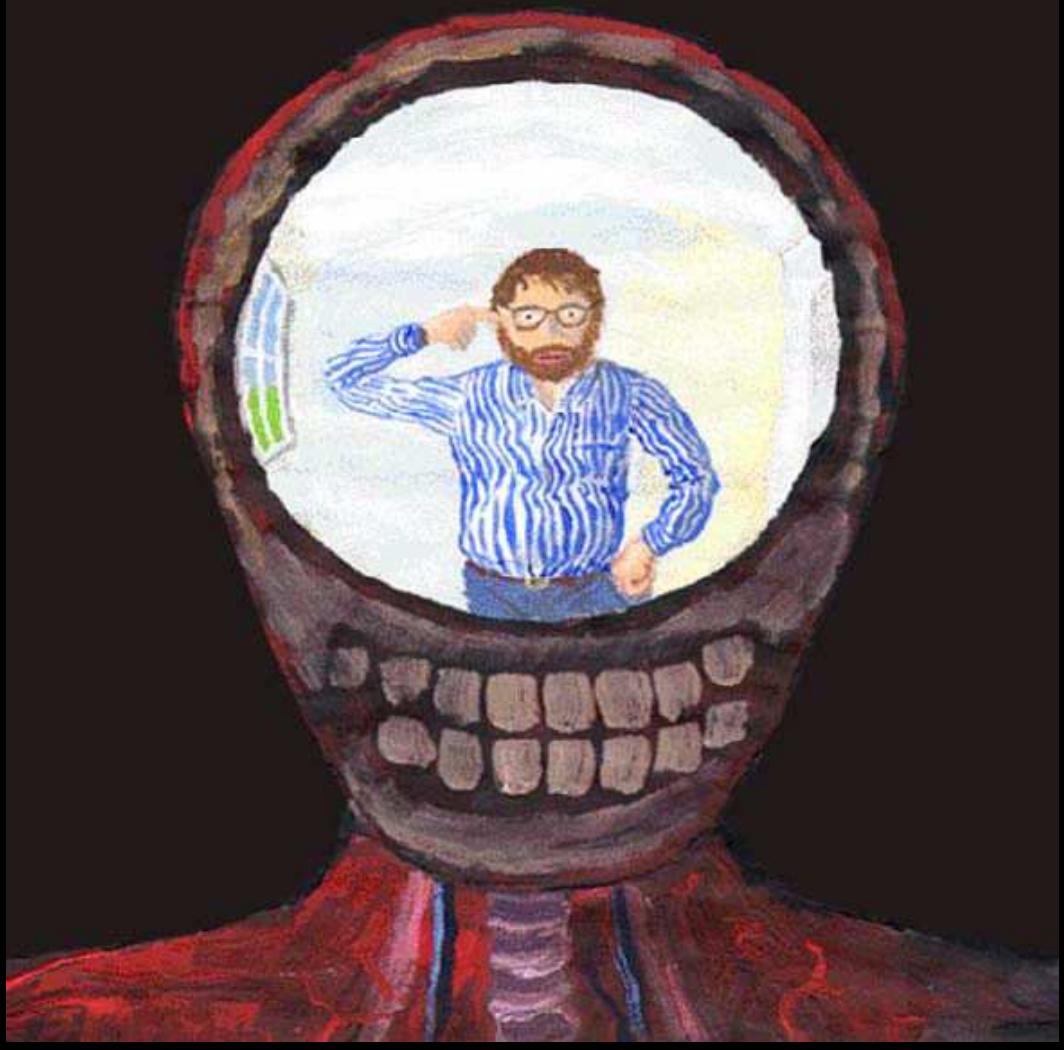
The Grand Illusion

A Psychonautical Odyssey Into the Depths of Human Experience

Steve Lehar



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This book is a complete and total fiction. Any resemblance between the characters in this narrative and real people, either living or dead, is either complete and total coincidence, or more often, deliberate misrepresentation for the purpose of humorous defamation of old friends. Nobody in the real world, including the author, is remotely guilty of any of the acts and practices committed by the wild fantasy characters in this book.

Preface

This book tells the story of my psychonautical exploits, from my early teen experimentation with alcohol intoxication, all the way to my most intense and dissociated experiences as a middle-aged adult, on a range of the most potent psychedelic and dissociative substances. Of course I am not the only person to have taken this path to inner discovery, by now there are millions who have explored the psychedelic realm, and a handful of them have even documented their experiences and the conclusions they have drawn from them. However in my own psychonautical journeys there is something truly unique and profoundly interesting that I have discovered which deserves to be shared, not only amongst my fellow psychonauts, but with the world at large, because what I have discovered is truly unique, with profound implications for the nature of our self and our place in the world, and how the physical brain generates that spectacular electric fluid magic lantern virtual-reality entity that we call mind. I have accomplished an age-old dream of spiritual pursuit, I have found enlightenment in the psychedelic experience, and it is an enlightenment not only of a purely spiritual dimension, but one with very concrete implications for the physical world known to science.

This book is not intended as an endorsement of the use of psychoactive substances, and God forbid that anyone should seek to emulate my life. I do not hold myself up as a role model to anyone. However this is a path I have chosen for myself, for better and for worse, because this is *my* life, its the only life I will ever have, and this is what I have freely chosen to do with it for myself. I did it because I *could*, and there are not many who are in the position to do what I have done. I sincerely hope that my discoveries will be of value to others. Truth be told, I am not a particularly admirable fellow. In fact, in the modern politically correct ideology, I am about as incorrect as I could possibly be. In an era when women and minorities are held in high esteem, I am a white male, soon to be a dead white male relegated to the back of the politically-correct bus. In an era when we admire those who achieve greatness despite disadvantages of birth and socioeconomic circumstances, I was born to wealthy parents with a silver spoon in my mouth, and for much of my life I did not have to worry about working for a living. In an era where hard work and achievement is most valued, I have led a life of self-indulgence and idleness. This is the circumstance that allowed me to “*turn on, tune in, and drop out*” for about a decade of my life, indulging myself in almost daily intoxication under one substance or another. My motivation began as a journey of self-discovery, pondering the primal question of what it is to be a living

conscious being. But as I began to make, at first, interesting observations, then later, profound discoveries, I came to realize that I had something of great value to offer, and my motivation gradually morphed into a scientific investigation, an objective report of subjective experience, and its implications for the nature of mind. I began to take careful notes either during, or shortly after my wildest trips, and to ponder their implications for the nature of mind and brain. This book is a report of my experiences in the wild and crazy world of psychedelic intoxication, and of the implications I have drawn from those experiences. I hope you will find them as profoundly moving as I have.

Chapter 1

A Budding Young Psychonaut

My very first awareness of the existence of mind-altering substances occured when I was a boy, maybe 10 or 12 years old, back in the late 1960s, when I saw a short news clip on television about that wild and crazy drug, LSD. They showed some crazy fish-eye lens and kaleidoscopic scenes from the movie Easy Rider, that depicts a warped and morphing world, with frenzied dancing to zany psychedelic music and all kinds of crazy antics. We were told that users would sometimes experience sounds as colors, or colors as sounds. Although this television segment was, of course, a propaganda piece designed to scare anyone away from ever wanting to do drugs, I remember thinking to myself at that tender young age, “Boy, would I just *LOVE* to experience that!” And although it was many years later before I even contemplated using controlled substances, of course I indulged in all of those childhood intoxications, such as spinning round and round till I was dizzy, hanging upside-down, and doing somersaults, or holding my breath, or breathing too fast, etc. Spinning is the real “gateway drug” that first introduces kids to altered states of consciousness that all children indulge in, to greater or lesser extent. But what is the allure of these de-capacitated mental states? Why on earth would we ever want to get dizzy, and see the world spinning round and round when we know perfectly well that it isn’t? Why do kids sit upside-down in an armchair, and imagine walking on the ceiling in an upside-down world? Why can’t kids just stay right-side up? There is a very deep and primal allure to the altered state of consciousness, that hints at a hidden world of forbidden knowledge. All of the illusory phenomena that children encounter, such as spoons that appear bent when inserted in a glass of water, and the moon that seems to follow us as we walk, and the after-images observed after viewing a bright light, suggest that all is not quite as it seems. That the world we see is somehow imperfect, and contains curious glitches and anomalies that suggest that the entire world of experience is a facade, an illusion, a misrepresentation of something more fundamental. The allure is to try to peek behind the curtain of the illusion and try to see what reality lies behind it. Psychedelic drugs are just the “extreme sports” extension of this most basic human urge to find the real truth behind experience.

Whenever you have an unreal experience, such as a dream, or a vivid hallucination, or the dizzy spinning of the world that you know to be stable, there

are two alternative explanations for what you are experiencing. Either the hallucination is an illusion caused by some kind of faulty wiring or design flaw in your own brain, or you have somehow become able to see an invisible reality that is every bit as real as the familiar physical world, and perhaps even more real. Maybe it is the familiar world of *consensual reality* that is an illusion, and the alternate reality is somehow more real than the one that we normally live in and share with other people. If we are ever to get our metaphysics straight, we must not come down on the wrong side of this most profound philosophical dichotomy. In the case of dizziness the answer is clear: Obviously I do not cause the solid ground underfoot to tilt and spin by simply turning myself round and round and stopping suddenly. There is obviously something out of kilter in my head when I am dizzy, not in the world. Nobody would argue that point. And yet very few of us consider the profound implications of that observation. For it means that the world we see around us is not the real world itself. Otherwise how could it spin and tilt when we know for a fact that the world itself isn't spinning or tilting? Under hallucinogenic drugs the visual world tends to shimmer and waver like the bottom of a swimming pool viewed through glassy surface waves. I know its not the world that is wavering, even though I see it wavering, so the world I am seeing must be a picture of the world not the world itself. But then if this is a picture, where is the real world that it is a picture of? I eventually found the answer to this profound question at the end of a long psychonautical odyssey, one that led me to sample some of the most potent and exotic psychedelic substances known to man. What I discovered was so profoundly moving and sobering, that it has affected me deeply ever since.

My first chemical intoxicant was alcohol. We lived in Germany at the time, and the first time I got profoundly drunk, it was on that excellent German Lager, Licher Bier, fresh from the cask, served on long tables in the beer tent at one of the many annual festivals of the village where we lived. (The Germans had a very enlightened view of young people drinking beer, at the time) That beer went down so smooth and cool, that I would drink one after another until I could drink no more. When it came time to walk home through the dark village streets, I found the world to be a very wobbly place. My body seemed to have much more momentum and inertia than it normally has, and the world tended to tilt and topple like the deck of a ship in a storm. I found it hilariously funny to see the world misbehave in this way. And it seemed that my mind was very much smaller, I could only hold one small thought in my head at a time, and that too I found to be hilariously funny. When I lay in bed after staggering home I discovered for myself

the well known phenomenon of “the spins”, where the foot of my bed would slowly tilt up to some crazy angle, and then suddenly jag back to level, only to tilt up and jag down, again and again and again, just like the spinning world you see when you are dizzy, except this time spinning head over heels instead of round and round. Alcohol intoxication is now such a familiar experience to me that it can never again seem so crazy or funny again. Just as with dizziness, once I have been through the experience enough times for it to become familiar, I learned to shrug it off. “I’m just dizzy,” or “I’m just drunk.” Once we know how it will feel, we can compensate for this error in perception, and not trust our vision when we see the world acting crazy in that way. And there we discover one reason why evolution has provided us with an instinctive desire for intoxication. If you were always careful never to spin around and get dizzy as a kid, then maybe the first time you ever felt dizzy would be when you were running to escape some mortal danger, and needed to spin around quickly to escape, for example racing down a spiral staircase. Or perhaps you trip and fall while running down hill for your life, and tumble a few turns before getting back on your feet. Without the benefit of your childhood spinning experience, the sudden unexpected dizziness would render you helpless, incapable of escape. So one purpose of this craving for crazy or intoxicated experience, which for lack of a better term we might call *intoxophilia*, is to expose us to more extreme sensory conditions in order to help us map out and compensate for any sensory distortion. And once the mapping is complete, we are no longer in awe of the disorienting experience, it becomes as predictable and uninteresting as the wobbling of the bottom of a swimming pool.

The automatic compensation for perceptual distortion is something very primal, and occurs at an unconscious level. We do not decide to figure out dizziness for the sake of our future survival, we are instinctively enamoured of its absurdity, the obvious sensory violation of what we know to be true, as we are of a good joke or absurd statement. But as soon as we understand and can predict the effect then, like a joke re-told, or a magic trick revealed, it becomes no longer interesting, because it is no longer unexplained or magical. Our perceptual processes are built up upon layers and layers of this kind of compensation for perceptual error and distortion, that must have first begun in the earliest days of our infancy. Young infants are captivated by the game of “peek-a-boo,” presumably because they initially believe that an object that disappears has also ceased to exist. It is another perceptual illusion that things can disappear while in fact continuing to exist invisible to our experience, and the infant gets bored with the game only

when it has figured out that all is not as it seems; that things can continue to exist even when we don't see them.

One of the most noteworthy aspects of this compensatory process is how it seems to erase itself from our experience as soon as the compensation is complete. If as an adult, after spinning around we are asked "Do you feel the earth moving?" we are inclined to say "No, it is perfectly solid and stable — although I am a bit dizzy." It takes a bright camera flash to over-expose our retina enough for us to notice the after-image. But the retina does not only leave an after-image for very bright lights, it leaves a faint after-image of every image that it records. Young infants must be constantly confused by the after-image of the previous view whenever they shift their gaze, just as we are confused by the after-image of the camera flash when we first experience it. I remember many years ago I was exploring the unlighted dungeon of a castle in Germany, feeling my way along in absolute pitch blackness. I finally came to a room in the basement of a round tower that had a small arrow-slit window, exposing a tiny chink of the bright sunlit sky outside in the otherwise pitch blackness of the dungeon. And almost immediately I saw a bat! It was flying this way and that in crazy figure 8's with incredible speed and in absolute silence, but there was something unreal and ethereal about that bat that captivated my attention. Eventually I discovered that it was a dynamic after-image on my retina, caused by the movement of my eyes. If I shifted my eyes to the right, for example, I would see the after-image of the slit window flit off to the left, due to the motion of the patch of light on my retina caused by the eye movement, a dynamic variation on the static after-image. And when I instinctively tried to follow the after-image off to the left, it caused another one this time flitting off to the right, and that was the cause of the crazy back and forth flight. But if I stopped moving my eyes, I would see the last after-image darting quickly while fading, like a skyrocket on the fourth of July, then all was still again. And once I discovered the explanation for this mysterious phenomenon, it was no longer surprising or disturbing, In fact, on subsequent visits to that dark cellar I hardly noticed the effect at all, and could only replicate the illusion with some conscious effort. So the reason I saw the magical bat was not simply because the stimulus was bright enough to over-exposed my retina, but because my perceptual system had not yet learned to compensate for an after-image of such great brightness and contrast.

There is a well known side-effect of psychedelic intoxication known in the drug culture as "trails." If you get good LSD then you will see them. Trails are an after-

image on the retina seen whenever an image moves across its surface, not only bright lights like a camera flash, or a chink of skylight in a pitch black dungeon. For example if you move your hand in front of your face under LSD, it leaves faint trails from the finger tips, just like a video image on a monitor with a high persistence phosphor. But the interesting thing about these trails is that they are almost completely invisible without LSD. Or are they? Actually I can sort of see them when I pay close attention, now that I know what to look for, thanks to my extensive experience with LSD, although they are never quite as clear or vivid as they are when viewed under LSD. But there is another factor involved. I have now done LSD so many times that I don't really see trails any more under its influence. With an effort of course I can see them again under LSD, and under LSD they are always clearer and brighter than in the sober state. But I have now seen them so often that I would normally not even think to look for them while tripping, any more than I would look for the magic bat in the dungeon. For the novice experimenter with LSD, the trails jump out at them as something that is hard to ignore. But with increasing familiarity with the experience the phenomenon fades and tends to disappear altogether. And this in turn leads me to propose *Lehar's Law of intoxication:* you can only really learn from an altered state of consciousness while it remains novel and unfamiliar. As soon as the effect becomes familiar, it virtually disappears from consciousness, and the intoxication loses its paradoxical and magical quality. This is a very sad fact of life for the devoted psychonautical adventurer, because it means that the most interesting and intellectually fulfilling experiences of psychonautical exploration are necessarily and inevitably transient. You cannot continue to be surprised indefinitely by perceptual distortion and illusion. After a while, even the most extreme psychedelic experience becomes a kind of hum-drum routine. And perhaps this explains why most teenage drug experimentation generally ends at adulthood. Don't get me wrong, it can still be pleasurable and intellectually rewarding. Its just that I can no longer justify my drug taking as exploration or experimentation, it has now become just a sensory pleasure, like a nice glass of wine, or a fine brew of beer.

In fact, Lehar's Law applies not only to the intoxicated state, it actually applies to all of conscious experience. As young infants we are all natural born scientists trying desperately to make sense of a confusing and chaotic world. We are captivated by the sparkling of water, or the glistening of a crystal, or the mirror shine on a pot or a kettle. We are endlessly fascinated by balloons that defy gravity and fall upwards instead of downwards, fun house mirrors that distort our reflection, pinwheels that turn magically in the wind, and kites that tug and twirl

like a living thing. It is only after familiarity sets in that these toys become boring, because they can no longer astonish us with their magical and unexplainable behavior. Water sparkles because its just water, and a diamond sparkles because its just a diamond. The world becomes a much more boring hum-drum place to the adult, where things generally behave exactly as expected, even if that expected behavior is itself sometimes somewhat bizarre. And of course this is very adaptive in the evolutionary sense, because it allow us to focus our attention on the greater challenges of the world, like learning how to milk the maximum push from the wind in a sailboat, or learning how to do a loop-de-loop in an airplane, or that endlessly challenging task of trying to fathom the unfathomable depths of other people's minds. But if our field of interest happens to wander to the metaphysics of perception and consciousness, then this very useful aspect of human perception suddenly becomes a great hindrance to observation of the nature of our experience in its raw unfiltered form. When we try to see our experience of the world, all we see is the world itself. Or at least so we think, as long as we continue to fall prey to the *Grand Illusion* of consciousness. This is where psychedelic drugs can help to pry open again the innocent eyes of childhood.

A woman once told me that as a child she had often had the disturbing impression that she was separated from the world by some kind of invisible film or membrane. She remembers complaining to her father that she felt she could never touch the world directly, but only indirectly, through this transparent and trans-sensory membrane. In his most excellent book *Understanding Comics*, Scott McCloud (1993) recounts an observation from his early childhood illustrated in Figure 1.1, where he first discovered the *missing hemifield* phenomenon, that the perceived world only exists where we look. These peculiar perceptual anomalies are eventually passed off as illusions, and usually forgotten altogether as an adult. But these peculiar chinks in the facade of perceptual reality are very real. In fact, they are a more real and accurate view of the true nature of our experience than the illusory world that we think we inhabit. The reason why I took psychedelic drugs was in order to return to the perceptual innocence of childhood, to give me a second chance to notice these phenomena, and make a record of them now that I knew them for what they were, so that I could learn from them about how my brain represents world information.

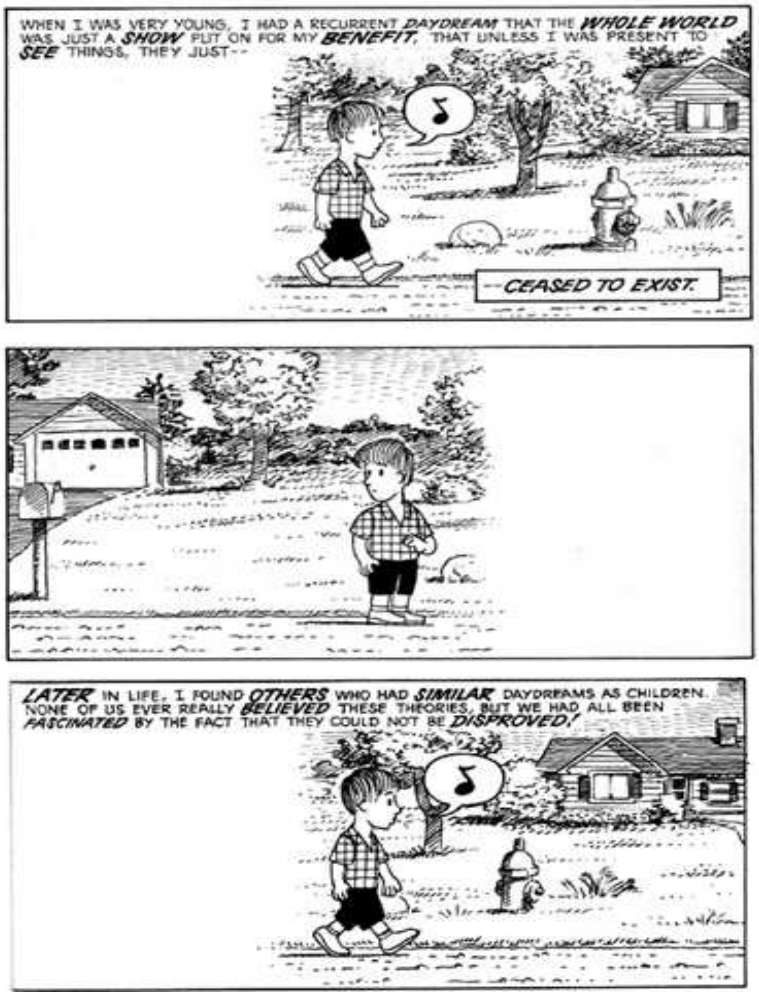


Fig. 1.1 Young Scott McCloud discovers the missing hemifield phenomenon.

High School Experiences

It was in the last two years of high school that I first discovered psychedelic drugs and marijuhana. At first I was a staunch opponent of drugs, as I had been warned against these things by my parents and the larger culture. My mother would regale me with horrific stories of kids who took their first toke of a marijuana “cigarette” and then jumped out a five story window thinking they could fly. She told me about wily dealers who would lure unsuspecting children; “The first one’s free, kid!” But when the lure of intoxophilia finally came to tempt me it was not at all as I had expected. It is a strange fact of modern American culture that it is easier for kids to buy drugs in high school than it is to procure alcohol, because alcohol comes from liquor stores that check your ID, whereas illicit drugs come from a friend of a friend who doesn’t care how old you are. And therein we see the folly of prohibition. Would but that we had learned our lesson from the failed experiment of alcohol prohibition, but alas we are collectively condemned to repeat that sad and violent

history all over again and again. What really surprised me when I first found drugs was that it was not through some seedy middle-aged man with a trench coat on a street corner, but through young kids like me in school, kids that I knew and loved and admired. I was absolutely astonished when I first discovered how many kids in my class were smoking marijuana and even taking LSD, because they exhibited none of the drastic and horrific symptoms promised by all the scare stories I had heard. In fact, they seemed like normal healthy intelligent kids, who had maybe a bit more sense of adventure and curiosity than their more conservative peers. It was the stark contrast between the way that drug users were presented in the media, and my own personal experience of them, that led me to question the conventional view of drugs. In eleventh grade I purchased and voraciously consumed a book called “The Marijuhana Papers” (Solomon 1968) where I discovered that the scare stories were a pack of lies, and that marijuhana was no more harmful than having a few beers at a bar. It came as a profound shock to me that this intensive propaganda war against drugs was a tissue of the most fantastic exaggerations and outright lies, and that millions were being deceived by it on a grand scale at a cost of millions and billions of dollars.

