bit of culture, a new gadget, a new plot twist, and so on. But we are not confined to old realities, because we can make new ones by analogy -- perhaps VR is one.

VR does not in itself threaten more standard realities, contrary to claims made by Druckrey and others. There have always been multiple realms that could be realities, including social realities, mathematical realities, and other structures that are robust and systematic. Such realities can coexist. At the same time, they are not entirely separable, because work in one or another of these often will have substantial effects on others : our physical landscape, for example, is shaped by its being also a terrain of social interactions. Realities and the structures that make them up can leak into one another. Thus VR, and cyberspace more generally, may have concrete and profound effects on other realities, as Zizek claims. But it does so as a virtual-2 reality, not as a virtual-1 reality.

I should now correct my opening claim. Right now virtual reality is a wonderfully successful misnomer. To the extent that VR is reality, there is little virtual-1 about it. Given enough time we might create environments that would be correctly called virtual-1 reality -- environments that are in effect real but in some way unreal, environments that are deceiving simulations of pre-existing realities -- but for the moment that seems both unlikely and relatively uninteresting. More fruitful, it seems, is to use computers and VR technologies to create new realities (virtual-2 realities), not to simulate old ones.