Now lest it should seem that I am advocating drug use, I should hasten to emphasize at this point that that is not at all my intent. The picture painted by “The Marijuana Papers” was itself a mild distortion of the facts, skewed in its own way to promoting marijuana use, although the level of distortion was on a different order of magnitude, being more of an emphasis or tilt, as opposed to the outright lies and bald propaganda of the prohibitionist agenda. Marijuana is neither good, nor it is evil. It is merely a tool that can be used for both good and for evil. True there are some who succumb to its influence and become helplessly “addicted” in the sense of feeling a compulsion to get stoned every single day. That is a real and present danger of marijuana, and an even greater danger with other more powerful drugs. Andrew Weil (Stafford 1992, Forward p. III-11) a recognized authority on a vast range of psychedelic substances, has the following unkind appraisal of marijuana.

> *Marijuana is somewhat more irritating than LSD or mescaline, capable of causing respiratory problems in those who smoke it excessively. I have yet to see good evidence of other ill effects on the body, but I have seen no end of cases of marijuana dependence. Compared to the true psychedelics, pot is insidious in lending itself to regular and frequent use, a pattern that easily turns into an unproductive and stubborn habit, providing few of the interesting effects that novice smokers experience.*

Those are harsh words indeed for my favorite intoxicant. But I harbor no illusions about the vaunted weed. Weil is right, and I am myself an example of one who falls easily into a pattern of frequent use, so I am well aware of the downside of this substance in particular, and of all intoxicants in general. Recreational drugs, of necessity make you feel good, and since they do, they tend to make you consume them all the more, which can lead to a vicious cycle of ever increasing use. But in defense of marijuana I am inclined to argue that the reason why it tends to produce dependence is exactly because it is such an ideal drug. I found it possible to kick an adolescent addiction to cigarettes, (although it took many years and several failed attempts) because tobacco is such an unrewarding drug; it feels more like an itch to be scratched than an actual pleasurable indulgence. I eventually kicked the cigarette habit by demonizing tobacco in my own mind, seeing it as a dirty, smelly, and parasitic habit. Alcohol too is somewhat disappointing after the initial novelty wears off, although it is intrinsically more pleasurable than tobacco could ever be. But marijuana is in a different class of intoxicants. It produces the most marvelous mental confusion and a feeling of euphoric pleasure all over. Although I no longer use marijuana so much for psychonautical exploration, I still love it as an old friend that has given me endless pleasure for many years, and it continues to give me pleasure, which is why I choose to continue consuming it. I will not regret all that pleasure even if it eventually costs me a few years from the tail end of my life. I would not recommend drugs of any sort to anyone who is not otherwise inclined to try them. Drugs are not for everyone. But I would fight to the last breath in my body for the right of free people in a free society to dose themselves with whatever intoxicating concoction they choose, providing of course that they do so in a manner that does no harm to anyone other than themselves. It is not by accident that the Bill of Rights proclaims a right not only to life and liberty, but also gives prominent billing to the *pursuit of happiness*. For what worth is life if we cannot pursue happiness in it, each in our own individual way?

Weil is also right that regular use of marijuana produces few of the interesting effects that novice smokers experience. But that is largely because of Lehar's Law, whereby familiarity inevitably breeds indifference. I still remember my early experimentation with pot, and the wonderful experiences that it gave me. By the time I first tried pot, I had read "The Marijuana Papers" from cover to cover, including a number of different peoples' accounts of their experiences with Cannabis. When I finally tried Marijuana myself, I was astonished to discover that the experience was completely different than I expected from those accounts. The

drug experience is truly ineffable, as impossible to describe as is consciousness itself, so no written account of a drug experience can ever prepare you for the real thing. And as with the case of consciousness, every experience is unique and different, depending on such variables as set and setting, past experience with different substances, one's natural basic wiring, i.e. whether one tends to be up and happy, or down and depressed, or panicky and fearful, and it even depends on one's basic philosophy of life, whether one believes in magical spiritual realities, or whether one is a hard-nosed materialist. So you should not expect your own experience with any intoxicant to be similar to the experiences of others as you read about them in books, and that includes the descriptions of different intoxicants described in this book. Your experience is almost guaranteed to be profoundly different than that of anyone else, even when you and the other person are sitting right next to each other having consumed the same dose of the same substance. This might lead one to conclude that the psychedelic experience is hopelessly subjective and can offer no useful observations about objective reality. But the same criticism can, and has been, raised against introspective analysis of consciousness itself. Many psychologists and neuroscientists believe that introspection is also hopelessly subjective, and that it offers no useful observations about the brain. I have always found this argument baffling, for if conscious experience is mediated by physical processes in the physical brain, then how could it possibly *not* provide direct evidence for the nature of those underlying neurophysiological processes? And since the drug experience is itself a variation of conscious experience, how could it not also offer valuable insights into the workings of the human mind and brain? The only way that the properties of consciousness could be irrelevant to neurophysiology would be if we could see the world directly, unmediated by the representational machinery of the brain, as many neuroscientists and psychologists today apparantly seem to mistakenly believe. But ever since our first childhood experience of dizziness and other perceptual illusions, we can see quite plainly, if we only give it a thought, that the world of experience is not the external world viewed directly, but is an internal replica of that world, and that is why it is subject to all of those illusory effects. In my first book, The World In Your Head (Lehar 2003) I showed how the properties of conscious experience can be used to deduce very specific properties of the representational mechanism in the brain. In this book I focus on the potential of psychotropic substances for further and deeper exploration of the properties of the human mind and brain.

There was one observation that I made during my early marijuana experiences that has had a profound influence on my concept of mind. Perhaps the strangest thing about the marijuana high was that from the outset, it seemed to be hauntingly familiar. It was like a case of *deja vu*, I felt like I had been there before, long ago and far away. But where? And when? Was this *deja vu* itself merely an illusion, as *deja vus* so often are? I think not in this case. I noticed that I could see myriad patterns in things. On a piece of inlaid walnut paneling I saw faces, mountains, birds, clouds, and all manner of things just like the shapes children see in clouds. And then it came back to me, a memory from my long ago childhood. I can place my age to no more than 7 or 8, because that was when we still lived in Canada. And I remember very vividly that the profiles of certain trees seen across the street looked to me like cartoon characters. And every time I looked at them, they were usually the same characters. That one there was goofy, and those three were the snap, crackle, and pop characters from the cereal box. When I looked at the tile floor while sitting on the toilet I would stare at the marbled patterns in the linoleum, and I would always find my old familiar images; the cowboy over here, the black girl with blond hair over there. My head was just filled with images everywhere I looked. And it's not just me. Take a look at the best children's literature, and you will see that same theme again and again in a million variations. A cartoon car sprouts a face, with its headlights as eyes, and its radiator grille becomes a toothy smile. Trees sprout faces, and so do dishes, forks, and spoons, and they often sprout arms and legs and go off dancing in a geometrical ballet of periodic motion. It was then that I made my first significant psychonautical discovery: that the drug experience is similar to the experience of early childhood. The more powerful the drug, the farther back it takes you, and the more primitive the experience becomes. This observation is of acute interest to the student of mind, because it allows us to relive some of the perceptions of childhood before our compensatory mechanisms learned to remove them from experience.

In my senior year of high school I graduated to LSD and mescaline, although at the time I believed that they might be doing permanent damage to my brain, so I only did them a total of three or four times. I had not yet heard that the prohibitionist case against LSD was as spurious and unsubstantiated as that against marijuana, and that I would not become a genetic cripple with damaged DNA just from tripping on LSD. I remember brief flashes from that confused experience that made a deep impression on me, and I swore to myself at the time that when I was an old man and had no further professional use for my brain, I

would find some LSD and try it again, because the experience was so profoundly moving that it was even worth a little brain damage! At the tender age of 18 I did not yet have the life experience to make much sense of the LSD experience. I remember seeing the room as filled with geometrical patterns in the form of lattice, grid, starburst, and arabesque patterns of the most exquisite complexity and extravagance, as described by the subjects of Heinrich Klüver's experiments (Klüver 1966). And I saw wild distortions of space, as the world around me seemed to be too big, or too small relative to its normal size, and the overall color or 'cast' of the whole scene seemed to drift from pink to yellow to green, as if viewed through colored glass of constantly changing color. And I saw clearly the fading after-image of the previous scene whenever I shifted my gaze, that gave the distinct impression that I was viewing the world indirectly, as if through an invisible film or membrane. But perhaps the most profound effect of all of my psychedelic experiences was that they began to unhinge my mind from its comfortable naive realism, i.e. the belief that the world we see is the world itself. Under LSD it became perfectly clear that this was a distorted image of the world, but exactly what that really meant took me many more decades to figure out.

This book is not an autobiography, so I will not bore you with the details of my confused and chaotic rise from adolescence to adulthood. Suffice it to say that I abandoned drugs and quit cigarettes, and took an interest in other things, confining my indulgences to the legal intoxicants of alcohol and caffeine. I did on rare occasions encounter the odd joint being passed around at a party, and whenever that opportunity arose I would take a toke or two "for old time's sake" before passing it on, but made no effort to procure a private supply. Years later my aimless and wandering career track eventually led me to go back to school and get a PhD in "Cognitive and Neural Systems," i.e. neural network models of how the brain works. I had spent a few years doing computer image processing, and artificial vision, and I was intrigued by the vision problem, and how the brain makes sense of the visual stimulus on the retina. I had learned from my image processing work that this is a formidable undertaking, for although it is easy enough for a computer to find low level features like edges in an image, trying to put those edges together into a coherent picture of what you are looking at remains a great unsolved problem of computer science. I was intensely curious about how the brain pulls off this astounding trick. And I began my own investigation of the mind with a basic assumption that I was to discover would give me an inside track in my study of the problem of vision. I naturally assumed that conscious experience must offer valuable clues to how visual information is

represented and processed in the brain. How could it possibly be otherwise? At some level, perhaps due in part to my adolescent experiences with LSD, I knew that the world of experience is a distorted picture of the actual world, although I had not yet pursued the implications of that idea to their logical conclusions. But one thing I did know was that I remembered my LSD experiences from many years ago, and I knew for a fact that the psychedelic experience would certainly offer powerful clues to the secret of biological vision. When I joined the PhD program therefore, I made a concerted effort for the first time in years, to locate some LSD, and to consume it specifically for psychonautical purposes, i.e. as a tool for exploring the mechanism of conscious experience.

Chapter 2

Graduate Studies in Psychonautics

Astronauts are not selected from people with a fear of heights or of danger, astronauts are selected from those who love flying and love the thrill of danger. And mountaineers come from the ranks of those who love mountains and the thrill of heights. So it is perfectly natural that psychonautical explorers emerge from the ranks of those who love the psychedelic experience for its own sake, and are only too happy to find a useful purpose for their pleasurable passtime. I confess therefore that the first and principal reason for my consuming psychoactive substances was and is because I just love the psychedelic experience! I love the wild confusion of mental state that challenges every fiber of my being, and I even love the terrifying feeling of dissociation when you cannot even find your own body, but live like a disembodied spirit, unsure whether you will ever return to a state of normal existence. For me these experiences are like the thrill of the fighter pilot, who knows well the dangers of his trade, but considers the risks worthwhile in return for the sheer exhiliration and mental challenge of engaging in mortal combat against another human being in an airplane. A fighter pilot who also finds a noble cause to fight for, such as the defense of his land and liberty, is doubly pleased to be doing something he enjoys so much for such a noble and lofty goal. And so it was that I was doubly pleased to find that I could indulge my curiosity in alternate states of consciousness while in pursuit of the noble cause of investigating the human mind and brain.

Return to Alternate Reality

I was over thirty years old in November 1988 when I first did LSD again since my high school years. But this time I was equipped with more life experience to help make sense of the psychedelic state. Like many of the best things in life, drugs are wasted on kids who are not mature enough to really understand the insights they have to offer. And yet curiously, the cultural pattern seems to be that kids experiment with drugs through high school, and some continue on through college, but then they usually quit and go straight as soon as they get serious about their careers and family life. Many of these ex-druggies then turn into virulent anti-drug crusaders in a vain attempt to protect their own children from the very pleasures that they had indulged in in their own youth. Returning to drugs in later life, you can rediscover some of the wonder and confusion and vivid vitality of youth that is inevitably lost as we learn more about the ways of the world.

My old friend Peter supplied me that first time, from a stash he had saved in the freezer for many years since the days of his own youthful experimentation. We only had three or four “hits” to share between the two of us, but either this was LSD of exceptionally high caliber, or my mind was super sensitive due to the long hiatus since my last consumption. In any case it was a very intense and illuminating experience, of which I can only give you brief disconnected highlights. Since I now considered myself a scientific explorer rather than a mere vacationer to alternate reality, I prepared for the experience with a checklist of questions to myself about my experiences. The questions were in the nature of "How does the visual world look?" "How do you experience sounds?" "can you compute 345/15?" and the like. I looked forward to the experience with great interest and curiosity.

We went to my appartment in Boston that night and made ourselves comfortable, and when things started turning wierd, I pulled out my checklist. First of all, the notion of having a checklist seemed at the time to be so hilariously funny that Peter and I were doubled up with laughter for a long long time before I could get to any of the questions seriously. It was a kind of laughter that I haven’t experienced since childhood, a deep and overwealming mirth that shook my whole body to the core with tears streaming down our cheeks as we gasped happily for breath. Each new question occasioned a renewed outburst of helpless laughter until we were thoroughly exhausted.

When I finally got back around to the questions I discovered a fact that leaves me astounded to this day. I answered every one of the perceptual questions exactly as I would have while stone cold sober. The reason why this was so surprising was that I was actually feeling very very different. In fact I was feeling exceeding peculiar. In fact words cannot express how strange I was feeling, and yet, my sensations of the world around me were exactly as they are normally. So, I asked myself, what is it that is actually different? Well, the sights and sounds and smells were the same. It was my *perception* of them that was different. This experience gave me a new appreciation for the word perception. Normally we think that if we observe an object, a pencil in your hand for instance, we see exactly that, a pencil, the real pencil, and nothing but the pencil. It came to me that that is not the case. Even when regarding as matter-of-factual an object as a common everyday pencil, we perceive it through a filter of our own perspective, our own view of things. This perspective is normally so ordinary and unremarkable that we are not even aware of it, but it was exactly

this perspective, our view of the world around us, that is altered by the drug. It brought my attention to something that I had been totally unaware of although it has been in front of me all my life.

It is somewhat like the experience of intently watching some event unfold before your eyes, and suddenly becoming aware of the fact that you are watching it on television rather than in real life. Shifting your attention from the event itself to the glowing phosphor dots on the screen. You are looking at the same thing, and you are seeing the same thing, but your perception of it has altered radically. Well the same thing was happening to my own senses. Suddenly I was aware of the fact that the world around me is not the real physical world, but only a view of the world as it impinges on my senses. That the image of the pencil is not a pencil, but a pattern of neural activity in my visual cortex that only appears to me as a pencil. Of course this is no new scientific revelation, I knew that all along. But now I could feel it, I could perceive it in a way that has permanently altered my way of thinking about consciousness.

We went outside for a little walk in the night air, and while walking down the street I got a repeat of that first insight. I had the feeling that instead walking down a real street, I felt as if there was a big spherical screen all around me, with an image of the street projected onto it, and that as I walked the image morphed, expanding out in front of me and collapsing back down again behind me like a fish-eye lens view. I could look up and see an image of the starry sky beyond a screen of leaves overhead, look down and see my feet pushing the sidewalk backwards. I was stationary, it was the image of the street that was moving past me all around. Of course when you think about it, this perceptual 'distortion' is actually more real than the 'normal' perception. My brain, comfortably enthroned in my skull feels nothing of the outside world except through the pattern of activity it receives from the senses. It receives images, sounds, sensations, and pastes each one in its proper place on a sensory sphere that represents the world around us. My perceptual distortion was that instead of seeing the outside world, I was now seeing this sensory sphere, with a sensory image of the world projected on it. To me this was an extremely interesting and exciting insight that has had a profound influence on the rest of my life.

I would see strangers approach along the sidewalk, at first appearing as a little insignificant dot near the expanding focus of my sphere. They would grow and grow until I could see them in great detail before they passed behind and shrank

back down again to nothing. It was as if each of us posessed his own sensory sphere, and as we approached, our spheres would intersect, and I would appear in his sensory world as he appeared in mine.

We stopped at MacDonalds to get a bite to eat, and never did a big mac taste so good, although it seemed to take an hour to consume it, and I was a little concerned that the other customers might notice the enormous effort I was expending in getting it down. I could feel my tongue and cheeks maneuvering the lumps of food into position on my molars, a few good chomps, then it was pushed down the chute where my esophagus began an elaborate sequence of peristaltic contractions to persuade it down to my stomach. I looked up at my friend Peter between mouthfuls, and his face looked so wierd, it is hard to describe. Although visually he looked exactly as he always does, I would become aware of individual components of his face, his nose, his cheek, his eyes, which appeared momentarily stronger or clearer than the rest of the face, giving the impression of a dynamically shifting cubist painting, and an exaggerated cartoon depiction.

We went back to my place and I suggested putting on Pink Floyd. Pete, who had tripped on Pink Floyd in his youth ad nauseam, surreptitiously switched the gramaphone to 75 rpm. I thought the music sounded a little funny, but thought nothing of it at the time, and only discovered his trick when he told me about it the next day.

We attempted a few arithmetical exercises and found that although we were fundamentally capable, it was difficult to remember which part of the problem we were working on, or to hold interim results in our head. While walking around town I had found it extremely challenging to navigate around the familiar streets of my neighborhood for a similar reason; although I could plan a course from here to there, I had some trouble remembering which part of the course we were actually on, or what our destination was again. We were never in danger of actually getting lost, but we did spend some time discussing where we were and how to proceed. It was a wonderful sensation like exploring a fabled town that you have read about in a fairy tale but have never actually visited before.

As the hours rolled on by we spent the time playing with a slinky and one of those electrostatic lightning machines, blissfully absorbed in such simple pursuits like two children playing with toys. Our conversation disintegrated to short meaningless sentences. I would say something like "The quality of light is an

etherial essence" to which Peter might respond "But the meaning of existance is not comprehensive" and I would reply "Yes but it is if you want it to be", and it would go on like this, knowing that he had no idea of what I had meant, which didn't matter at all, since I didn't know myself what I had meant. Often we would just break into paroxisms of mirth, laughing and laughing until our stomachs hurt and the tears flowed in rivers down our cheeks. At one point I noticed a luminescent glow on the slinky that I could not account for. I told Peter breathlessly of my discovery, thinking it was a new form of mysterious energy, on a par with Newton's discovery of gravitation, and it took us at least ten minutes to discover that it was only the reflection of the lightning machine on the shiny steel coils of the slinky, and that triggered another bout of helpless mirth as we laughed at what idiots we had become.

At one point we turned out the lights and looked at the patterns of light cast on the ceiling from the street. I cannot begin to express the deep beauty of those patches of light. I stared and stared with my eyes boggled out muttering "Oh my God! Oh my God!" I swore I would never take patterns of light for granted again! I could see fantastically complex latticework patterns in the dark which became very vivid when I closed my eyes. I tried to describe these visions to my tape recorder because I knew I could never remember them in all their beauty and complexity, but the visions rushed by so fast and furiously that I could not begin to keep up with them, even if I could find words to describe them. In introspective experiments performed subsequently I found that some kind of patterns can always be seen when you close your eyes, even when stone-cold sober, if you only know where or how to look for them. But the kaleidescopic complexity and richness of patterns seen on LSD far exceeds that of patterns under normal conditions. This is a real difference of perceptual experience induced by the drug.

Throughout these experiences I remembered an insight I had had ten years earlier when I had last taken LSD. I remember thinking that although the experience is novel and fantastic beyond the wildest imagination, that there is also an element of familiarity to it all, a sense of deja vu, that at some past time I had seen these kinds of things before. And near the end of the trip when thoughts and sensations become more 'fundamental' (how else can I word it?) and you feel spasms of energy pulsing through your whole body and shaking you to your very foundations, it brings to mind the convulsions of a very young infant, and the boggled eyes with their expression of uncomprehending wonder and

fascination at their first glimpses of the world. Is this the reason for the familiarity? Is this the way the world looked when I first cast eyes on it?

Experiences in 1990

When I was in high school LSD and other intoxicants were relatively easy to procure. It was just a matter of knowing the right people, and waiting for the next opportunity. But as an adult I discovered that psychedelic drugs were very much more difficult to acquire. All my friends were now serious about their careers and family plans, and although I could set up a connection for marijuhana easily enough, exotic substances like LSD were virtually impossible to track down. But with enough time and persistence anything is possible, and in a couple of years I had located a transient one-time source who sold me maybe a dozen or so “tabs” of LSD before disappearing without a trace. On the next free day I “dosed up” in my appartment in Boston, and went out for a stroll down by the river, which was a few blocks from my back bay appartment. The world becomes smaller under LSD, and again I experienced the peculiar “bubble” effect of the perceived world as a finite sphere of experience that seemed to surround my egocentric point. As I walked across the Massachusetts Avenue bridge towards Cambridge on a bright sunny morning, the long straight bridge looked infinitely long, the far end shrinking down to a vanishing point far ahead. It was wildly exhilerating to see the world looking so different, and everything seemed exaggerated like a cartoon carricature. I remember passing an older woman walking the other way, and could hardly stop myself from laughing out loud at the absurdity of her appearance. Under normal conditions she would probably have appeared unremarkable, with perhaps just a little too much makeup and hair styling for my taste. But under LSD she looked to me like a circus clown! Didn’t she check in the mirror, I thought to myself, before she walked out the door? At the same time I was acutely aware of the fact that it would be rude of me to stare, so I was careful to look straight ahead as she passed close, paying her only the occasional furtive glance.

I became aware of a peculiar social ritual that we all practice unconsciously whenever we walk among strangers. We all know that it is rude to stare, because staring at someone communicates a message that we consider them to be unusual or remarkable for some reason, and if we should stare with raised eyebrows and a face of shocked astonishment, or worse, merriment, as I felt inclined to do with this painted lady, it would have made the poor woman feel unduly self-conscious, and she would probably have glared back at me with a look of “Whats the matter with YOU?”. So we stare rigidly ahead casting only the

occasional nonchalant glance at passers-by as if to communicate to them non-verbally that we consider them to be totally unthreatening and perfectly “normal”. If during a glance our eyes should accidentally meet, it is like an electric charge flashing between us, which requires us to either glance hasily away, or to acknowledge the exchange with a hint of a smile, or a barely perceptible nod of the head or twitch of the eyebrows as if to say “Hi there normal person, just a normal friendly hello from another normal person! Don’t worry, I won’t bother you, gotta go!” It would never do to stare at a stranger as we would at a flowering bush, or other inanimate object that happens to catch our attention, absorbing the image with our eyes without any outward acknowledgement of the other party’s personhood. Every stranger we pass on the street is like a mirror that reflects the emotional impact that our image has on their consciousness, a subtle signal of which we are acutely, although somewhat unconsciously aware. I had never before noticed this curious channel of silent communication between strangers passing in the street.

I also experienced that day for the first time the phenomenon of *synesthesia*, the crossing-over of sensory information from one sensory modality to another. I had heard that under LSD people would report seeing sounds as colors, or smells as shapes, but I never knew what that could possibly mean until that day. It came to me as I was passing a tree adorned with thousands and thousands of tiny twigs, as trees generally are. It was early spring and the leaves had not yet sprouted, so each twig was terminated by a pointed bud pregnant to burst out in a splash of leaves within a few days. We pass by trees every day so they hardly catch our attention under normal conditions. But under LSD I was overwhelmed by the vast number of spiky twigs on this tree, all simultaneously present in my conscious experience. The myriad twigs stuck out like so many claws, and suddenly I felt a tingly sensation as if those thousands of claws were gently stroking and tickling my naked body all over. And suddenly it came to me that synesthesia is not just for synesthesics, or for people on LSD, but is a property of everyday ordinary perception, except that our recognition of it is dulled by the familiarity of everyday existence, or the effects of Lehar’s law on normal consensual experience. It was like my childhood association of numbers with characteristics that had nothing to do with the numerical values themselves. My association of the numbers 3 and 8 with a frilly feminine nature was probably due to the soft compliant curves of which those particular digits are composed, and that feminine association automatically linked them also with the light, feminine colors of pink and yellow. The number 4 on the other hand is made up of bold straight strokes crossing at a rigid right

angle, which suggested to me a powerful masculine figure flexing his arm as if to show off his biceps. These cross-associations between different sensory modalities are seen commonly in art and in advertising and in every other aspect of human activity. The strong square forms seen in the architecture of banks, or of government buildings, and court houses, project an image of stability and permanence and strength. The smooth lythe forms of expensive sports cars project an animal-like image of speed and agility, and of course there is endless synesthetic association with music, as seen for example in the music chosen to accompany movies or cartoons or television commercials to communicate a whole wealth of emotions or attitudes about the objects or events portrayed along with that music. These are all examples of a kind of synesthesia in ordinary life that we pick up on automatically and intuitively without any awareness of it as synesthesia. So LSD does not in and of itself produce synesthesic effects, but rather, by altering the normal balance of sensory and perceptual experience, it allows us to notice the synesthesia that is actually present all the time in every aspect of sensory experience. This was a discovery of great interest to me.

I had planned a simple route for my tripping excursion; first across the Massachusetts Avenue bridge to Cambridge, then along the river front in Cambridge, back across the river on the Longfellow bridge to Boston, and thus back home in a big loop along the river. I had finished the loop at this point and was planning a return back to my appartment in the Back Bay. But my mind was so profoundly befuddled by the drug that I was having some difficulty finding my way back home in my old familiar neighborhood! I stood at a street corner trying to plan my course. I looked at the street sign and read “Beacon St.” Ok, thats familiar, I know where that is, but *where* along Beacon? I looked around and found the sign for the cross street that read “Fairfield St.” After some thought I recognized the name, and made a mental image of where it was. But Fairfield corner of *what*? At which I would look back over to the first sign and read again “Beacon St.” I know where that is, but Beacon corner of *what*? Ah to hell with it! I suspect its somewhere along this way, and off I went. LSD is not for those who are prone to panic or anxiety, because if anything should spur you to panic, it should be finding yourself unable to navigate your way back home in your own familiar neighborhood! But I am not a man prone to panic, and in fact I enjoyed this wild befuddlement of the mind, and strolled around randomly turning first this way then that, hoping to run into something familiar. Eventually, following a path much like a moth around a candle flame, I happened upon my building, and went inside with some relief, hoping not to run into one of my neighbors in the hallway.

Trip to Europe

I had two or three such experiences on my new batch of LSD, taking perhaps 2 or 3 “hits” (tabs) each time (presumed to be about 1000 micrograms, or “mikes” per tab). And each time the experience became somewhat more familiar, and I learned to think more clearly under its influence. In July 1990 I took a trip to Europe with Tim, a colleague from work, because we were both presenting posters at a neural network conference in Paris, and the company where we worked very kindly funded the travel expenses. Tim and I took this opportunity to plan a little excursion around Europe after the conference, visiting Germany, Austria, Italy, and Switzerland touring in a rented car. When we got to Austria we bought a little tent at a camping store, then we hiked up an enormous mountain in the Alps, and spent the day sightseeing at the top. When I told Tim that I happened to have some LSD with me, his eyes lit up. It turns out he too had been a hippy in his youth, and had even attended the original Woodstock, so he immediately warmed to the idea of taking LSD with me on a mountain top, although he had not done psychedelic drugs in over a decade. So there in the most stupendous and idylic setting of a mountain in the Austrian alps, early the next morning after camping overnight, we consumed five hits of LSD each, and spent the day in profound wonder at the glory of creation!

I made a few new and interesting discoveries on that mountain top in Austria. First of all, I learned to have a great deal more control of the experience in the following manner. I discovered that the effects of LSD become markedly stronger and more pronounced when you sit still and stare, and clear your mind, much like a state of zen meditation, or pre-hypnotic relaxation. When you do this under LSD, the visual world begins to break up and fragment in a most astonishing way. You tend to lose all sense of self, that is, you lose the distinction between self and non-self. This can be a very alarming experience for those who are prone to panic or anxiety, or for those who insist on maintaining a level of control and awareness of themselves and the world around them. But I also discovered that this mental dissociation and visual confusion can be diminished, and normal consciousness can be largely restored by simply looking around, moving about, and interacting actively with the world around you. Because when you do this, suddenly the world appears as a solid and stable structure again, and your familiar body reappears where it belongs at the center of your world of experience. This discovery greatly enhanced my ability to explore the deeper spaces of consciousness revealed by the drug, while providing an insurance against the natural panic that tends to arise with the dissolusion of the self, and the world around you. It allowed me to

descend into the depths of the experience while maintaining a life line back to consensual reality, like a spelunker descending into the bowels of the deep underground cavern of my mind, while always able to return safely to the surface. And what a splendid and magnificent cavern it was that I discovered within my mind!

One of the most prominent aspects of consciousness that has puzzled philosophers and psychologists for centuries is the unity of conscious experience. We feel that we live in a world that surrounds our body, and that world appears as a single “picture” or volumetric spatial structure, like a theatre set, every piece of which takes its proper place in the panorama of surrounding experience. It has always been somewhat difficult to grasp this notion of conscious unity, because it is difficult to even conceptualize the alternative. What would consciousness be like if it were *not* unified? What does that even *mean*? Under LSD you can discover what non-unified consciousness is like for yourself, and that in turn by contrast offers profound insights as to the nature and meaning of unified consciousness. Again, the most interesting revelations of the psychedelic experience are not confined to that experience itself, but they reveal insights into the nature of normal conscious experience that might otherwise be missed due to its familiarity. In fact, I realized much later, even normal consciousness has aspects which are not unified.

The most familiar example of non-unified consciousness is seen in binocular vision. Under normal conditions the two eyes view the same scene and produce a three-dimensional “picture” in the mind that is a unified construction based on the information from both eyes simultaneously. But everyone knows the experience of double vision. For those with greater control over their own visual function, double vision is easily achieved by simply staring into space and relaxing the eyes. As a vision scientist myself, I have trained myself to do this so as to be able to “free fuse” a binocular pair of left-eye, right-eye images to create the perception of a 3-D scene. For those who have difficulty with this, a similar experience can be had by holding a small mirror at an angle close in front of one eye, so as to send very different images into the two eyes. Whichever way you do it, the result is rather unremarkable in its familiarity, and yet when you think of it, this is in fact an example of disunity of conscious experience that is familiar to one and all. For what you see in double vision is actually two visual experiences which are seen as if they are superimposed in some manner, and yet at the same time they are also experienced each in its own separate disconnected space. It is generally possible

to observe the correspondence between these two disconnected visual experiences, for example to determine which point in one eye view relates to a particular point in the other, as if viewing two slide transparencies that are overlaid on top of one another, although this correspondence is shifting and unstable, as the vergence between your two eyes tends to wander when binocular fusion is broken. But in fact it is more natural to simply ignore that correspondence and to view the two visual experiences as separate and disconnected spaces that bear no significant spatial relation to each other. When the images in our two eyes do not correspond, we tend to focus on one while ignoring the other, like an experienced marksman who no longer has to close his idle eye while aiming a gun. And yet, although the image from the idle eye is generally ignored, it has not left consciousness entirely, and with an effort, or perhaps more accurately, with an absence of effort or focus, it is possible to experience both views simultaneously.

In the trance-like state of yoga-like meditation performed under LSD, the entire visual world breaks up and fragments in this manner into a multitude of disconnected parallel conscious experiences, each one only loosly related spatially to the other experiences in the visual field. The effect is much enhanced by the fact that your eyes actually diverge or relax in this mental state, as they do under binocular fission, and this helps trigger the state of visual confusion as your mind gives up on trying to make sense of what it is seeing. As in Zen meditation, the LSD trance state is a passive or receptive state of consciousness that allots equal attention, or perhaps lack of attention, to all components of experience, which is why they appear in parallel as separate disconnected pieces. The state of normal active consciousness resists this kind of parallel confusion, and tends to select and focus on the the most significant portion, like the marksman aiming a gun, suppressing alternative experiences such as the view from the idle eye.

The deep LSD-induced trance state can be easily broken by simply moving the eyes, so conversely, the deeper states are achieved by complete mental and physical relaxation, with glazed eyes staring blankly into space. But of all the separate fragments of visual experience observed in this mental state, there is one special fragment located at the very center of the visual field, the foveal center, that appears somewhat sharper and clearer than the rest of the visual field. In fact, the visual fragmentation is somewhat like a kind of tunnel vision in which the peripheral portions of the visual field break off and disconnect from this central portion of the experience. But while the peripheral fragments become separated from the whole, they are never entirely and completely independent,

but appear to interact with each other, and especially with the central foveal image in characteristic ways. For example if the foveal image shows a couple of blades of grass, twitching and dancing in the wind, then if any of the peripheral fragments of visual experience happen to show a similar image, i.e. blades of grass at a similar angle and twitching and dancing in synchrony with those in the foveal view, then the central and peripheral images become instantly coupled into a larger unified perceptual experience of a global motion sweeping through the image. Instead of a million blades of grass each twitching individually, we perceive the invisible wind as a wave of synchronous motion that sweeps invisibly across the blades of grass. The waves of motion caused by the wind are perceived as waves of energy across the visual field, a perceptual experience of something larger than the individual grass blades that collectively give rise to it. By careful adjustment of my state of relaxation, I found I could relax until the visual world fragmented into a million independent experiences, and I could gently bring it back into focus, as first a few, and then ever more of the fragmented visual experiences coupled together into fewer separate, and eventually a single unified global experience, much like the moment of binocular fusion when the two monocular images finally lock into each other to produce a single binocular experience.

When the visual world was locked into a unified perceptual experience, even then there were instabilities in local portions of the scene. A little detail seen in distant trees appears first as a mounted horseman, then pops abruptly into a hand with three fingers extended, then to a duck on a branch, then back to the mounted horseman, all the while the actual shape and color perceived remain unchanged, it is only the interpretation, or visual understanding of that pattern that switches constantly, as when a child sees mountains and castles in the clouds. One of the many possible interpretations is of a dead tree with leafless branches, (the veridical percept of what was actually there) and that is the only alternative that enters consciouseness under normal circumstances. The effect of LSD is to make the visual system more tolerant of obvious contradictions in the scene, such as a giant horseman frozen in a line of trees. The effect is like those surrealistic Dali paintings, for example the Three Ages of Man, shown in Figure 2.1, where one sees a single coherent scene, local parts of which spontaneously invert into some alternative interpretation. This is very significant for the nature of biological vision, for it shows that vision involves a dynamic relaxation process whose stable states represent the final perceptual interpretation.

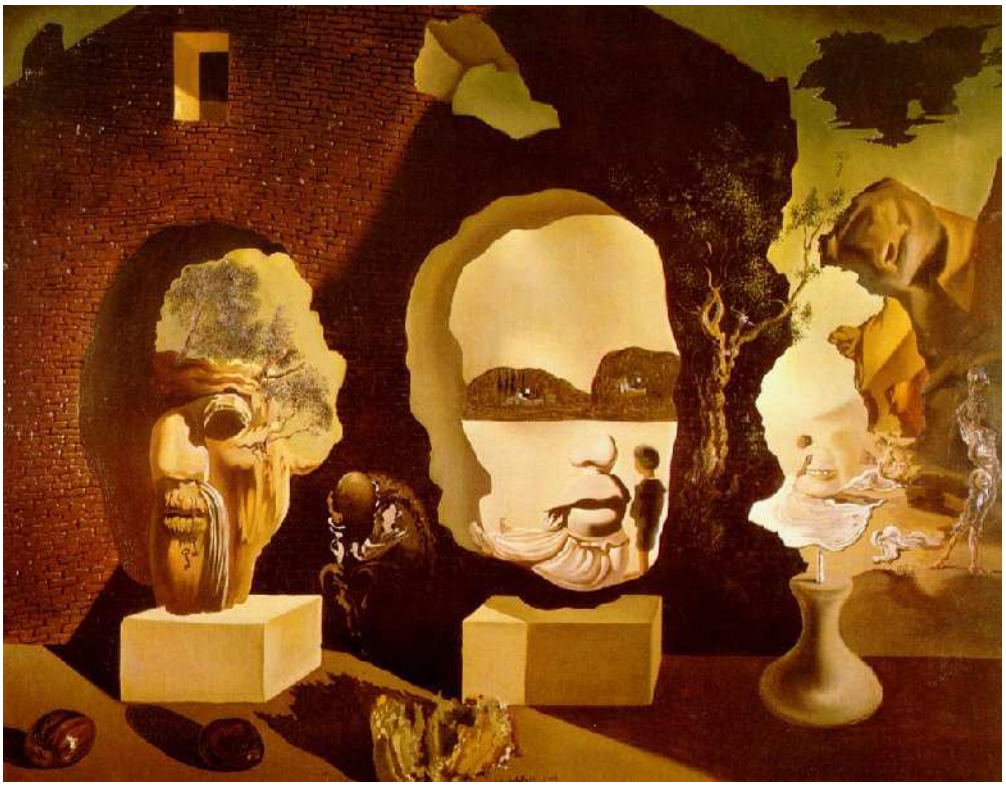


Fig. 2.1 Salvador Dali's *Three Ages of Man*. The profound spatial ambiguity inherent in this picture causes it to pop back and forth alternately between discrete states in which every part of the percept converts to a completely different volumetric spatial configuration.

There was another interesting observation that I made that day. I noticed that under LSD things appear a little more regular and geometrical than they otherwise do. It is not the shape of things that is different under LSD, but rather the shape of the things we see *in* objects. For example a cloud is about as irregular and fragmented a shape as a shape can be, and yet we tend to see clouds in a simplified cartoon manner, as a little puff composed of simple convex curves. A real cloud under closer inspection reveals a ragged ugly appearance with very indefinite boundaries and irregular structure. Under LSD the cloud becomes even more regular than usual. I began to see parts of the cloud as regular geometrical shapes, seeing the shapes in the shapes of the cloud as if on a transparent overlay.

Another rather astonishing observation of the LSD experience was that the visual world wavered and wobbled slowly as if the visual scene was painted on an elastic canvas that would stretch over here while shrinking over there, with great waves of expansion and contraction moving slowly across the scene, as if the whole scene was "breathing", with its component parts in constant motion relative to

each other. This was perhaps the most compelling evidence that the world of experience is not the solid stable world that it portrays. Figure 2.2 shows a sketch I made shortly after my alpine mountain adventure to try to express the wavery elasticity and the visual regularity I had observed under LSD. This picture is of course an exaggeration, more of an impression than a depiction of how the experience actually appeared.

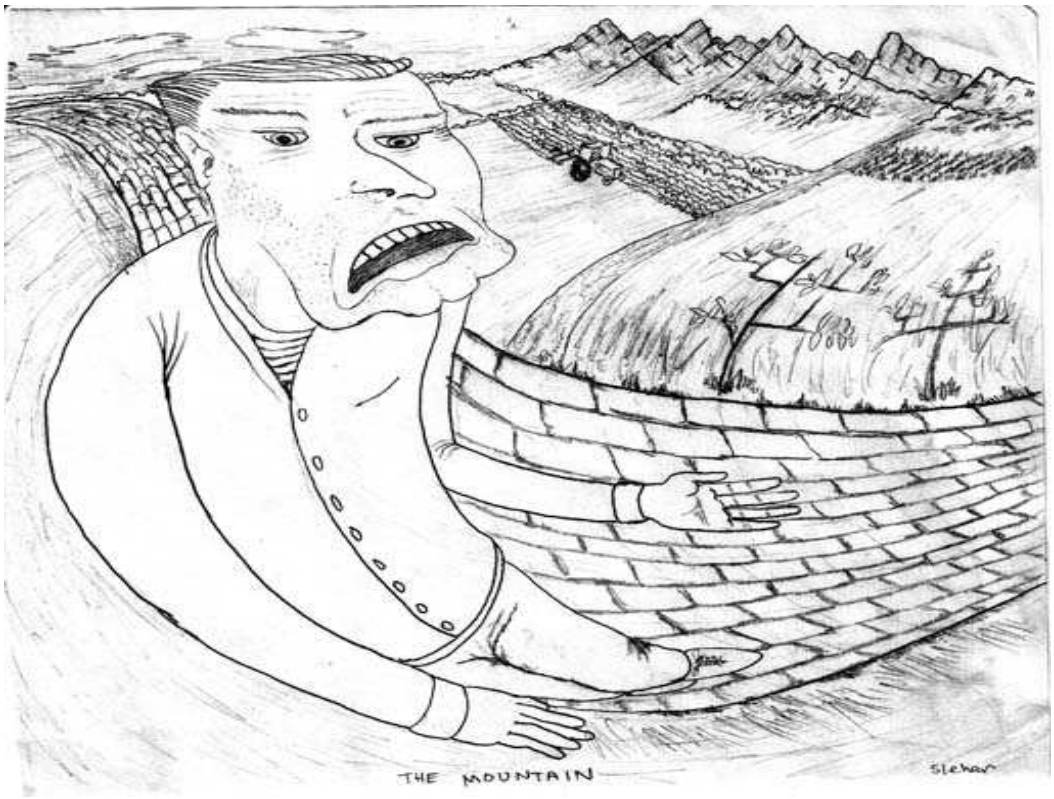


Fig. 2.2 A picture I drew shortly after my LSD experience on the mountain in the alps, where I tried to depict the exaggerated periodicity, and the general wavery nature of the visual world observed under psychedelic intoxication.

The geometrical regularity was particularly prominent in peripheral vision, when attending to the periphery without looking to see what is there. Usually peripheral vision is hardly noticed, giving the impression of a homogeneous visual field, but under LSD the loss of resolution in peripheral vision becomes more readily apparent, especially when holding a fixed and glassy stare. And in that periphery, objects like trees or shrubs appear more regular and geometrical than they do in central vision, like artificial Christmas trees with perfectly regular spacing of brances and twigs. Again, it was not the raw image in the periphery that appeared regular or geometrical, but rather it was the invisible skeleton of visual understanding derived from that raw colored experience that exhibits the more regular features. And suddenly I could see it. This is the way the visual system

encodes visual form in a compact or compressed manner, by expressing shape in terms of the next nearest regular geometrical form, or combination of forms. Children draw a tree as a circular blob of leaves on top of a straight vertical trunk, or a pine tree as a green triangle with saw-tooth sides. It is not that we see trees in those simplified forms, but rather that we see those simplified forms *in* the trees, and the forms that we perceive in these invisible skeletons are the expression of our understanding of the shapes we perceive those more irregular forms to have. This was later to turn into my harmonic resonance theory of the brain, as I sought an explanation for this emerging regularity in perception, but in 1990 all I saw was the periodicity and the symmetry, and I thought they were profoundly beautiful.

My friend Tim who had not done LSD for many years, responded to this sudden 5 hit dose by going into a state of complete dissociation. He lay down on the forest floor with glassy eyes, muttering “It is TOO beautiful! It is TOO beautiful!” and he did not respond to me, even when I stared him straight in the face. He reported afterwards that he found himself in a giant Gothic cathedral with the most extravagantly elaborate and brightly painted ornamental decorations all around him. This too can be seen as an extreme form of the regularization discussed above. Under the influence of this powerful dose, Tim’s visual brain could no longer keep up with the massive irregularity of the forest around him, and therefore presented the forest in simplified or abbreviated form, as the interior of a Gothic cathedral. It captures the large geometry of a ground plane that supports an array of vertical columns, each of which fans out high overhead to link up into an over-arching canopy of branches. The only difference is that in the Gothic cathedral the trees are in a regular geometrical array, and each one is a masterpiece of compound symmetry, composed of smaller pillars of different diameters in perfectly symmetrical arrangements, and studded with periodic patterns of ribs, ridges, or knobby protruberances as a kind of celebration of symmetry and periodicity for their own sake. There is a kind of geometrical logic expressed in the ornamental design. If part of the cathedral were lost or destroyed, the pattern could be easily restored by following the same logic as the rest of the design. In *information-theoretic* terms, the Gothic cathedral has lots of redundancy, its pattern could be expressed in a very much simpler compressed geometrical code. In Tim’s drug-addled brain his visual system could only muster a simple code to represent the world around him, and that is why Tim saw the forest as a Gothic cathedral. Under normal conditions, the additional information of irregularity, or how each tree and branch breaks from the strict regularity of the cathedral model of it, creates the irregular world of experience that we normally

see around us. This suggests that the beautiful shapes of ornamental art are not the product of the highest human faculty, as is commonly supposed, but rather, ornamental art offers a window onto the workings of a simpler visual system, whose image of the world is distorted by artifacts of the representational scheme used in the brain. The Gothic cathedral gives a hint as to how the world might appear to a simpler creature, a lizard, or a snake, to whom the world appears more regular than it does to us, because its full irregularity is too expensive to encode exhaustively in all its chaotic details. Of course the flip-side of this rumination is that the world that we humans experience, even in the stone-cold sober state, is itself immeasurably simpler, more regular and geometric, that the real world itself, of which our experience is an imperfect replica. In the words of William blake, “If the doors of perception were cleansed, everything would appear to man as it is, *infinite.”*

Mittersill

While I was a PhD student at Boston University, my parents owned a beautiful ski lodge house in the picturesque town of Mittersill in the mountains of New Hampshire, and on spring breaks or long week-ends I would invite my friends, the other PhD candidates, up to Mittersill where we would take long hikes up the mountain, and spend evenings by the fireplace. I introduced a small circle of my friends to the illuminating experience of LSD, in the hopes of sharing some of my perceptual discoveries with them, and perhaps inducing them to learn to use the experience to make discoveries of their own. Eventually Mittersill became associated in our minds with these group trips with an ever-shrinking circle of true diehard psychonauts, making our regular pilgrimage up the mountain in search of Truth and to touch the face of God. We always brought a goodly supply of Happy T’Baccy, which provides a beautiful complement and bemellowment to the otherwise sometimes sharp and jangly LSD experience. Our pattern was usually to arrive on a Friday night, cook up a great feast, and spend an evening by the fire, drinking beer and/or wine and passing the pipe around until everyone felt properly toasted. The talk was often about the workings of mind and brain, since we were all students of cognitive and neural systems. We were all adept computer programmers and well versed in mathematics as part of our PhD studies, so we all understood the issues of mental computation and representation, and I found the conversations about the computational principles of the mind, to be most interesting and intellectually stimulating. This was the high point of my academic career, this is why people want to be scientists. The next morning we would rise early, and after a hearty breakfast, we would all set off up the mountain, which was

a steep brisk climb of two or three hours. About half way up the mountain, at a carefully pre-planned time, we would stop, and each “dose up” with our individually chosen dose of LSD for the occasion, timed to reach the peak of the experience about the time we reached the peak of the mountain. Then we would continue our climb through the rich lush mountain forests of New Hampshire to the top of Maida Vale, the sub-peak next to Canon Mountain, from whence a stupendous view opened up across to Canon Mountain and the vast valley below. We would settle ourselves comfortably at some location off the beaten track, and spend the best hours of the day just dreaming crazy thoughts and drinking in the experience.

By now I had perfected my introspective techniques to the point that I could voluntarily relax my mind into a state of total disembodiment. The visual world began to fragment, first into two large pieces as binocular fusion was broken, then into a few smaller fragments, and eventually into a miriad of separate fragments of consciousness, like the miriad reflections from a shattered mirror. I was fascinated by this state of consciousness, and how different it was from normal consensual reality. Most alarming or significant was the total absence of my body from its normal place at the center of my world. As the world began to fragment, my body would fragment along with it, disconnected pieces of my body seeming to exist independently, one part here, another over there, but in separate spaces that did not exist in a distinct spatial relation to each other, but as if in different universes, like reflections from different shards of a shattered mirror. And as the visual world attained total fragmentation, all evidence of my body completely vanished, and I lived the experience of a disembodied spirit, pure raw experience, just sensations of color, form, and light. I felt safe and secure in this environment among friends, so I did not mind the total vulnerability afforded by a complete functional shut-down of my mind in this manner. Besides, I had learned that I could snap back together again to a relatively normal consciousness at will, simply by getting up and looking around, and interacting with the world. I was endlessly fascinated by the state of complete disembodiment, and one feature of it impressed itself on me again and again, the geometric regularity of it all. There was a powerful tendency for everything to reduce to ornamental patterns, geometrical arrangements of three-dimensional shapes, like so many glistening gems in a jewelry store, with rich periodic and symmetrical patterns in deep vibrant colors. The deeper I plunged into the experience, the simpler and more powerfully emotive those patterns became. And since my body had totally vanished, these patterns were no longer patterns I viewed out in the world, but rather, the patterns were me, I had

become the spatial patterns which made up my experience. I began to see that symmetry and periodicity were somehow primal to experience.

I remember lying on my back and watching the clouds in the sky overhead. Weather patterns are often chaotic at the tops of mountains, and on more than one occasion we were located at a spot where the clouds that formed on the windward side of the mountain were just cresting the summit, where they would dissove in a continuous process of chaotic fragmentation, a veritable Niagra Falls of nebular dissolution, evocative of the fragmentation of my psychedelic experience. The shattered shreds of cloud, viewed from this close up, were about the most ragged and irregular shapes you could imagine, and yet under the influence of the drug I kept seeing fleeting geometrical patterns in them. There were great circular pinwheels and arabesques, patterns like those carved in the doors of Gothic cathedrals, but each flashing in and out of brief existence so quickly that it would be impossible to draw them. I began to realize that the human mind is one great symmetry engine, that the mind makes sense of the world it sees by way of the symmetries that it finds in it. Symmetry is the glue that binds the fragments of experience into coherent wholes.

Figure 2.3 shows a series of paintings by artist Louis Wain, that I find very evocative of the LSD experience. Wain suffered a progressive psychosis that manifested itself in his art, which was originally quite realistic, becomming progressively more abstract and ornamental, in the manner I observed in the various stages or levels of my LSD dissociation. Figure 2.3 A shows a fairly realistic depiction of a cat, but there are curious artifacts in the textured background, a mere hint of periodicity breaking out. I would see such artifacts everywhere, almost invisible, fleeting, and faint, reminiscent of the ornamental pinstripe patterns painted on trucks and motorcycles, a kind of eddy in the stream of visual consciousness as it flows around visual features in the scene. As I descended into the fully dissociated states, the patterns would become more like Figure 2.3 B, C, and D, breathtakingly ornate, with many levels of compound symmetry, revealing the eigenfunctions of perceptual representation, the code by which visual form is represented in the brain.

At times we would break free from our individual reveries, and share absurd nonsensical conversations about our observations. One time, looking down at the vast valley stretching out below us, a vista that seemed to stretch out to distances beyond comprehension, my old friend Peter said that it was hard to tell whether all that scenery was just “way out there”, or was it “way *WAY* out there?” Of course

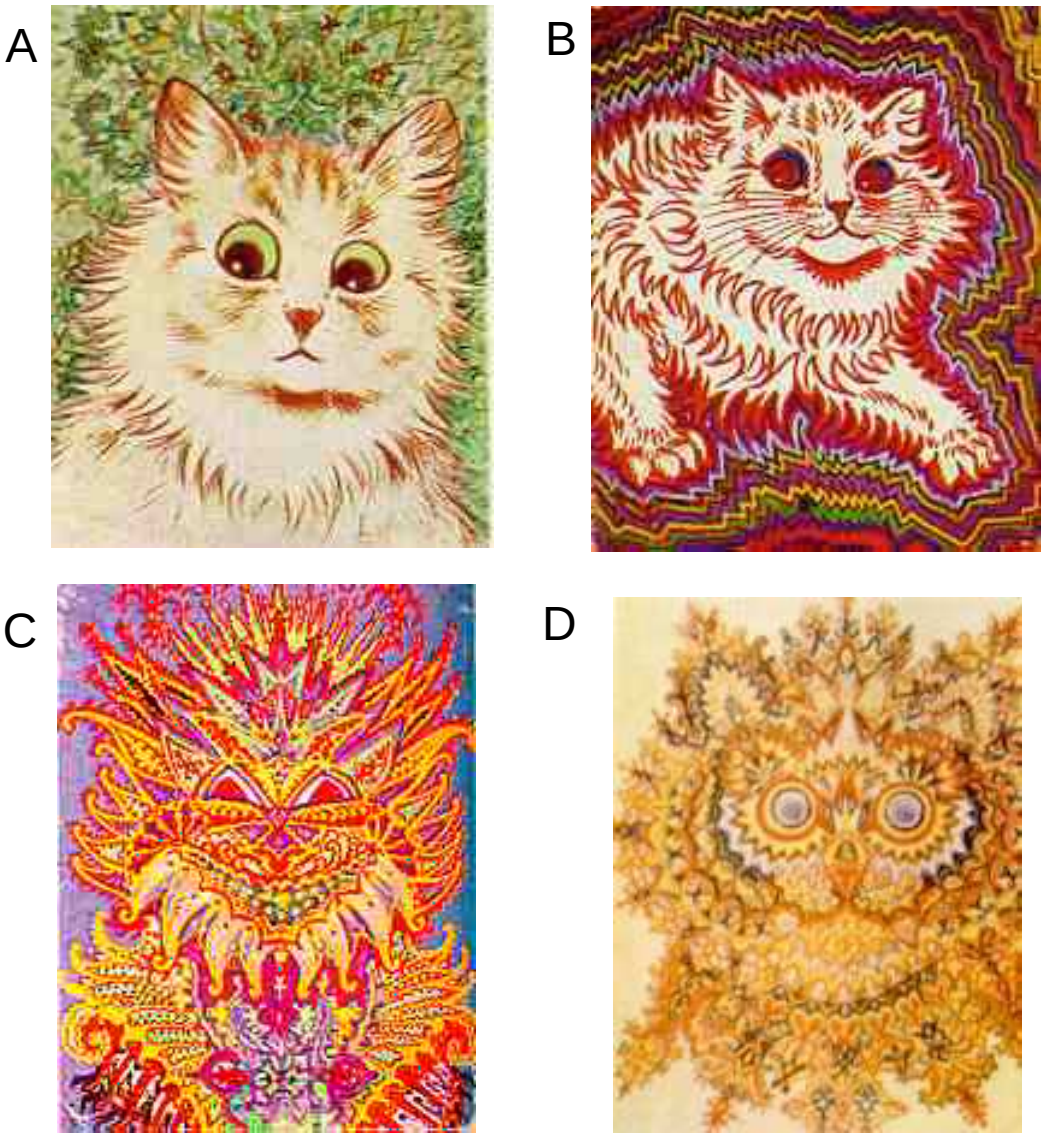


Fig. 2.3 A series of paintings by artist Louis Wain, who suffered a progressive psychosis, which manifested itself in his art. I find these patterns very evocative of my own LSD experience through various levels.

we both laughed heartily at the absurdity of his statement, but I knew exactly what he meant. When viewing such a grand vista under normal consciousness, one is deeply impressed by the vastness of the view. But under the influence of the drug, the vista somehow did not look quite as large as we “knew” that it really was. What Peter was saying was that for some strange reason, the world had shrunken back in on us, and that magnificently vast valley had shrunken to something like a scale model, or a diorama, where it is easy to see how vast the modeled valley is *supposed* to be, but the model itself appears very much smaller than the valley it attempts to portray. What Peter was observing was the same thing I had observed, and that was beginning to even become familiar, that the world of our

experience is not a great open vastness of infinite space, but like the domed vault of the night sky, our experience is bounded by, and contained within, a vast but finite spherical shell, and under the influence of psychedelic drugs that shell seemed to shrink to smaller dimensions, our consciousness was closing in on its egocentric center. Many years later after giving it considerable thought, I built the diorama shown in Figure 2.4 to depict the geometry of visual experience as I observed it under LSD.

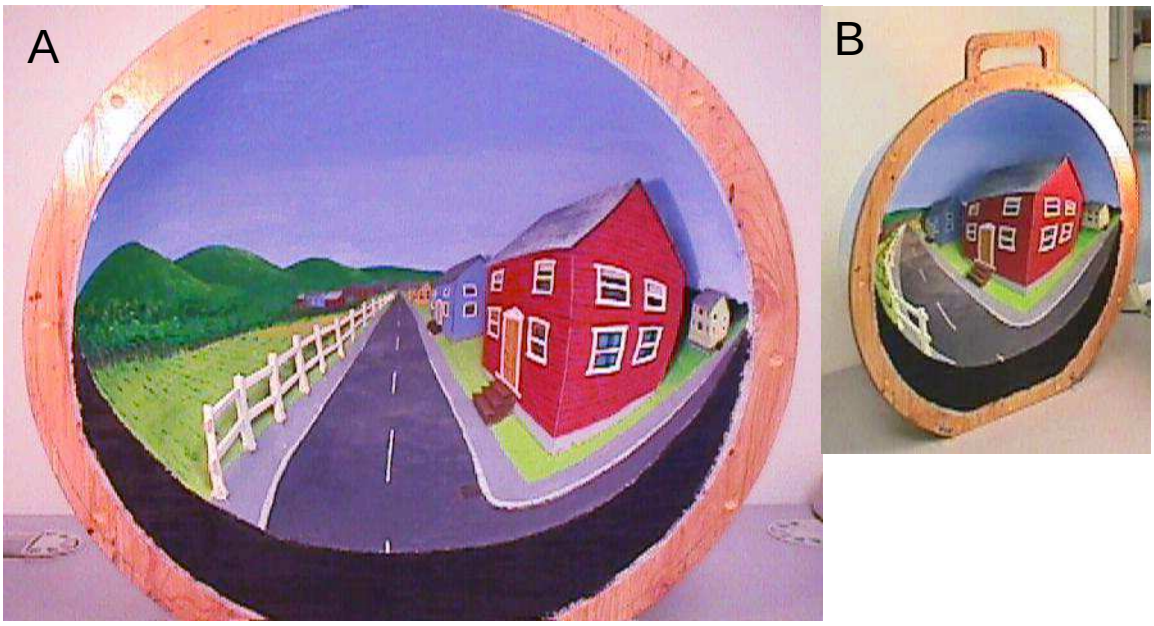


Fig. 2.4 A: A diorama I built to depict the geometry of visual experience. B: Oblique view.

And when I was in the completely disembodied state, my consciousness closed in even smaller and tighter, the range of my experience was all contained within a rather modest sized space, like a glass showcase in a jewelry store, and the complexity of the patterns in that space was also reduced, from the unfathomably complex and chaotic fractal forms in a typical natural scene, to a much simpler but powerfully beautiful glistening ornamental world of the degree of complexity seen in a Gothic cathedral. The profound significance of these observations dawned on me incrementally every time we had these experiences.

I can recall fragmentary pieces of insights gleaned through the confusion of our passage down the mountain, stopping to sit and think wherever and whenever the spirit took us. At one point three of us stopped by a babbling brook that was crashing and burbling through the rocks down the steep mountain slope. We sat in silent contemplation at this primal “white noise” sound, when Lonce commented that if you listen, you can hear a million different sounds hidden in that noise. And

sure enough when I listened, I heard laughing voices and honking car horns and shrieking crashes and jangly music and every other possible sound, all at the same time superimposed on each other in a chaotic jumbled mass. It was the auditory equivalent of what we were seeing visually, the mind was latching onto the raw sensory experience not so much to view it as it really is, but to conjur up random patterns from deep within our sensory memory and to match those images to the current sensory input. And now I could see the more general concept. We experience the world by way of these images conjured up in our minds. I came to realize why the LSD experience was enjoyed best in outdoors natural settings, and that is because the chaos of a natural scene, with its innumerable twigs and leaves and stalks, acts as a kind of “white noise” stimulus, like the babbling brook, a stimulus that contains within it every possible pattern, and that frees our mind to interpret that noise as anything it pleases.

On one occasion, on arrival back down at the lodge, our minds were still reeling, and we were not yet ready to leave the magnificence of the natural landscape for the relatively tame and controlled environment indoors, so Andy and I stopped in the woods behind the house and just stood there, like deer in the headlights, drinking in the experience. It was a particularly dark green and leafy environment in the shadow behind the house, with shrubs and leaves at every level, around our ankles, our knees, our shoulders, and all the way up to a leafy canopy high overhead, and at every depth and distance from inches away to the farthest visible depths of the deep green woods. The visual chaos was total and complete, the world already fragmented into millions and millions of apparently disconnected features and facets uniformly in all directions, that it hardly required LSD to appreciate the richness of this chaotic experience. But under LSD, and with the two of us standing stock still for many long minutes of total silence, we both descended into a mental fragmentation as crazy as the fragmented world around us. My body disappeared from my experience, and I felt like I *became* the forest; the forest and all its visual chaos *was* me, which in a very real sense it actually was. And in that eternal timeless moment, wrapped in intense but wordless thought, I recognized something very very ancient and primal in my experience. I felt like I was sharing the experience of some primal creature in an ancient swamp many millions of years ago, when nature was first forging its earliest models of mind from the tissue of brain. I saw the world with the same intense attentive concentration, bewilderment, and total absence of human cogntive understanding, as that antediluvian cretaceous lizard must have experienced long ago and far away. The beautiful geometrical and symmetrical forms that condensed

spontaneously in my visual experience were like the first glimmerings of understanding emerging in a primitive visual brain. This is why I do psychedelic drugs, to connect more intimately with my animal origins, to celebrate the magnificent mental mechanisms that we inherit from the earliest animal pioneers of mind.

One time after we had descended from the mountain and were sitting around the lodge drinking and smoking in a happy state of befuddlement, a peculiar phenomenon manifested itself that made a deep impression on me. It was getting close to supper time and somebody expressed something to that effect. But our minds were so befuddled by the intoxication that we could only speak in broken sentences, as we inevitably forgot what we wanted to say just as we started saying it, instantly confused by our own initial words. So the first person must have said something like “I’m getting hungry. Do you think...” and then tailed off in confusion. But somebody else would immediately sense the direction that thought was going, and would instinctively attempt to complete the sentence with something like “...we otta go get...” before himself becoming confused, at which a third person might interject “...something to eat?” It does not sound so remarkable here in the retelling, but what erupted before our eyes was an extraordinarily fluid and coherent session of what we later referred to as *group thought*, where the conversation bounced easily from one person to the next, each person contributing only a fragmentary thought, but nobody having any clear idea of what the whole thought was supposed to be, or how it was going to end. What was amazing about the experience was the coherence and purposefulness of the emergent thought, how it seemed to have a mind of its own independent of our individual minds, even though of course it was nothing other than the collective action of our befuddled minds. It was fascinating to see this thought, like a disembodied spirit, pick up and move our bodies and hands in concerted action, one person getting wood for the fire, another getting out a frying pan, a third going for potatoes, or to open a bottle of wine, none of it planned by any one person, and yet each person chipped in just as and when they thought would be appropriate, as the supper apparently “made itself” using us as its willing accomplices. It was reminiscent of the operational principle behind a ouija board, where people sitting in a circle around a table, all rest an index finger on some movable pointer on a circular alphabet board, and the pointer begins to spell out some message under the collective action of all those fingers. At first the emergent message appears random, but after the first few letters have been spelled out, the participants start to guess at each next letter, and without anyone

being overtly aware of it, the word appears to “spell itself” as if under the influence of a supernatural force. As with the ouija board, none of us participating in the group thought experience could hold a coherent thought in their head, and yet coherent thoughts emerged nevertheless, to the bewilderment of us all. And later I observed the same phenomenon with different LSD parties. I have subsequently encountered people well versed in the psychedelic experience who claim with great certainty to have experienced mental telepathy in the form of wordless communication and sharing of thoughts. But for us hard-nosed scientific types, the natural explanation for this apparently supernatural experience is just as wonderous and noteworthy, because it offers a hint as to how the individual parts of a mind act together in concert to produce a unified coherent pattern of behavior that is greater than the mere sum of its constituent parts. The principle of group thought occurs across our individual brains in normal sober consciousness as we instinctively read each other’s faces and follow each other’s thoughts, and it is seen also whenever people are moving a heavy piece of furniture, all lifting and moving in unison in a coherent motion towards some goal. But the psychedelic experience highlighted this aspect of wordless communication and brought it to my attention in clearer, sharper focus.

As the evening tailed on and the drug’s effect gradually subsided in a long slow steady decline, we would sit by the fire and pass a pipe or joint around, and share our observations and experiences of the day. At one point Lonce, who had just taken a puff of a joint, breathed out and held it contemplatively for a while, before taking a second puff and passing it on to the next person in the circle. I objected to this behavior, and accused Lonce of “Bogarting” the joint - smoking it all by himself without passing it along. Lonce responded to this with an explanation that where he comes from, people don’t puff and pass in haste, but every man has the right to a few moments of quiet contemplation and a second puff before passing it along. That was, he explained, the *civilized* way of sharing a joint. So we immediately adopted Lonce’s suggestion, and this method of sharing a joint has henceforth and forever since been referred to by us as the “Lonce Method”.

Theoretical Implications

As I have explained, the purpose of all this psychonautical exploration was not merely for our own entertainment, although entertaining it was, and to the highest degree. No, the primary purpose of these psychonautical exploits was clear all along at least in my mind, and that was to investigate the theoretical implications of these experiences to theories of mind and brain. And my investigations were

actually beginning to bear fruit in two completely separate directions, each of which had profound theoretical implications. At that time I was studying neural network theories of the brain, or how the brain makes sense of the visual world. A principal focus of our investigation was the phenomena of visual illusions, like the Kanizsa figure shown in Figure 2.5 A. It is clear that what is happening here is that the visual mind is creating illusory contours that link up the fragmentary contours suggestive of the illusory triangle. In our studies we learned of Stephen Grossberg's neural network model of this phenomenon. Grossberg proposed that the visual brain is equipped with oriented edge detector neurons that fire whenever a visual edge passes through their local receptive field. These neurons would be triggered by the stark black / white contrast edges of the stimulus in Figure 2.5 A. A higher level set of neurons would then detect the global pattern of collinearity, and sketch in the illusory contour by a process of collinear completion. These higher level "cooperative cells" were equipped with much larger elongated receptive fields, long enough to span the gap in the Kanizsa figure, and the activation of these higher level neurons in turn stimulated lower level local edge detector neurons located along the illusory contour, and that activation promoted the experience of an illusory contour where there is none in the stimulus.

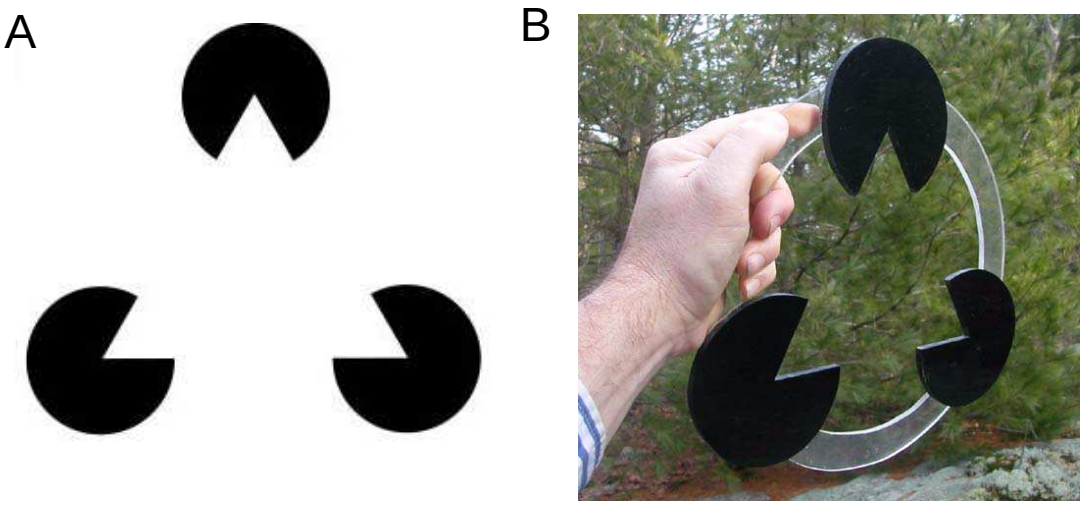


Figure 2.5 A: The Kanizsa figure. B: A three-dimensional Kanizsa figure that creates illusory contours in space.

I believed I was seeing these illusory contours in my LSD experience, as suggested by all the curvy lines in my sketch in Figure 2.2 above. But I was not only seeing the contours in illusory figures, I was seeing "illusory" contours just about everywhere across the visual field. But curiously, these contours were not "visible" in the usual sense, but rather, they are experienced in an "invisible" manner as something you know is there, but you cannot actually see. However I

also noticed that these contours did have an influence on the visible portions of the scene. I have mentioned how under LSD the visual world tends to “breathe”, to waver and wobble like a slow-motion movie of the bottom of a swimming pool viewed through its surface waves. In fact, the effect of the “invisible” contours was very much like the effect of the invisible waves on the surface of the pool, which can also be seen only by their effects on the scene viewed through them. You cannot see the waves themselves, all you can see is the wavering of the world caused by those waves. Well I was observing a very similar phenomenon in my LSD experience. I devised a three-dimensional Kanizsa figure, shown in Figure 2.5 B, and observed that even in the stone-cold sober state, I could see a kind of warp or wobble of the visual background behind the illusory contour caused by the figure, especially if the figure is waved back and forth gently against a noisy or chaotic background. So far, my LSD experiences were consistent with our theoretical understanding of the visual process, confirming to myself by direct observation an aspect of the neural network model we were currently studying in school.

But there was one aspect of the LSD experience that had me truly baffled, and that was the fantastic symmetries and periodicities that were so characteristic of the experience. What kind of neural network model could possibly account for that? It was an issue that I grappled with for many months that stretched into years. In relation to Grossberg’s neural network, it seemed that the issue concerned the question of what happens at corners and vertices where contours meet or cross. A model based on collinearity alone would be stumped at image vertices. And yet a straightforward extension of Grossberg’s neural network theory to address image vertices leads to a combinatorial explosion.The obvious extension, initially proposed by Grossberg himself, was to posit specialized “cooperative cells” with receptive fields configured to detect and enhance other configurations of edges besides ones that are collinear. But the problem is that you would need so many different specialized cells to recognize and complete every possible type of vertex, such as T and V and X and Y vertices, where two or more edges meet at a point, and each of these vertex types would have to be replicated at every orientation, and at every location across the whole visual field! It just seemed like a brute-force solution that was totally implausible.

Then one day after agonizing for months on this issue, my LSD observations of periodic and symmetrical patterns suddenly triggered a novel inspiration. Maybe the nervous system does not require specialized hard-wired receptive fields to

accomodate every type of vertex, replicated at every orientation at every spatial location. Maybe the nervous system uses something much more dynamic and adaptive and flexible. Maybe it uses circular standing waves to represent different vertex types, where the standing wave can bend and warp to match the visual input, and standing waves would explain all that symmetry and periodicity so clearly evident in the LSD experience as little rotational standing waves that emerge spontaneously at image vertices, and adapt to the configuration of those vertices. Thanks to illegal psychotropic substances, I had stumbled on a staggeringly significant new theory of the brain, a theory which, if proven right, would turn the world of neuroscience on its head! My heart raced and pounded at the implications of what I had discovered. And this theory became the prime focus of my PhD thesis (Lehar 1994), in which I did computer simulations of my harmonic resonance model that replicated certain visual illusions in a way that no other model could. I had accomplished the impossible. I had found an actual practical use and purpose for what was becoming my favorite passtime, psychedelic drugs! It was a moment of glory for an intrepid psychonaut, a turning point in my life. Figure 2.6 shows a page from my notebook dated October 6 1992, the first mention of my new theory of harmonic resonance in the brain. .

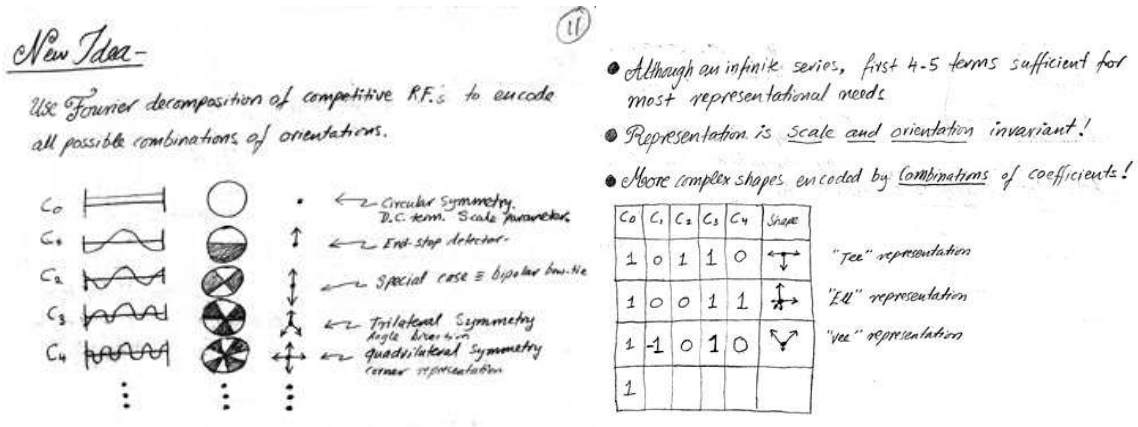


Figure 2.6 A page from my notebook dated 10/06/1992 where I first mention my harmonic resonance theory of visual perception.

But that was not to be my only significant discovery through the use of psychedelic drugs. There was another equally profound realization that came to me incrementally in stages, which was also to have a profound effect on my life. I have hinted at it several times up to this point. It is the idea that the world we see around us is not the world itself, but an image of the world constructed by our brain. This much was obvious from some of my earliest experiences, going back all the way to my childhood dizzy-spinning experiments, my experience of “the

spins” after consumption of alcohol, my experience of the retinal after-image from a bright light or camera flash, and now it became plain through the many strange warps and distortions of the psychedelic experience, most extreme of which was the fully dissociated state. In fact, this much was already plainly evident even from visual illusions like the Kanizsa figure in Figure 2.5 A, where an illusory triangle is experienced to exist where clearly none actually exists. I would sit and ponder the implications of this idea back at home or in my office at school. I would stare at the world around me and ask myself the question, where in the world I see around me is the evidence of my visual cortex, without which none of this visual experience would be possible? How could I disentangle or disconfound my experience of the world, from the world itself which it is an experience *of*? How can the two be meaningfully separated into “this is my brain”, and “this is the world seen through my brain”?

I still remember to this day the day the answer hit me, because it was a feeling like being struck by lightning! I was sitting in my armchair in my living room at home, asking again and again that same question, when suddenly the answer came to me in the form of a vivid mental image. Suddenly I saw out beyond the walls, floor, and ceiling of the room I was sitting in, out beyond the farthest things that I perceived in all directions was the *inner surface of my physical skull!* And beyond that skull was an unimaginably immense world of objective reality of which all this here is merely a miniature internal replica! It was no new fact that I had suddenly discovered, you have heard those very same words from me several times throughout this narrative. And yet something very big and significant had suddenly fallen into place in my mind, I could suddenly see clearly a distinction which had eluded me up to this point. The answer to my eternal question trying to disambiguate the world from my experience of it, is EVERYTHING! It is absolutely EVERYTHING in my experience which is a representation in my brain, and there is NOTHING in my experience which is a direct experience of the world itself. In one sense this is blindingly obvious, so obvious it needs hardly be stated. And yet in another sense it is absolutely impossible to conceive! This was the paradigm shift to beat ALL paradigm shifts. It moves ALL of human knowledge into a completely different internal dimension, and the world of science and human knowledge would never be the same again.

Chapter 3

Nitrous Balloons and Candy-Flipping

I came running into school the day after my great introspective breakthrough, eager to share my thoughts and hear some reaction. To my amazement there seemed to be a near-universal consensus that my idea was either completely and totally wrong, or that it was nothing new, everybody already knew that all along. And most often those two contradictory opinions were expressed alternately by the same person as I argued various points. Our debates would often go round and round in vicious circles, something like this:

Everything we perceive is inside our head? Of course! Everybody knows that!

Your skull is beyond the dome of the sky? Nonsense! Absurd!

The world of experience appears as a volumetric spatial structure? Trivially obvious!

There are actual volumetric pictures in the brain? Nonsense, totally absurd!

Our brain encodes all of the information content of our experience? Of course, who would argue with that?!

Our brain encodes volumetric spatial pictures? Nonsense!

Our experience is the result of electrical activation in the brain? Of course!

What we see in our experience is that electrical activation? Nonsense, absurd!

We cannot see the external world directly? Of course, everybody knows that!

The electrical activity in my brain is shaped like the world I see? Nonsense!

I remember one particular debate with my good friend Frank, which culminated in his proclaiming most emphatically (while pointing at his head) "*I don't care what you say, this here is my head! My* real *head! Not just an image of my head in my brain!*" I only wished that he could see the image that appeared inside *my* head as he uttered those words. It was an image that made such an impression on me that some years later I made a painting of it, which you can see in Figure 3.1. (By rights, I should actually have painted Frank himself as the subject of the painting, but instead it is a picture of myself making the same point.) In the end, my persistence on debating this issue with anyone who would listen, and especially Frank, became so tedious that I was forbidden to raise the issue in social settings, because I was getting to be a bore! That was a terrible blow for me at the time, because in fact I very much enjoyed those debates, and hearing people's objections to my points deepened my understanding of the issue, and sharpened my arguments to make my point more conclusive, and I was genuinely curious

Figure 3.1 A painting inspired by a heated debate with my good friend Frank, when he insisted “I don’t care what you say, this here is my head! My *real* head! Not just an image of my head in my brain!”

whether I could formulate the issue in such a manner that no reasonable person could refute it. I think I was getting close, and perhaps that is why I was shut off from further debate. It was rather like arguing about the existence of God with a true believer. At first they are generally game, and trott out the well-worn rationalizations they learned in Sunday school, but when you get close to clinching the case, they tend to get defensive or angry, and lose all interest in further debate. It turns out, as I discovered over the years, that the issue of The World In Your Head is as powerfully emotive as is belief (or disbelief) in God. It is a profoundly paradigmatic issue on which people generally don’t change their minds, because even contemplating the theoretical possibility of the truth of it requires a kind of thinking outside “the box” of naive realism that many people are evidently incapable of, having spent a lifetime of learning to structure their reality from within that box. It is like asking them to ditch everything they have learned since infanthood and start again with a completely different foundation of reality, and try to put the whole thing back together again into a coherent view of the world. Many don’t see what is wrong with the naive view that has served them so well for so long, that it should require such radical surgery. Indeed, that is why it

took me so many years to discover this insight for myself, despite all the overwhelming evidence that had been pointing to that conclusion all along.

Phenomenal Perspective

I remember pondering the issue of perspective, that peculiar warp I had observed under LSD where the world appeared as a kind of fish-eye lens view, as suggested in my diorama in Figure 2.4. Was this warp real, or was it illusory? I spent many hours sitting in a long straight hallway and pondering the question: Does the far end of the hallway appear smaller by perspective than the near end, or does the hallway appear straight and parallel throughout its length? I would never have thought to ask myself such a basic question had I not been clued in to something weird from my psychonautical observations. But now that I sat and thought about it, I felt very unsure. Sometimes the hallway looked perfectly straight, as I "knew" that it was, objectively speaking, and yet at the same time the hallway also clearly converged by perspective toward a vanishing point. Of course everyone knows that perspective is real, and is a result of the optics of the eye. The same thing happens in a camera, a photograph of that hallway would clearly show a foreshortening of the far end, and the mathematics of perspective is well understood. But that kind of perspective is a projection from the 3-D world through a focal point onto a 2-D surface. This hallway here before me was not a 2-D surface, it was a solid volumetric structure and yet it had perspective foreshortening. But then again, at the same time there was no perspective distortion, the hallway looked perfectly straight and parallel along its entire length! I sat for hours puzzling over this quandary, flipping alternately between those two disparate conclusions. Which one was right? I encourage the reader to go stand in a long straight hallway and try to answer this for themself. Does it shrink with distance or not? What do *you* see?

As often happens in the case of great discovery, after much fruitless pondering, the answer came to me all of a sudden in a flash of intuition. The answer, I could suddenly see, was BOTH! The hallway was *both* diminished by perspective foreshortening, and at the same time it *wasn't*! And that is exactly why I had been having so much trouble trying to decide between them! Take a look at the diorama in Figure 2.3, and you will see exactly the same thing. The road in the foreground is obviously wider than it is out in the distance, but anyone can tell by looking at it that it is *supposed to* be straight and parallel. The red house in the foreground is bigger than the blue one in the background, and yet we "*know*" that both houses are *supposed to* be the same size! This diorama has two completely different

spatial scales, there is the "real" scale that you can measure with a ruler, by which the road obviously shrinks into the distance, and there is the *model* scale that anyone can tell is supposed to represent perspective, by which the sides of the road remain straight and parallel and equidistant *even where they meet at a point on the horizon !!!*

What is plain and obvious on a diorama, however, is not quite as plain and obvious in reality, because we believe we are looking at the real world, and we *know* with as much certainty as we can know anything, that the world does *not* shrink with distance by perspective. Go measure it with a ruler if you're not sure, and the ruler will show it to be undiminished in size, an objective scientific measure that surely nobody could question. But what if the road that you're seeing is *not* the road itself, but merely a three-dimensional *image* of the road inside your head? What if your brain used the same trick as you see in the diorama, representing distance by a shrinking spatial scale? In other words, your experience of the road is a volumetric spatial model, constructed in your brain, and it uses the same trick of perspective as you see in the diorama to represent distances all the way out to "infinity", but all within a finite bounded model!

Are the little houses in the "distance" down the road in the diorama, are they way out there? Or are they way *way* out there? Thats it! Now I understand! The peculiar warp observed in visual space, depicted in Figure 3.2 A, is absolute undeniable *proof* that the world of experience has a *variable representational scale*, as shown in Figure 3.2 B. In other words, our experience of the world is a scale model, but the scale of that model varies with distance from the egocentric point, and it does so in a nonlinear fashion that achieves the mathematically *impossible*, it goes all the way to *infinity* all within a finite bounded distance!

The missing part of the puzzle was the insight that had come to me sitting in my armchair at home, that the world we see around us is not the world itself, but merely a replica of that world in an internal representation. Once you entertain the *possibility* that the whole world is in your head, then the answer becomes blindingly obvious, the world in your head is a diorama with a warped spatial scale. And the reason why it is warped, is so that it can fit all of space out to infinity in all directions, within that finite bounded sphere. What was truly amazing to me was that it was *I*, just little old *me*, drunken happy-go-lucky *Stoner Steve* that nobody ever takes seriously, could it be possible that *I* was the first to notice something so profound? And now that I was there to point it out, surely this is undeniable. Does the world *not* look just like my diorama? Surely nobody could

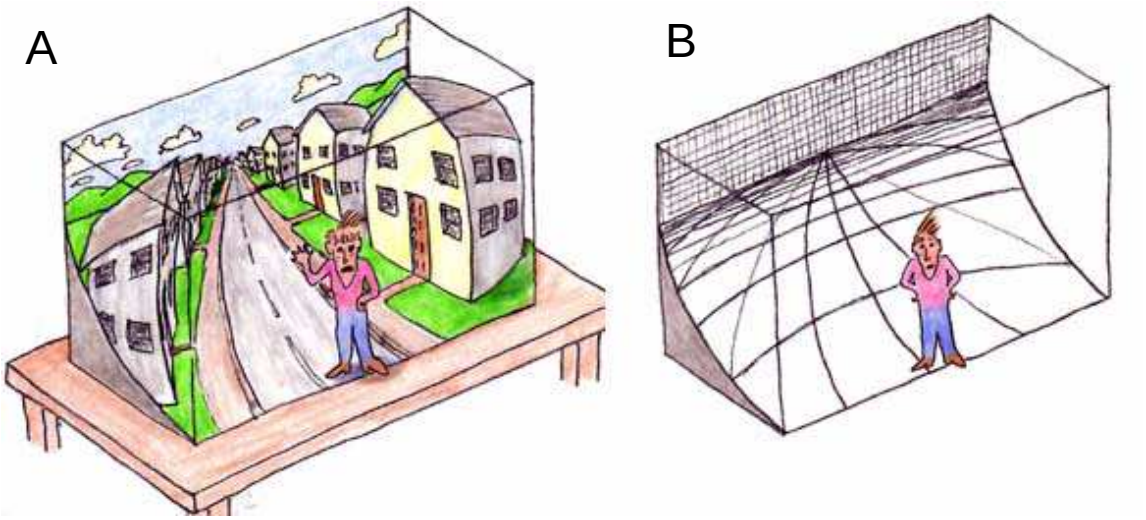


Fig. 3.2 A: The peculiar warp observed in visual experience is proof that B: the visual representation has a variable representational scale.

deny that the world of experience is both distorted by perspective foreshortening, and at the same time it *isn't*, and the fact that it has this dual character is itself the final and certain *proof* that the world we see in our experience is *not* the real world itself! It seemed damned near undeniable! And yet deny it they did!

When I dared to submit a paper to a peer reviewed journal proposing that the structure of visual experience suggests that there are actual three-dimensional images encoded in the brain, I was put through what was in effect an academic *hazing ritual* that went on for four and a half *years*, as first one of two reviewers objected: (Reviewer 1: Antti Revonsuo) "The author attempts to overthrow too many widely held beliefs without arguing against those positions in detail. He does not systematically or convincingly defeat the standard counterarguments. There is insufficient review of the actual phenomenon." Then in the second round, two new reviewers pile on with their objections: (Reviewers 2: O'Brien and Opie) "The model does not account for *all* of visual phenomenology. ... This model explains the epistemology, but not *ontology* of conscious experience. ... It is not appropriate to describe the objects of experience as the 'product' or 'output' of consciousness." ... "If Lehar subscribes to a 'picture-in-the-head' approach to visual perception he must do more to defend it against the numerous objections it faces. There is a voluminous psychological/philosophical literature on this problem, with which Lehar should show at least some familiarity." (Reviewer 3, a really ***bad*** one!) "I find the present 'aggressive tone' inadequate, and to be frank, not very persuasive. ... The author must provide comparison with *specific* perceptual theories, not general lines of investigation such as neural network models ... The author must provide a more structured comparison of his proposal with other theories

of space/form perception. ... The set of predictions presented should concern perceptual facts. After all this is a perceptual theory, not a theory of consciousness." Then, in the *third* round of review, with the addition of yet one more reviewer (to a total of 5) (Reviewer 1, the new one) "The introduction is too long, esp. philosophical name-dropping. Many theories are mentioned, but none are tackled in depth." (This in response to the newly added citations demanded by the earlier round of reviewers!) "The author must discuss higher-order isomorphisms. ... The author must show how other theories cannot satisfy the phenomenological constraints mentioned." (Reviewers 2: O'Brien & Opie) "Lehar addressed many of the minor issues we raised last round, but **NONE** of the major ones! ... Lehar's response is not really adequate, he has missed an opportunity for communication and clarification. ... He must reference Wolf Singer. ... There is inconsistency between structural & functional isomorphism. The author is careless about the vehicle/content distinction." (Reviewer 3, the really ***bad*** one!) "Unfortunately Lehar is unwilling to meet the challenge to improve his manuscript and address *constructive* criticism. This is unacceptable. I cannot recommend publication." (Reviewer 5, new this round) "There is dubious scholarship and a series of **non-sequiturs** on philosophical issues. ... It is **begging the question** to assume that conscious experience *corresponds* to electrochemical activity, rather than merely *correlating* with it. Searle is not being naive, but merely pointing out the **obvious,** that we see the paper itself, not just a percept of the paper. ... Conscious experience need not be either in the head, nor out in the world. It can be in neither place but still exist. ... Causes and correlates need to be distinguished from identities. ... How can the objects of consciousness also be the product of consciousness? ... Lehar creates a misleading account of alternative positions in order to bolster his contention that his own position is the only tenable one." (em***pha***sis added)

All this fuss, just for daring to propose that since our experience takes the form of explicit spatial structures, that therefore the brain must construct the explicit spatial structures of our experience. After all, all I was proposing was a *perceptual model*, a model of the geometry of visual *experience AS IT IS EXPERIENCED,* independent of how it was represented in the brain.

At this point in my life, I had already had several rejections by other journals, all of them unjustified, in my view, and all following the same pattern. A reviewer would make some absurd indefensible criticism, I would argue back coherently and intelligently, and my rebuttal was ignored, the editor had no interest, they had no time to read the papers themselves, so a single "no" vote from any reviewer is enough to sink the paper. Often just because the proposal was too outlandish,

they had never heard of these ideas in their own studies, so they figured they couldn't possibly be right. I had posted all those rejections, complete with my futile and impotent rebuttals, on my web site as a kind of protest against the unfairness of it all, and began to accumulate and treasure these rejections as trophies on my web site as evidence of ideas so creative and original that they are banned from public release by academic orthodoxy. So, with the Behavioral and Brain Sciences journal, I made it clear from the outset that I was posting a copy of the whole exchange on my web page, I even gave them the link.

http://cns-alumni.bu.edu/~slehar/webstuff/bubw/submitted.html

All the while, ever since the first round of review, my old friend Richard Held, a well respected researcher from the Gestalt school, student of Wolfgang Köhler himself, whom I had recommended as a reviewer, wrote: (round 1) "The provocativeness of the manuscript would excite a lot of comment and lead to productive interaction. I would be pleased to see it in print." (round 2) "I haven't changed my opinion since the first review I sent to you. Lehar's view is iconoclastic and provocative but, in my estimation as legitimate as that of the "establishment". It is well worth publishing in a journal dedicated to discussion of varied points of view." (round 3) "Although not every point has been addressed, Lehar may be right that it is simply impossible to examine in extensive detail all of the myriad implications of his approach. I recommend that the paper is accepted in its present form." (round 4) "Lehar has done justice to the comments of his referees. He is somewhat prickly in his responses but that is a stylistic factor and I don't think bears on the substance of the issues. Since all of the reviewers feel that the manuscript is publishable in some form, it seems to me that it is now ready for publication."

Thank you Richard Held! Now *there's* a man who recognizes a paradigmatic proposal when he sees one! That fellow single-handedly pushed me through the review process. Because they did finally publish that paper, to my great surprise and disbelief, because after all that wrangling I was sure the paper would ultimately be rejected, and I had started fighting back at the reviewers, with statements like: "***Hello?*** is anybody *reading* this? I already answered this question last time! ... No model can *possibly* account for ***all*** of visual phenomenology! ... The *ontology* of conscious experience is *totally irrelevant* for a pure perceptual model! ... The objects of experience *ARE* the "product" or "output" of consciousness! ... ***Dubious Scholarship?*** Oh my! What you call **"dubious scholarship"** and **"begging the question"** are exactly the paradigmatic issues that you fail to comprehend. It is not ***"begging the question"*** to propose that mind corresponds to our conscious experience, that is merely ***stating the***

thesis of identity theory! ... You assume that supervenience and vehicle/content theories [that mind and brain are distinct] are established *fact*, while identity theory [that mind is a physical process in the brain] must first be proven beyond a doubt. But both are paradigmatic hypotheses and are equally valid!... Do I have to solve the *whole problem of consciousness* just to propose that spatial experience implicates a spatial representation in the brain? ... If conscious experience is *neither* in the head, *nor* out in the world, then it *does not exist as a scientific entity!"* And to that really ***bad*** reviewer I wrote back: *"Aggressive tone?* I'll give you aggressive tone! The *"aggressive tone"* is required to *wake these people up* to their responsibility as scientists to *justify the foundations of their theoretical stance!* ... The competing hypotheses challenged by this paper are *not* specific perceptual theories, but *exactly* 'more general lines of investigation, such as neural network models.' Its a *paradigm* fer Chrissake, don't you *get* it? ... Is it not the prerogative of the *author* to determine whether this is a perceptual theory or a theory of consciousness? ... This is the kind of review I hate most of all! These criticisms are so vague as to be essentially meaningless! If this paper were revised to meet with this reviewer's satisfaction, I would ***no longer wish to be it's author!"*** (And after his final recommendation for rejection, I fired back) "This guy must be a big mucky-muck at a prestigeous institution to be such a pompous ass! ***Good riddance*** to this guy!"

(I suspect that was Daniel Dennett, *Mister Naive Realism*, whom I had also recommended as a reviewer [in my naive innocence to hear the opposing view!] but he is covered by reviewer anonymity from having to take responsibility for his judgment! In any case, Dennett won't talk to me any more.) You can read the whole ugly exchange at the link provided above, although it would take you a couple of *days* to read through the whole thing! But to the eternal credit of Stevan Harnad, the editor, who weighed in himself through the last couple of rounds of the review with objections of his own, finally agreed that his objections had been addressed, and the paper was finally published! (Lehar 2003 *b*) *Whew!*

The Behavioral and Brain Sciences journal is an *open peer commentary* journal, i.e. researchers are invited to weigh in and comment on the target article, and their commentaries, along with the author's responses, are published along with the paper. After the review process, I thought the fireworks was over, but it started back up again with the commentators.

Booth: *"There are well known conceptual reasons why no such purely introspective approach can be productive."*

Dresp: *"As a scientific approach to the problem of consciousness, the Gestalt Bubble fails for several reasons."*

Duch: *"The Bubble Gestalt perceptual modeling disconnected from neuroscience has no explanatory power."*

Fox: *"Much of the argument is based on setting up theoretical straw men and ignores much known perceptual and brain science."*

Grossberg: *"Lehar's lively discussion builds on a critique of neural models of vision that is incorrect in its general and specific claims."*

Lloyd: *"The 'Gestalt Bubble' model of Lehar is not supported by the evidence offered. The author invalidly concludes that spatial properties in experience entail an explicit volumetric spatial representation in the brain."*

And so on. I won't bore you with all of them, you can find them all at the above link if you have the patience to go through them, along with my feisty responses to each objection. All in all, there were 11 commentators who were opposed to the thesis, (Booth, Dresp, Duch, Fox, Grossberg, Hochberg, Laming, Lloyd, Markovic, McLoughlin, Velmans) 6 in support of it, (MacKay, Revonsuo, Rosenthal & Visetti, Schirillo, Tse, Wright), and 5 who were neither explicitly in favor or opposed. I really thought that after all that fireworks, my theory would get the attention of the academic community, even if only as an example of wrong-headed thinking. But the paper was simply ignored, and most people simply went on with their work. To this day, nearly a decade later, my theories are not taught in schools, neither in neuroscience as a possible principle of neurocomputation, nor in psychology as a method of quantifying the dimensions of visual experience, nor in philosophy, for its implications on the nature of mind and consciousness. The only place my theories reign supreme is on my own web site, where I get the occasional hit from the passing amateur, or civilian scientist, saying they like the ideas. Some time later I devised the Cartoon Epistemology as a kind of cartoon summary of all the futile debates I have had over the years with various people on this contentious issue.

http://cns-alumni.bu.edu/~slehar/cartoonepist/cartoonepist.html

Well this turn of events left me in a rather strange state "career-wise", if you could call my rather aimless rambling path through life a career path at all. I had given up a rather promising career in computer image processing and artificial vision to

get a PhD in Cognitive and Neural Systems, because I had become interested in how nature solves the vision problem. I was convinced that nature harbored some mysterious and elegant trick for making animals see, because we see such amazing visual performance from some of the simplest of creatures. For example the common house fly, with its tiny pinpoint of a brain, can fly effortlessly through the tangled branches of a tree or shrub, in dappled sunlight, compensating for gusty crosswinds, without colliding with the branches. This is a staggeringly breathtaking accomplishment for such a lowly creature, which seems to thumb its nose at our most complex computer hardware and software, which could not come close to that performance despite decades of research and the most powerful computer hardware. It was intense scientific curiosity that enticed me to get my PhD to see if I could try my hand at solving the vision problem. I was never a great student in school, my grades have always been mediocre, so I had no ambitions for an academic career track, I realized that was far beyond my wildest expectations. It was personal curiosity that I was seeking to satisfy, I had had every intention of returning to computer programming when I was done with my PhD.

But now here I found myself with not one, but two radical new theories which, if true, were nothing short of revolutionary! And if false, then of course I must be stark raving *mad*, because they seemed downright irrefutable from my own perspective. I hardly had a choice in the matter, I simply had to pursue my dreams and publish these ideas to share them with the world. I would worry about my career track afterwards. So at this point in my life I took a few years off to write my book and publish some papers on my theories. It turned out over the course of the next few years that my difficulties in garnering any interest in the World In Your Head idea were mirrored in my other theoretical attempt, the Harmonic Resonance Theory of brain function. I just could not seem to get any traction on either idea from the rest of the academic community. The pattern was often the same:

(Lehar 1994 *b*) “There is a consensus among all readers that the topic is interesting and the work contains some novel ideas ... the speculation about a new form of neural coding is fascinating but mainly a conjecture at this point. ... Accordingly, I must decline the paper for publication in Perception & Psychophysics.

(Lehar 1996) “The general feeling is that your work is interesting and imaginative, but not mature for appearing in print. Therefore, I regret that I cannot accept your paper for publication in the special issue of Perception. ... two of the referees were in fact quite favorably impressed by your work ... I believe that your paper presents a fresh and exciting approach to very complex issues, and that an ammended version of the model well

deserves to be made available to the scientific community. (Never did!)

(Lehar 1999) “The reviewers agree that you have tackled an important and very interesting issue and that your approach has novelty and may have promise. However, both of them criticize the manuscript on the same ground, that you have not developed your approach beyond the metaphor stage.”

(Lehar 2000 *a*) “both [reviewers] find much to admire in the manuscript but, in the end, neither considers it to be appropriate for publication in Cognitive Psychology.”

(Lehar 2000 *b*) “I have heard from my two readers of your paper and I sorry to say that neither felt able to recommend its publication in JCS. Since neither submitted a detailed report, I cannot give you the reasons for their decision. This is annoying for you as an author and awkward for me as an editor. But if a busy scholar reads through a paper, judges it unsuitable for publication, and decides not to spend further time on it, we have to accept that. At least they both responded fairly quickly.

(Lehar 2008) “Two reviewers have seen your manuscript ... and while both found it interesting and potentially significant, they also both though it premature for peer commentary at this time. One suggested ‘his creative but speculative ideas might be tested in a more specialized journal’".

And so on it went. You can read the full reviews, and my rebuttals at...

http://cns-alumni.bu.edu/~slehar/myexperience/myexperience.html

So, while working on my various publication attempts, I continued my psychonautical quest, to see if there was more to be learned about the mind from the psychedelic experience.

Nitrous Oxide, or Laughing Gas

In the mid 1990’s I continued my psychonautical investigations with the discovery of Nitrous Oxide, or “laughing gas”, and for the first time in my life, I tried the drug Ecstacy, or MDMA. Thanks to the internet, I discovered that Nitrous Oxide, or “Nitrous”, as it is called on the street, was legally available as a propellant for whipped cream. The most primitive way to consume Nitrous is to purchase a can of whipped cream, and to push the nozzle to the side, as in normal dispensing, except with the can held upright, instead of inverted as instructed on the label. This releases the propellant gas without any whipped cream, which can be sucked in by pressing your lips around the nozzle. More serious psychonauts purchase cartons of Nitrous cartridges which are designed to be used with home whipped cream dispensers, and rig some kind of system for releasing the gas. As a serious and professional psychonaut I thought it necessary to construct my own nitrous oxide dispenser out of bits of plumbing purchased at the hardware store.

Fig. 3.3 shows my “Nitrous wrench” in its final, most advanced model after several

Figure 3.3. My nitrous wrench, with the storage bag on the left, mouthpiece on the right, a carton of nitrous cartridges above, and one cartridge shown ready to be screwed in at the bottom. The puncturing pin is in the bottom piece, which is covered with “needle hitching” (nautical rope work) for insulation from the cold due to the release of compressed gas.

rounds of refinement. The core of the wrench is two sections of pipe, (at the bottom in the figure) of exactly the diameter to hold a Nitrous cartridge, and these two pipe sections are screwed into each other so as to squeeze the cartridge against a hardened steel point (at the bottom of the lower piece) that punctures the seal at the tip of the cartridge, and thus releases the gas. The key feature of this wrench design is a “T” pipe connection (at the top) with a hand valve on each branch of the T. One branch of the T goes to a plastic bag or balloon (on the left) to store the released gas, the other branch (on the right) is the mouthpiece for inhalation. With the mouthpiece valve closed, a whole package of cartridges can be released into the storage bag one by one, and the user can then sit comfortably, wrap his mouth around the mouthpiece, open the mouthpiece valve and inhale a lungful of gas, then close the valve again and enjoy the ride. This way the user can consume all the gas in the storage bag in several deep breaths

in succession, riding the crest of the wave of unconsciousness like a surfer surfing a wave.

This account of my psychonautical adventures is not to be interpreted as an endorsement of Nitrous Oxide, nor a recommendation for others to follow my example. There are several severe and even mortal dangers involved in the use of Nitrous, which the responsible psychonaut should take very seriously. In the first place, Nitrous displaces oxygen, so you can easily suffocate for lack of air. Secondly, Nitrous can make you pass out into complete unconsciousness, at which point you will no longer be able to notice that you are suffocating. People have died of suffocation by laying on the floor and breathing from a large garbage bag full of nitrous, passing out, never to regain consciousness. The cautious and responsible psychonaut should take certain essential precautions against this mortal danger. In the first place, whenever possible, you should do your Nitrous experimentation in the company of fellow psychonauts, who take seriously their responsibility to monitor your vital functions whenever you are in a Nitrous-induced unconscious state. Secondly, I endeavor to seat myself in such a way that if I should fall completely unconscious, the Nitrous wrench would naturally fall away from my mouth and drop into my lap. Thirdly, I make sure to take two or three deep breaths of fresh air between lungfuls of Nitrous, to keep the oxygen content in my bloodstream within reasonable limits.

So what is the purpose of all this dangerous experimentation with unconsciousness? Do the rewards justify the mortal dangers involved? The answer to that depends on what you gain from the experience. In the beginning, Nitrous was merely a thrill for me, akin to that appalling practice of “huffing”, that is, seeking states of unconsciousness by sniffing glue, or terpentine, or amyl nitrate, that brings spots before your eyes, and a whoozy feeling of blacking out. At first my experimentation with Nitrous was nothing more than the thrilling feeling of a rush. It is a euphoric rush however, and one which I find to be enjoyable, but not particularly enlightening. I played around with Nitrous only to leave no stone unturned, to familiarize myself with every category and classification of intoxicant. It was in the same vein that I experimented with Cocaine, Crack, and Heroine, fully aware of their potential for addiction, none of which I found to be particularly enlightening or interesting as a psychonautical tool, but I felt I had to try them just to fill out my psychonautical resume, the better to know the complete landscape of altered experience. In the case of Nitrous however, I had experienced the first of a (to me) new class of intoxicant, known in the literature as *dissociative* drugs.

Dissociative drugs are thus named because they separate or dis-associate you from the external world, that is, they leave you floating in an internal world of separate experience. I was not yet aware of this category of drugs by name, when I began my experimentation with Nitrous, but I was to discover by happenstance a new principle that seems to apply to all dissociative drugs, a principle I call *dissociative coloring* by psychedelic substances. By themselves, dissociative drugs tend to promote a kind of gray world of colorless isolation, without much in the way of interesting or illuminating images or experiences. However when taken in combination with psychedelic drugs, marijuana, LSD, or mescaline, the psycedelic drug had the effect of splashing a world of color and lively imagery into the grey world of the dissociative state, a synergistic combination where one drug provides the canvas, and the other provides the paint.

My first experience of this effect was in March 1997, when I happened to be high on marijuana one evening with friends, when I indulged in nitrous oxide. After passing around the pipe, I picked up the nitrous wrench and took several deep breaths that brought me to the brink of consciousness. The result was a stupendous cataclysmic experience, accompanied by body convulsions and weird facial expressions, and a repeated echo effect, as if there was a periodic impulse function echoing in a long pipe, like the one in the San Francisco Exploratorium. I heard sounds like Ptcheou! Ptcheou! Ptcheou! ... together with other assorted rhythmic resonant sounds “dee dee dee dih dih dih dih dih dah dah dah dah doh doh doh doh doo doo ...” The visual field turned somewhat gray and colorless, and I saw some speckly “television snow” effects, accompanied by the husssh of a gentle sand-blasting sound. I saw the visual field decompose into primitive component elements, some stark black and white patterns, and stark magenta and lime green colors.

Is it perhaps a little presumptuous to even call this a scientific experiment at all? Is there a purpose to this kind of psychonautical exploration? Well in the first place this is an exploratory experiment, one whose outcome is not predicted by any particular theory, it is an attempt to map out the landscape of consciousness to see what it can possibly contain. As for the result, that seemed very ambiguous at the time, but after many more experiments with this combination of intoxicants and others, a picture of the mind began to emerge with some rather interesting conclusions. At this point what was slowly becoming clear to me was the highly analog, or *analogical* nature of the mental representation. The mind, it seemed, was something like an echo chamber, or resonant cavity, and that in turn implied

that the brain is more akin to a musical instrument, a mechanism for promoting and amplifying analog vibrations, rather than the Boolean klunk-klunk symbolic type of mechanism embodied in the digital computer.

Tripping Hill

During this period of my life I had taken to arranging occasional “retreats” with a number of fellow psychonauts, during which we would dose up at my house, which is adjacent to a large tract of forest. The more adventurous of us psychonauts, including myself and my friend Joe, would always take a large dose of either four or five hits of LSD, to go for the maximal experience, while others made do with one or two hits. Then we would march off into the woods to a favorite hill, which came to be called “tripping hill”, where we would wile away the hours drinking wine, smoking Marijuana, and contemplating the splendor of natural beauty around us. It was a glorious magical experience to be out in the woods under LSD, and I made many profound discoveries during this era. One thing I discovered was the combinatorial effect of different substances. I already knew of the pleasant compatibility between LSD and Marijuana. The two drugs made a synergistic combination in which their qualities complemented each other, producing an experience quite different from either one by itself. LSD can be somewhat “speedy”, that is, it can have a trembling spasmodic quality similar to amphetamines, or *speed*. Marijuana tends to mellow out this speedy feeling, resulting in a smoother, more pleasant high. Conversely, smoking large doses of Marijuana can lead to slowness of thought, a heavy kind of torpor that tends towards listlessness and eventually sleep. The LSD wakes up and sharpens the experience, the “speediness” prevents any possibility of sleep, and permits a more profound exploration of the Marijuana high. A bottle of red wine was always brought along for these retreats, because the wine also helped to counter the speedy nervous jangling due to LSD, resulting in a very mellow all-around experience that was hard to beat.

It was arounnd this time that I was perfecting my Nitrous wrench. I had already made one discovery—that the Nitrous experience was considerably more interesting and colorful when consumed in combination with Marijuana. By itself, Nitrous tends to make you “black out” gradually and in stages. At first you see sparkly little points of light across the visual field, and the world turns more gray and colorless, and loses some of its perceptual depth. Passing out to Nitrous was like fading away into a gray fog of oblivion. In combination with Marijuana, however, the experience was much more vivid and colorful. There seemed to be a

lot more to be learned from it, besides the thrilling rush of euphoric unconsciousness. It was as if the dissociative, the Nitrous, set up a barrier between my experience and the external world, leaving me in a grey colorless fog of solipsistic experience, but the psychdelic, in this case Marijuana, would splash that colorless world with vivid colors, creating a more vivid internal world of experience cut off from the external world. On our next retreat in the woods, therefore, I came equipped with my Nitrous wrench and several cases of Nitrous cartridges, for consumption out in the woods to test the combination with LSD.

The first time I tried Nitrous while high on four hits of LSD was the most stupendously cataclysmic experience I had ever had in my life! I was sitting on the forest floor, loading one cannister after another into the storage bag, then I sat back and inhaled a great lungful of Nitrous. This time the world did not go gray or fill with noisy scintillating spots, but instead, the sphere of my conscious experience shrank abruptly from the size of the dome of the sky, to a smaller and smaller sphere of isolated experience, which eventually shrank to a tiny point of vivid experience, which then promptly blinked out of existence, like an old-fashioned television set when it is turned off. I did not observe this shrinking sphere of experience from the outside, but I *was* that shrinking dot, and when it vanished, so did I. I was no longer there, I no longer existed, but had reached a state beyond space and time. Then, just as suddenly as it had disappeared, all of a sudden the world of experience exploded back into existence with the power and intensity of the primordial Big Bang, and before I knew what had happened, I found myself sitting on the forest floor, with the Nitrous wrench in my limp hands, surrounded by my friends, after an absence which might as well have lasted an eternity, being a completely timeless place, while my friends had missed my company for a mere matter of a minute or two. Perhaps the most interesting period was the time of “waking up” again from unconsciousness. It felt like being born for the first time at that very moment, simply coming into existence out of nothingness, with no memory or understanding of what was happening to me, like a new born babe when it first enters the world. Time had slowed down to almost a dead stop, as I lay helpless, unable to make sense of anything around me, with no awareness of my self or my body, just an experience of pure being, and I had the strong impression of being mentally incapacitated, as if I had been mentally crippled for an indefinite period of time before coming to this state. It was at the same time profoundly frightening and confusing, and yet so powerfully intense as to make all other experience pale in comparison to this intense burst of mental existence. As the disconnected fragments of my experience would slowly

reassemble themselves into a single coherent world, I had the impression that time itself had come to an abrupt stop, before slowly bootstrapping itself back up into full consensual consciousness. And after an absence of what seemed to be ten thousand years or so, I was amused to hear the continuation of the conversation between my friends which has begun a mere few minutes ago.

There was something very strange about that moment of blinking consciousness that demanded further investigation. There was a sense of experiencing a backward flow of time, a rude violation of normal causality. Eventually I made sense of the experience as similar to a phenomenon of dreaming when I was a child. I remember waking up one morning from a frantic dream involving a desperate chase and a final suicidal plunge over a precipice, vividly experienced in all the glory of a lucid dream. And as I fell toward my doom over the cliff, I awoke to find myself slumping to the floor having slid out of my bed. But the strange thing was that the whole long and intricate dream seemed to have been leading up to this final cataclysmic moment, and yet my brain couldn't have known that I was about to hit the floor and awake just in time to hit the floor. How did my dream synchronize so perfectly with the external non-dream world? There was that same sense of backward causality, of something happening backwards in time. I now believe that the whole dream, that I would have estimated to be of at least five or ten minutes duration, had actually been fabricated in its entirety at the moment that I fell to the floor, and fleshed out "backward in time" to provide a reasonable account for the present circumstance. And so it was with the nitrous experience. Your mind is accustomed to having a running real-time memory of very recent and ongoing events, such as where you are, and what you are doing, and what you plan to do next. But when emerging from the nitrous "hole" you arrive as if newborn, with your memory wiped clean of any recent or ongoing events. You have to make it up on the fly, and in the flash of an instant your brain takes in your present experience—the blue sky dappled with green leaves overhead, arms and legs apparently belonging to you over there. I am here! This is now! And in that flash my brain would fabricate an explanation for my present circumstance reconstructed "backward in time". In the case of my dream, I woke up to the thought that I am falling through space! I am going to die! Why? How? Because I just jumped over a cliff. Why did I jump, and why am I terrified? Because I am being pursued by two winged beasts! And I've been trying to get away from them for a long time! Any explanation is better than no explanation. We cannot leave holes in our understanding, all holes must be plugged by theories, and any theory will do in a pinch when there is no better one available.

It is easy enough to talk about consciousness shrinking to a point and disappeariing, or the experience of mental fabrication backwards in time, but I cannot tell you how profoundly moving it was to actually experience these things for myself. It is something like the experience the astronauts had when they first escaped the pull of the earth and launched out into the vastness of space, leaving the earth as a shrinking blue marble floating in an infinite ocean of nothingness. To see my very own consciousness, the whole world that I know, shrink down to a little blue marble, and then explode back out into the full depth and vibrancy of life, was to frame my experience of the world in the infinite ocean of beyond-my-consciousness that lies beyond my little bubble of experience.

Ecstacy

About this time I had the good fortune of locating a supply of ecstacy. True to its name, ecstacy promotes a kind of euphoric jitteryness, in which it is just a thrill to be alive! Every fiber of your being is just quivering with energy. But ecstacy also has some interesting perceptual manifestations. In the first place there is a kind of jitteryness across the whole visual field. And this jitteryness is so pronounced that it can manifest itself in your eyeballs, that jitter back and forth at a blinding speed. If you relax, and just let the jitters take over, the oscillations of your eyes will blur the whole scene into a peculiar double image. But if you concentrate, and focus, the ocular jitter can be made to subside, and thus become less noticable or botfhersome. One of my friends got the ocular jitters so bad that he could not control them, and that preventeed him from having a good time. That was the last time he took ecstacy. I however found it enchanting. And I analyzed that subtle jitteryness more carefully. It was not caused exclusively by jittering of the eyeball, but differernt objects in the perceived world also seemed to jitter endlessly between alternate states. In fact, all perceived objects jittered in this manner, creating a fuzzy blur between alternate states. This was interesting for a psychonaut! It seemed to me that I couild see the mechanism of my visual brain sweeping out the image of my experience right before my eyes, like the flying spot of light that paints the television picture on the glowing phosphor screen. The refresh rate of my visual mechanism had slowed to such a point as to make this sweep visible to me. Very interesting indeed!

Candy-Flipping

Having access simultaneously to ecstacy and LSD, I tried my hand at the practice known in the drug literature as “candy flipping”, that is, taking ecstacy and LSD in combination. The combination is so unique and different from the experience of

either drug in isolation, that it has earned its own unique name. Under LSD and ecstacy I could see the flickering blur of visual generation most clearly. And I saw peculiar ornamental artifracts on all perceived objects, like a Fourier representation with the higher harmonics chopped off. LSD by itself creates sharply detailed ornamental artifacts, like a tranparent overlay of an ornamental lattice or filigree pattern superimposed on the visual scene, especially in darkness. Ecstacy smooths out those sharp edges and blurs them into a creamy smooth rolling experience. I would sometimes feel some part of my world suddenly bulging out to greater magnification, like a fish-eye lens distortion appearing randomly in space, stretching everything in that portion of space like a reflection in a funhouse mirror. But it was not an actual bulging that changed the shape of the visual world, but more of a *seeming* bulging, that was perceived in an invisible sense without actual distortion of the world. For example one time I was putting on my boots to go outside, and as I reached down to pull on a boot, I suddenly got the impression that my leg grew to ten times its normal length, but I could still reach my boot because my arms had also grown by the same proportion, as had the whole space in that part of the room. Nothing actually looked any different after this expansion, it was just my sense of the scale of the world that had undergone this transformation, and even as I contemplated this, and finished securing my boot, the world shrank down gradually back to its normal scale again and the distortion vanished.

I have theorized that the way that ecstacy achieved its creamy smoothness is by dithering or alternating so fast between perceptual alternatives as to blur them together, like a spinning propellor that appears as a semi-transparent disc. At this level of observation I was unable to get my co-trippers to see the features that I was seeing. I would ask them when they saw that line of trees, did they not see illusory projections, like a transparent overlay of vectors projecting up from the trees into the blue sky that I could see? They did not see these things. So don’t expect to see what I see when I take LSD and ecstacy. I report my observations as I experience them, but observation of the psychedelic experience is every bit as subjective and variable as any phenomenoligical observaton of our own experience. What stands out for one observer might remain completely obscure to another.

But the features I observed in my psychedelic experience all pointed toward a single self-consistent explanation of the mechanism of experience. It appears that the spatial structure of visual experience is swept out by some kind of volumetric

imaging mechanism with a periodic refresh scan, not unlike the prinicple of television imagery, but extended into three dimensions. This was interesting indeed!

Chapter 4

Into the Depths: The Dissociative Experience

Deeper Dissociated States

Around the time I was experimenting with ecstacy and LSD, I discovered a whole new class of drugs, the dissociative drugs. Unbeknownst to me at the time, my experiments with Nitrous Oxide had been my first foray into the dissociative realm. Perusing on the internet brought my attention to Dextromethorphan, or DXM, known in the drug world as “Robo”, because it is the active ingredient in Robutissin DM, the cough medicine. Following my education on the internet, I took my first Robo experience by slugging down a whole bottle of the sickly sweet Robotissin syrup, which I could only hold down for a while before it all came back up again. The result was a state of profound mental befuddlement. I really had no clue at all. I became very uncoordinated, and could only move slowly like a sloth, for fear of losing my balance and falling over. And my thoughts shrank down to a tiny trickle of one intense but simple thought at a time. It was only by accident that I discovered the unique power of Robo. I was lying on my bed, probably wondering why I was doing this to myself, when I noticed a peculiar phenomenon. When I closed my eyes, the world around me *failed* to disappear! There it was, bold as brass, right there before me in all its color and glory, while my eyelids were firmly closed! I blinked open, then closed again. No difference! My eyelids had become transparent! I could see right through them! What was actually happening was that my mind had made an image of the world before me, partly as a visual after-image, and partly by visual memory and perceptual filling-in, and it was presenting that image to me with eyes closed as if my eyes were still open! It was absolutely extraordinary! It was only on a later occasion, several years later, that I discovered that these hallucinations need not be boring copies of consensual reality, as had occurred in this case, but if you just ask for them to present something more interesting, they will happily oblige! In other words, Robo gives you the power to produce full free-wheeling hallucinations on demand! You can experience virtually anything you want, if you can just imagine it! Those of you who are familiar with the phenomenon of lucid dreaming, the ability to have startlingly real and vibrant dreams which can also be brought under voluntary control, already know of this wonderous capacity of the human mind, to build complete synthetic hallucinated worlds of visual experience every bit as vivid and

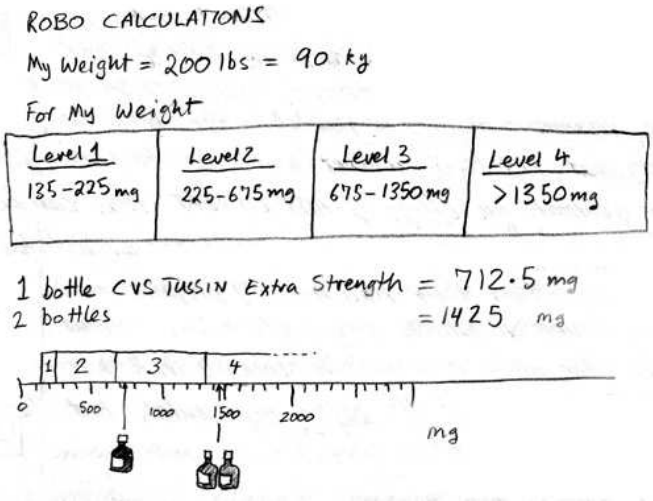
apparently real as the waking world. If nothing else, this should clearly clinch the case for the World In Your Head.

On the internet I later read about robo parties where people would assemble in one room, consume Robo simultaneously, then they lie back and close their eyes and share a collective hallucination. For example they might agree in advance to take a trip to the moons of Mars. Then they all lie down and close their eyes, and their collective trip would begin. One will say “fasten your seat belts”, another will hit the launch button, a third might remark on the rumble of the rocket and the view of the sky out the viewport, and everything that they describe is hallucinated by everyone else simultaneously, although each in their own personal way, so they are literalling sharing a single consensual experience, except this time totally de-coupled from objective external reality. The very existence or possibility of this capacity is very instructive of the principles behind human perception.

In my own solitary explorations of the dissociated state I put this imaging power to the test, with a combination of Robo and Marijuana. This time I had read about a chemical procedure by which one can separate the Robo from the Robitussen DM with an acid / base reduction process. I carefully followed the directions in my kitchen, and what emerged after a couple of hours of mixing and boiling, was a glob of clear goo at the bottom of my beaker. I tasted it, and it tasted like hell fire! It was inconsumable! So I stirred it up with some orange juice and slugged it all down. I immediately felt very very sick, and after no more than about a minute, it all came back up again, to my great releif. But the chemical had done its thing, and I was plunged into a state of the deepest mental confusion. I retreated to my tripping room and reclined on my recliner, took a few notes in my notebook, and recorded the time. The image of the clock, and everything else in the room, was double. Even with an effort of will, I could not fuse my binocular vision, so it became more easy and comfortable to just close my eyes. What followed was some number of hours of the wildest mental confusion, with senseless whirling images tumbling through my mind, one following the next in completely senseless procession. I just let it go and went for the ride, having lost all sense of who or even what I was, or where I was located. All that existed for me was those chaotic tumbling patterns. Figure 4.1 shows some notes from my lab notebook showing A: dosage calculations based on research on the internet, and B: a trace of the time course of this particular trip.

That night I did not sleep at all, but lay awake all night in a more placid mental state, eyes closed, but in a glowing luminescent experience. But all around me,

A



B

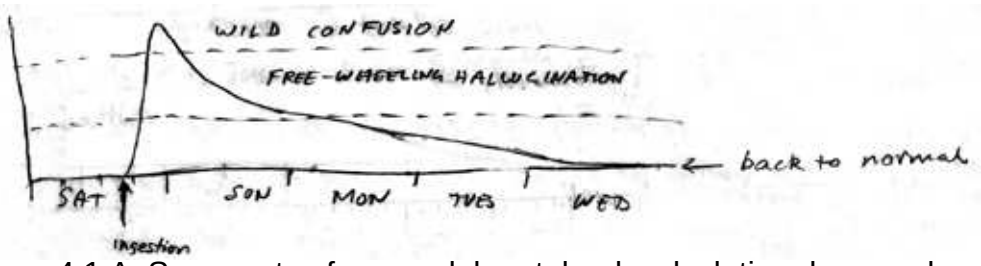


Figure 4.1 A: Some notes from my lab notebook calculating dosages based on research on the internet. B: A trace of the time course of this particular trip.

surrounding me like a great dark cave, was an inkling or impression of my body as a huge surrounding structure, and it was breathing and snoring as if it were in the deepest sleep. I was sleeping it off, and yet at the same time I was wide awake, and yet I felt like I was getting the benefit of a good night's rest, only without the unconsciousness which normally accompanies deep sleep. With every inhalation of breath I felt a deep urge for mental relaxation deeply satisfied by my stupified state. And with this experience emerged a thought, mostly in retrospect a few days or weeks after the fact, that perhaps this experience of wakeful sleep was not as anomalous as it might seem, but different only in magnitude from the more normal experience of sleep. In other words, I could see a real posibility that we are not really unconscious, even in the deepest sleep, but merely unable to recall our experience after the fact. This has profound philosophophical consequences for theories of the purpose or function of conscious experience. The received wisdom in our generation is that consciousness serves no purpose, because unconscious behavior is sometimes observed. For example when driving down a familiar road, one can often have no recollection of the experience after the fact. But if you are interrupted during this experience, you always report being conscious at the moment, so it is perhaps only the memory or recollection of the experience that is missing. And likewise, with apparently unconscious behavior, like the ability to

wake one's self up in the morning for an important appointment even without an alarm clock, is often considered a demonstration of unconscious behavior. But it is at least equally likely that we are dimly aware of the passage of time throughout our sleep, and are dimly aware when the world beyond our closed lids brightens up a bit, but we awake in a mental fog that quickly erases all memory of that sleeping experience.

In any case, I "awoke" the next morning in a very gray and colorless foggy space with little in the way of mental images, just a gray sense of being trapped within the vast cavern of my mind. I opened my eyes to a double-image world, and found the pipe thoughtfully pre-loaded with marijuana that I had left for myself, along with the clock and notepad, before launching into the experience the day before. And sure enough, consistent with my new theory, after smoking the pipe, I closed my eyes and found that the internal world was now splashed with color and light and all kinds of interesting shapes and patterns. I had arrived in the state I had been targeting all along.

Once I realized that I was in the free-wheeling hallucination stage, I took a look at the experience. Where was my body? I was in a space somewhat like the last room I remembered being in, but I had no body! Or did I? When I looked down at my hands, (with eyes actually closed) there they were, floating in space, disconnected from anything else. And the rest of my body was just gone! Or was it? When I asked myself about it, there it was! Or I could make it disappear again at will! My choice! I was like God who can think any thought, and it becomes reality. So I thought to myself "let there be a table", and there was a table! Right there in front of me! A rectangular top, four legs, aspect ratio about 1:2, just your typical canonical table. And I could rotate it in my mind's eye to see it from any angle I chose, and I could translate, rotate, and zoom my viewpoint by just wishing it. I could even turn my viewpoint upside-down. I tried it! And when I zoomed in to examine the table closer I discovered a strange thing. If I did not bother to imagine a body for myself, then I had a disembodied experience, like the view from an eyeball floating in empty space. I could see a view from a point, but there was no body or self at that point. And in this disembodied state there was no longer an objective sense of scale. When I zoomed in to take a closer look at the table there was no distinction between my looking from closer, and the table simply zooming to larger size. Zooming in on the table was at the same time shrinking down to the size of an ant. This gave direct meaning to Empedocles's dictum that *man is the measure of all things*.

But there were limits to what I was able to image. For example I tried to fulfill one of my long time fantasies, and fly a Spitfire in aerial combat in the Battle of Britain. “Let there be a spitfire cockpit around me”, I commanded, and there it was, with a view of the English countryside from 20,000 feet. But the picture was not very good. I could only see one instrument at a time on the panel, and even that only with an effort, and the view of the world around me was very sketchy and simplistic, so I gave it up after a while. I guess there are limits to the power of imagination in the dissociated state

It is extraordinarily difficult to keep one’s head in such a dissociated state. The free-wheeling hallucination stage follows only after a period of such profound confusion and dissociation that no coherent pictures can form, there is just a wild roller-coaster ride of one fantastical vision after another in such a nonsensical sequence as to make your head spin. When things settle down a bit, and your experience settles into a more stable, coherent state, it is hard to remember that this journey was taken for a purpose, and that the scientific psychonaut should remember to observe and remember as much as he can. The experience is generally a chaotic blur, with little flashes of imagery that are later recalled piecemeal. For example I remember seeing a head, in 3-D right before me, but it was flickering and flashing at a truly blinding rate between millions of variations, a black face, a white face, a man, a woman, an ape, an android, but flashing so fast between these countless alternatives like fanning rapidly through a picture book with your thumb. I found it extraordinary that my mind was capable of such rapid switching of imagery, especially considering the fact that the mind is slowed considerably by the effects of dissociative drugs, and that was probably the only reason that I could distinguish the fleeting individual heads at all. Under more normal consciousness the many heads blur into one general head of indefinite features, the general concept of head that applies to all heads, and thus to none individually. In retrospect, after much contemplation of this and other similar experiences, I came to hypothesize that I was seeing the method by which the brain expresses the general concept, which it does apparantly in a very literal way, as a kind of probabilistic superposition of mutually inconsistent alternatives through which it cycles at a blinding speed. This is what your visual system does in a flash when a new face appears, before settling on the one face recreated from memory that best fits the sensory evidence before us. This was a profoundly moving discovery.

The dissociative state does more than just dissociate your experience from the external world, creating a solipsistic inner experience, but it also dissociates one brain area from another, causing a mental fragmentation in which one no longer feels like a single individual, but as a kind of fragmented collective consciousness almost like a multiple-personality syndrome, or a cacophany of asynchronous “group thought”. The most direct and obvious manifestation of this strong dissociation was seen in vision turning double, as also happens when one is profoundly drunk. It just becomes too great an effort to keep the two eyes fused, so one tends to relax and just let the world turn double, each eye ignoring the experience of the other, and thus, it is normally more relaxing and less disturbing to simply close your eyes, and in the dissociated state this does nothing to reduce the vividness or clarity of the experience. Thoughts also dissociate from each other, allowing one part of your mind to think one thing, while another part thinks something completely different. Your mind becomes a cacophany of discordant voices, you lose your sense of being a single self. This also was a fascinating experience with profound philosophical implications.

There is a strange sense of space that takes over as your world of experience becomes dissociated, as your perceived body fragments into a million pieces and and dissolves seamlessly into the surrounding world of non-self, or perhaps it is more accurate to say that the self expands outward to encompass the whole world of your experience. Your self is transformed from a central body-shaped object, to a larger spatial void that is just crammed full of images madly morphing from one pattern to the next. This world is your *all*, it is the screen that defines the maximum extent of your possible experience, just as a television screen, with its glowing colored dots, defines the full range of all possible images that can be expressed in that gamut of colors. And during the free-wheeling hallucination stage, I would experience a succession from one moving experience to the next, from Egyptian pyramids in a desert, to the mountains of Mars, to people, faces, creatures, concepts, and wild pattens in an endless state of flux. It is one thing to read about these experiences as happening to someone else, but it is quite another to “be” those endless visions, and to have them be as real to you as any experience in the real world!

I came to call this phenomenon the “egg world”, a roughly ellipsoidal volume of space stretching to often dark shadowy and indistinct limits, like the dome of the sky matched by the bowl of an inverted sky, but with a curious missing hemifield back behind what would have been behind my head, a volumetric space in which

the images appear, morphing from one interpretation to the next, like a surrealistic painting by Dali. In fact, the radical transformation of one object to something completely diffent, was typical of the visual transformations, they tended to shift abruptly like one of those Gestalt illusions where a young lady is transformed into an old hag, and back again. In this profound state of intoxication I lost all sense of the distinction between the world itself and the experience of it in my mind. I got the sense that I was directly experiencing the cataclysmic transformaton of the universe, or at least the only universe of which I was aware, and that whole universe was exploding into senseless fragments. I felt I was witnessing the cataclysmic birth or death of the entire universe, witnessed not by viewing from the outside, but by *being* the universe undergoing those cataclysmic events. There was nothing else beyond myself that entered into my awareness, I was isolated in a kind of “brain in a vat” solipsistic experience disconnected from external reality.

And yet at the same time I had a sense that my universe was finite and bounded, delimited by the outer shell of the egg-like space, a surface whose distance was indefinite or fuzzy, or changable, not unlike the space you see before you with eyes closed, or in pitch darkness, and the dimensions of that space seemed to depend on what was being imaged in that space. I had a claustrophobic sensation of being trapped within the confines of this egg-shaped world, and in that thought was embodied the notion of the possible existence of something else beyond, of the great infinite blackness of non-experience beyond the limits of my experienced world.

And with that thought, there came another, which I found even more moving still. With that thought came a thought, why do I have to be trapped within my own self? Why can't this beautiful energetic spirit that is me, escape the confines of my brain, and go out into the external world? Not as a supernatural spirit, I don’t believe in those. But as a resonance in some kind of resonator built for that purpose, that operates on the same essential principles as the resonance in our brain. Why don't we build machines that have the same power of dynamic image generation as our brain, and thus, create consciousness beyond the biological mind? And if we can create resonators that replicate the principle of the human brain, we can then interconnect them in a global network, where the images in the various resonators would be coupled with each other so as to produce a single emergent global mind, distributed across all the resonators in the network. It is

hard to express the profoundly moving nature of that thought. This was the philosophy of experience seen in a completely different light.

There was another aspect of the dissociated psychedelic experience that impressed itself on me, and that was the sound that I heard. Although I tended not to notice unless I attended to it deliberately, there was a strange and constant sound in the background during all these experiences, and that sound could be described as the thrumming of some great machine, or the drone of enormous deep organ pipes that vibrated to the core of my soul. There was a kind of “chugga chugga chugga” or “thumpa thumpa thumpa” sound, but that was only one component. On top of that were higher pitched and faster cycling sounds all the way to the highest audible tone, and these sounds were rich and deep and periodic and chaotic, all at the same time, impossible to describe. I came to believe that this was the sound that my brain makes when it is thinking. This is the sound of thought.

Angel Dust

Around this time I had made the acquaintence of a fellow psychonaut, Benoit, from Canada, by email, who very kindly agreed to send me a package of PCP, known on the street as Angel Dust, or “dust” for short. Actually I had encountered this drug unknowingly several years earlier, while tripping on LSD at a party where somebody passed around a joint laced with PCP. It was the only time in my life that I have been dosed with something without my knowledge or approval. (Not that I would have complained!) But I noticed the effects immediately.

At first, the world just seemed to become somewhat unreal--I just couldn’t believe that the world around me was the real thing. It seemed too bright, too vivid, and too spectacular to be a regular scene. It was as if I were on a theater set, where everything was just a cardboard facade, and yet painted in gaudy colors and under intense illumination, so as to seem hyper-real, and thus ultimately unreal. I remember having an intense experience of the spatial aspect of experience, I became conscious of the empty volume of the room around me, as if that space were filled with an array of invisible styrofoam blocks, stacked in rows and columns from floor to ceiling, filling the empty space of the room entriely. It was like I was seeing the fabric of reality showing through even in thin air, where it presented a kind of angular texture, reminiscent of the faint-printed grids on graph paper, but extended in three dimensions. The world seemed somewhat unreal, and in that unreality it took on a powerful beauty that the real world does not have. A grimy dented trash can on a filthy street corner looks ugly and dismal and plain.

But an artist's painting of that same trash can looks vibrant and beautiful exactly because it is unreal, because it is not a grimy trash barrel, something nobody would want in their house, but a cleverly devised layer of paint on canvas contrived to look like a dirty trash can, and that representational unreality makes it an object of great beauty, even more so if the artist deliberately exaggerates the colors and contrasts and textures, as it appeared in my experience at the time. When walking down the street at night, some time later, I was amazed how vividly the houses seemed to glow with their internal light, and how vividly three-dimensionally spatial they appeared, for all the world as if they were solid three-dimensional structures. Now if you believe you are seeing a house, it is quite unremarkable that it should appear as a three-dimensional structure, because that is exactly what you believe it to be. But if the experience becomes just a little too bright and lurid to be believably real, then suddenly it becomes a spatially structured *experience* of a house, rather than a house itself, and thus suddenly you come to appreciate the magical wonder, not of the existence of spatially structured houses, but the wonder of the *experience* of the house, as wonderful and unreal as an illuminated cardboard model of a house on a theatre set, glowing with an internal light.

But that was merely a "party dose" of the drug, several years earlier, enhanced by LSD. Now that I had a whole package of the stuff, I set out to achieve the "dissociative dose" of the drug, as I had read about it on the internet. I sat down at my desk in my office one night, sprinkled some PCP on top of the pot in my pipe and smoked. Figure 4.2 shows the sketches I made in my experimental notebook shortly after the experience to depict the visual transformations I had experienced. The first frame shows the corner of the room I was facing. In the second frame the

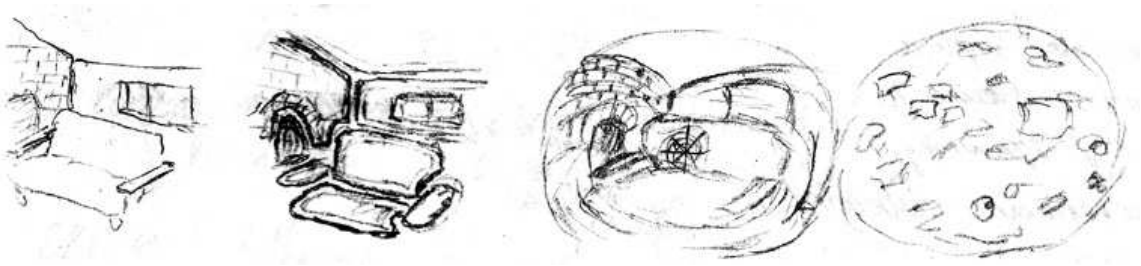


Figure 4.2. My sketches the next day of the dissociating progression of experience after consumption of PCP and Marijuana.

world became somewhat faded and grayish, with sparkling scintillations like the ones you see when you are about to pass out. Then the whole room seemed to warp like a fish-eye lens view, after which the parts of the picture began to disassociate into an assembly of visual fragments floating about disconnected

from each other. This was a total dissociated state. And it was absolutely breathtaking to see my world dissolve in that way. It is one thing to see the sequence of pictures in Figure 4.1, but quite another thing altogether to *be* that experience, because as the world dissolves into the fully dissociated state, your own body disappears in the process, and thus your sense of "self" either ceases to exist altogether, which is curious because you continue to have experiences in the absence of an experiencer to experience those experiences, or the sense of "self" is forced to migrate out to occupy the experiences that you are having, in which case you *become* those experiences. Your self is no longer a human body, your self has become a spatial void of finite size, filled with crazy chaotic spatial thoughts, patterns, images, and sounds. This profound transformation cannot help but alter your whole philosophy.

Theoretical Implications

So besides shattering one's comfortable naive realist philosophy, what else is there to be learned from this strange dissociated state? I began this investigation in the confident assumption that whatever it was that would happen during a dissociative trip, it must reveal something about how the mind works. What did I discover about the workings of the mind?

It is clear that the mind has a powerful imaging capacity, that many thoughts take the form of spatial images in our experience, as if the magic lantern in our brain had an image generation mechanism that can conjure up explicit spatial images. There is also a curious echo-like quality to the Angel Dust experience, similar to the sounds I had heard under Nitrous Oxide. On one occasion I recall an experience that felt like I was the water at the bottom of a dark well, when a single drop falling from above struck my surface, and sent my experience spreading out in every direction like the rings in a pond. My brain was like that dark pool of silent water, my mind was the waves that rippled its surface, reflecting, refracting, and eventually dissipating to a quiet hum of tiny ripples. What was unique about this experience is that it came entirely devoid of any understanding or knowledge of anything else. It is like I was the water, and nothing but the water, with no thoughts or experience besides just my waves. I was struck by the thought that if my mind, composed of waves of some sort in my brain, was conscious of its own existence, then surely the dark pool must also experience the waves on its surface, and that waves on a water surface was more than just metaphorically similar to mind residing in the brain, but that water must itself have a primitive primal consciousness of its own patterns of propagation and oscillation. Just as our mind

has no inkling of experience of the brain that sustains it, so too do the waves have no inkling of the water surface on which they propagate. I have come to believe that if the energetic waves of activity in our brain are conscious of their own existence, as seems to be the case, then the waves on water must also have a simple but powerful primal experience of their own energetic wave-like propagation. Experience must pre-exist in some simple primal form in physical systems, otherwise there would be no raw material out of which evolution could have sculpted the elaborate ediface of our conscious experience. You cannot paint a painting without paint or canvas, and likewise, a complex conscious experience cannot exist without some basic primal stuff out of which it is to be composed. In *information theoretic* terms, the color qualia are the *carriers* of the information in conscious experience, the information itself is expressed by the *modulation* of those qualia across space and time. Information cannot exist without some kind of carrier to carry the information.

There was one more profound insight I had under PCP, that concerned the nature of abstract, symbolic thought and cognition. If mind posesses a powerful imaging capacity, capable of forming any image that you can dream or imagine, it is easy to see how those images can represent concrete concepts, like a tree, or a house, or the ace of spades. But what of more general abstract concepts? How are they to be represented in image form? Under PCP I found an answer to this question by introspective observation. Consider the numerical concept “three”. It appears in the mind’s eye as three nondescript “things”. But what does a “thing” look like when it remains unspecified? It seemed to me that what the mind does in such cases is to express the concept “thing” as a simultaneous superposition of EVERY possible “thing”, all experienced in a semi-transparent manner superimposed on each other, or flickering at a breathtaking rate between all possible 'things”, each individual thing appearing for the briefest fleeting fraction of a second. The action of the dissociative drug slows down this blurring motion enough to catch a momentary glimpse of each “thing” as it flashes in and out of existence, like the many different kinds of heads described earlier.

Each “thing” is experienced as a kind of nucleus of condensation, a center of energy trying to turn into something more specified and substantial, but remaining in an indeterminate state exactly in between all possible things, or being all possible things all at the same time simultaneously. Three such “things” can appear to the mind’s eye either as three “things” in a straight row, or as three “things” at the corners of an equilateral triangle, but just as each “thing” cannot

specify what it is specifically, so too does the concept “three” not specify the exact arrangement of the three “things”, only the fact that there are three of them. I found I could move those three “things” around in my mind to any configuration I chose, for example two of them over here, and the third over there, but when I let go, and allowed them to find the most comfortable configuration, they would naturally fall back either into a straight line, or an equilateral triangle, that seemed to be the lowest energy state for the concept of “three”.

The concept of “three RED things” is similar, except that the nondescript objects are all red, of various shades, whereas “three BIG things” apeared as three of those nondescript nuclei of perceptual condensation, except that they were all BIG. In other words, any adjective can be applied to the nebulous notion of “thing”, and it would modify the nondescript “thing” accordingly. A“long thing”, a “fat thing”, a “flat thing” a “heavy thing”, each creates its own specific mental image that specifies all that is specified in the words, yet all else that is not specified, remains in the indeterminate state. This is a truly novel concept of mental image manipulation that emerged directly from my introspective observations under PCP.

As to whether these observations are reliable as to the true nature of mental representation remains to be determined. My experience was not proof, but just a hint of a possibility. But even as a hint of possibility it is a powerful idea, because the concept of an imaging mechanism that can remain in indeterminate states, or cycle rapidly between an infininite range of possibilities, is a novel concept that addresses the most profound issue concerning mental imagery, how a mental image could possibly represent an abstract concept.

And once I had come upon this basic insight, others followed logically. For example the concept of “above” or “below” can be expressed by two “things”, one above and the other below, specifying the spatial relation in explicit spatial form, while leaving the objects of the relation in an indeterminate state. Furthermore, the two “things” are not identical, but they are distinct, distinguished by the fact that one of them is considered to be “this”, or “this thing”, whereas the other represents “that”, or “that thing”. For example in the statement “this is above that”, the subject of the “above” relation is above, the object is below, whereas in the concept “below”, it is “this thing” that is in the below relation, whereas “that thing” appears above in the spatial relation.

Again, my having experienced my cognitive thought processes in this spatial manner does not prove that that is the way concepts are represented in my brain. But it does open a theoretical possibility that this *may* be how abstract concepts are represented in the brain, and that is already a novel proposal with powerful theoretical potential. Figure 4.23 shows figure 9.5 of my book The World In Your

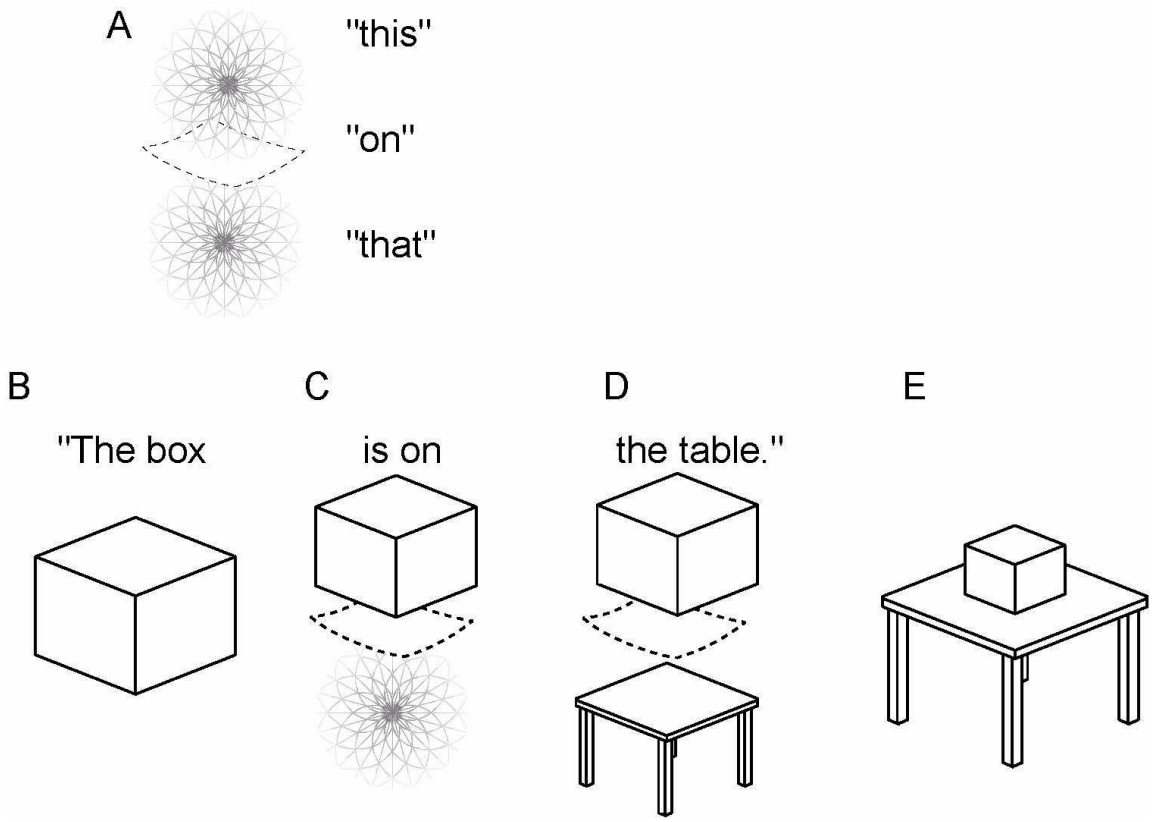


Figure 4.3 A: A mental image of the concept “on” as a “this” on top of “that”. B through E: The progressive evolution of mental imagery as a simple sentence is parsed into a mental image.

Head (Lehar 2003) where I elaborate on the image theory of language and cognition. Figure 4.3 A shows the spatial concept of “on”, which is similar to the concept of “above”, except that with the “on” relation, the weight of “this” impinges directly on “that”, which, in the elastic cartoon world of mental imagery, squashes “that” slightly under the weight of “this”, although by exactly how much, depends on the specific weight of “this”, and the softness or plyability of “that”, factors that remain unknown until those objects are more precisely specified. Figure 4.3 B through E shows the progressive evolution of the mental image as the sentence “The box is on the table” is parsed and interpreted in mental imagery. The words “The box...” stimulates a mental image of a generic box, of average size and typical aspect ratio unless otherwise specified. The next words “...is on...” stimulate the mental image of the “on” relation of “this” on top of “that”, and since

the box is already resident in image space, it becomes immediately associated with “this”, creating the mental image of a box on top of “that thing”, the unspecified object of the “on” relation. The following words “...the table” are immediately associated with “that thing”, creating a mental image of a box on a table, as suggested in Figure 4.3 D, but since a canonical box is typically smaller than the canonical table, the box shrinks somewhat while the table expands, the box moves into physical contact with the table, and rotates to match its orientation, resulting in the complete mental image shown in Figure 4.3 E, of a box on a table.

This theory of mental imagery as a basis for language and cognition, may or may not ultimately prove to be right. And I can almost guarantee that anyone other than myself pondering these questions under PCP would not come to the same conclusions or make the same introspective observations as I have. So mental imagery under PCP does not offer direct proof of anything in particular. But my own introspective analysis of my thought processes seems to suggest, at least to my satisfaction, that this is how I process linguistic and cognitive information, and I would probably have never come upon this observation except for the fact that the extreme state of intoxication induced by the Angel Dust put my mind into such an unfamiliar state, that I was able to perceive aspects of my cognitive processes which would otherwise have gone completely unnoticed due to the extreme familiarity of my cognitive processes which make them nearly invisible to introspection. It takes a dissruption of your normal mental balance for you to even notice what is going on in your mind all the time.

Chapter 5

Ketamine: The Ultimate Dissociative

About this time I came upon a book by D. M. Turner (1994) called The Essential Psychedelic Guide, in which he sang the praises of a new drug I had never heard of, *Ketamine*. Ketamine is an animal anesthetic, also used for children and old people, because the lethal dose is so much higher than the regular medicinal dose that there is little danger of accidental overdose. Paradoxically, the "recreational" dose of Ketamine is even lower than the "medicinal" dose, because the medicinal dose will knock you out into complete unconsciousness, whereas the recreational dose is supposed to take you half way there, into a state of semi-unconsciousness where the rich psychonautical experiences are to be had. In fact, the psychotropic effects of Ketamine were only noticed when people recovering from general anesthesia started reporting "emergence" experiences as they regained normal consciousness. Another oddity of Ketamine is that despite its extraordinary intensity, it has a very short duration, from minutes to an hour depending on dose, from which one comes down rather abruptly in discrete step-like stages which leave one's head spinning in wonderment. Ketamine has been called the "businessman's drug", because it is possible to have this rather extreme experience during your lunch break and return to work in the afternoon.

D. M. Turner writes "Ketamine is the most intense, bizarre, and enjoyable psychedelic I have tried." In his description of the high, Turner writes "As the high is coming on there is a break in the continuity of consciousness. Soon after this point I find myself in a swirling psychedelic universe. There is no concept that I am currently high on a drug that I'm going to come down from. Frequently there is no recollection of ever having been myself, been born, had a personality, or body, or even known of planet earth. The experience is one of being in total orgasm with the universe. I feel like I'm in hyperspace, simultaneously connected to all things. Billions of images and perceptions are simultaneously flowing through my circuits. I am not locked into the current moment. I experience backwards and forwards in time as well, with the current moment being the center of intensity." When I read those words in 1997 I determined that I would have to try that one for myself! I mounted an intensive search on the internet, and finally I found a kind soul called Bryan from Florida, who sent me a couple of vials of Ketamine for $50 per bottle. Figure 5.1 shows some notes from my lab notebook from that time.

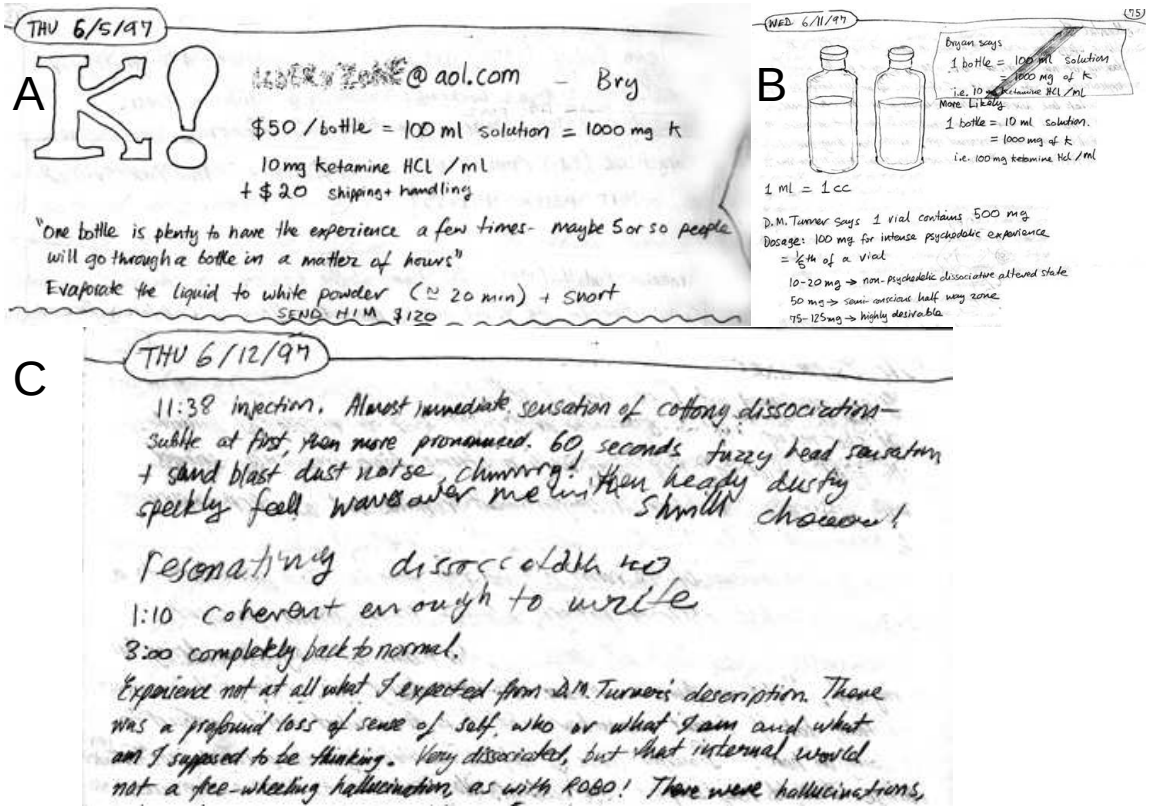


Figure 5.1 Notes from my lab notebook recording A: triumphal report of first aquisition of Ketamin, B: dosage calculations, and C: notes from my first trip on Ketamine. The words “Churrrg!” and “Shrill Chowheeeel” indicate the sounds that I heard. “Resonating dissociation, no ... [ability to continue taking notes].

At first I tried it all by itself, injecting it intra-muscular (IM) as recommended in the on-line literature for the maximal effect and least waste. This was a new psychological frontier for me, I had never ever used a needle for drugs, and had never imagined that I ever would. I have always been horrified by the idea of sticking a needle in my arm. Even when I go to the doctor's, it is not the tiny pinprick pain that bothers me so much as the rude invasion of my living flesh ripping through my tender tissues. I am ceaselessly amazed at how the body recovers from this violent invasion and seals itself back up again as if nothing had happened. But as a serious and devoted psychonaut I felt I owed it to myself to take this challenge seriously and do it like the professionals. A nurse I know very kindly donated a couple of needles she picked up in the hospital, and taught me how to insert the needle through the rubber stopper of the vial and draw up a measured quantity, then to invert the needle point-up and tap gently to raise any bubbles to the top, then to eject them by pushing the piston in until a tiny drop of the liquid appears at the tip of the needle. With my arm carefully swabbed with an alcohol wipe, I inserted the needle into the muscle of my arm (Ketamine is

administered "IM", intra-muscular, not "IV" intra-venous) pushing it deep until it struck the bone, then backed out a bit to target the center of the muscle, and slowly and steadily pushed the piston all the way to the bottom. This done, I put the needle away for later re-sterilization by boiling, and I sat down in my recliner with my notebook handy, ready to take notes of the experience.

The first chaotic stage

At first I heard a kind of whine, an amplification of that tiny humming-hissing super high-pitched note that you can always hear in your ear even in pitch silence, that became louder and higher frequency, sounding like a jet engine spooling up to full power. At the same time my visual field filled with a speckled scintillation like television "snow", colors faded to a grayish tone, and the sense of depth diminished, the world became a flatter two-dimensional surrounding surface. Then quite rapidly and abruptly I fell into a state of complete mental confusion like I had never experienced before. The experience is truly ineffable. What I describe here is impressions from a number of Ketamine experiences, carefully recalled and pieced together after the fact as I later came to make some kind of sense of them. I immediately lost all sense of myself having these experiences. I lost all memory of who I was or where I was, or even what I was. My body vanished, I found myself in a great dark void. I was not the normal "me", but rather I became a chaotic bundle of intensely powerful but totally incoherent shapes and sounds and feelings. And I lost all sense of time, I fell into a timeless place that might as well have been an eternity. There was no sense of past or future, just the immediately given moment happening immediately in real-time. And at the same time I had the impression (metaphorically speaking) that my mind was laid out as if in a coffin that was then topped off with fresh cement, and the cement slowly set, locking my mind firmly into tighter and tighter confinement until all I could do was to twiddle the tips of my mental fingers and toes just the tiniest little bit. And this was my experience, my thoughts and experiences clamped down as if in a vice, with hardly any residual degrees of freedom. It was not particularly pleasant, this feeling of mental confinement, I had lost all sense of free will, it was just a wild roller-coaster ride over which I had no control whatsoever.

Now why would anyone want to put themselves through such an extreme experience? From the "inside" it felt as if something profoundly catastrophic had occurred, as if I had suffered traumatic brain injury and had become a helpless mental cripple. In fact, that is exactly how it felt, and like a patient that has indeed suffered traumatic brain injury, I felt an urgent desperate desire to try to make any

kind of sense out of this senseless tragedy. If it would have been possible to ask me how I felt, I'm sure I would have reported that I was not at all happy! And yet, the experience was profoundly moving in a number of ways, and profoundly illuminating for its philosophical implications. For the first time in my life, I came to understand what it must be like to have experience without the tiniest scrap of self-awareness or understanding or of willful control. It was the pure experience of just being, and nothing more, totally devoid of memories or aspirations, or any sense of self. Contemplating the experience in retrospect, I could see how it refuted a number of claims made by a variety of philosophers over the centuries about the nature of consciousness. It *is* possible to have experience without any sense of your self. It *is* possible to have primal thoughts and experiences in the complete absence of any memory or understanding. And it *is* possible to have conscious experience without any sense of identity or free will. In fact, this bizarre locked-down experience gave me the first inkling of what consciousness must be like for a very simple creature whose mind is incapable of higher thoughts. After a number of these Ketamine experiences, I came to a conclusion that has profoundly re-structured my own understanding of consciousness and its place in the universe. Here is the notation in my notebook recorded when the thought first popped into my head back on 10/10/2001 (B16P71).

If my mind is a physical process taking place in the physical mechanism of my brain, and if my mind is conscious, then a physical process taking place in a physical mechanism can under certain conditions be conscious. Now it is true that my brain is a very special kind of mechanism. But what makes the brain special is not its substance, but its complex organization. It follows therefore that what makes our consciousness special is not its substance, but its complex organization. The fundamental "stuff" of which our consciousness is composed, i.e. the basic qualia of color and pain, are apparently common with the qualia of children and infants, despite their lesser complexity of organization, and by extension, they are probably common also with the qualia of animals, insects, and maybe even plants, except that those consciousnesses are immeasurably simpler in terms of organizational complexity. And the same argument connects the consciousness of life to that of non-living matter, which is also composed of the same basic substance, although of an immeasurably simpler organization.

(Thoughts of this sort have a tendency to pop into one's head all at once, as a vivid mental image, accompanied by feelings of glorious revelation and new insightful understanding!) Brains are made of matter and energy, mind is composed of patterns of energy. A complex brain can harbor the most complex

patterns of mental experience and understanding, just as a complex painting can contain the most elaborate patterns of color and form, imbued with many levels of structured meaning. But a painting is still just paint on canvas, and a mind is still just patterns of energy in a brain. It seems reasonable to suppose, therefore, that a simpler mind would have a simpler experience, like my Ketamine experience, but that experience must be composed of the same primal stuff of which all mind is composed, just as a simple painting is composed of the same paint-on-canvas as the most complex and elaborate paintings. The implication of this line of thought is that conscious experience is common to all sensory organisms, even those with very simple brains that support only the simplest minds. In fact, if you follow the causal chain even farther back, it seems that even inanimate matter must have some very basic raw experience of its own causal energy patterns, otherwise there would be nothing out of which evolution could have constructed the first simple minds.

This argument eventually found its way into that Behavioral & Brain Sciences article (Lehar 2003 *b*) in response to the insistance of Reviewer 5 (last round) that I must *at least* address Searle's contention that "a computer isn't even a computer to a computer", before I can validly propose that visual *experience* is spatially structured!

The Annealing Stage

The totally confused clamped-down experience described above, applies only to the first phase of the Ketamine high. After maybe a dozen or so Ketamine experiences, I began to see a larger pattern in it, as whatever it was that clamped my thoughts slowly began to loosen its grip during the time course of each trip, and my thoughts gradually felt ever more freedom of motion, as first (metaphorically speaking) I could move my hands and feet, then my arms and legs, then my head, and eventually my whole body was released from the grip of the drug and slowly returned to normal integrated consciousness. The last stages, just before a rather abrupt and step-wise return to normal awareness, were the most emotionally powerful and stupendously magnificent, as the largest chunks of reality finally coalesced into an integrated experience. I recall in one of my earliest Ketamine trips when I was so confused I had no idea who I was or what was happening, but I realized that whatever it was, it was not at all normal, I felt like a mental cripple trying desperately to figure out what was wrong with me, and what the hell was going on! It seemed like the aftermath of a chaotic disaster. Like I had done something really stupid, and now my house had blown up, my wife

and kids were dead, and the police and media were in the driveway to broadcast my mortal foolishness. And my foolish explosion had perhaps even been so serious that it had torn the fabric of the universe! In the solipsistic world of pure hallucination, there is no distinction between my self and the universe; my self *is* the universe, or at least all of it that I can be aware of in my tiny mind at that time. And then, as quick as an inspiration of breath, suddenly there I was, sitting in my chair, the room appeared around me and settled back into its familiar configuration, and with an *IMMENSE* sense of relief, I realized that my house was intact, nobody had died, the universe was OK, and the police and media were *not* in the driveway ready to take me off to the morgue! And most amazing of all, I looked over at the clock and saw that no more than an hour or so had elapsed since I had first sat back in my recliner. *Whew!*

After doing Ketamine by itself a couple of times, I tried it in combination, first with Marijuana and later with LSD, where I discovered that my theory of the *psychedelic coloring* of the dissociative experience held also for Ketamine, it made for a much more colorful and vivid and memorable experience, so from that point onward I would only do Ketamine in combination with both of those synergistic hallucinogens. There is a considerable disparity between the time courses of those three drugs. LSD lasts for about 8 hours, with a most intense peak in the first 2 or 3 hours. The Marijuana high lasts for maybe half that time, and the Ketamine provides the shortest experience. So the trick was to take the LSD first, then smoke the weed, periodically at intervals, and then do short "shots" of ketamine in shorter periods, either by injection, or as it turned out what was almost as good, drying it out and snorting the powder. This combination of three drugs produced the most incredible experience! Eventually, together with my friend Joe, we developed the ideal pattern with these three intoxicants. Joe and I would take a whole day off, meeting at my house the night before. Early the next morning we would rise early, "dose up" with LSD (typically 4-5 hits), then smoke a bowl and proceed out into the woods with the pipe and a bottle of wine. There we would sit for 4 or 5 hours, through the peak of the LSD high, drinking in the natural beauty of the woods, and of our minds' capacity to render it in all its color and glory. This part of the LSD high was too intense to enjoy with Ketamine, which would have only produced such profound mental confusion that there would be little in the way of insights or experiences that could be recalled. When our LSD high was beginning to taper off, we would walk back home and settle in the living room, with a glass of wine and a well stocked pipe, with the LSD intoxication holding pretty steady at a post-peak moderate intensity. Then we would then

chop and line up some powdered Ketamine with a razor blade on a thick pane of glass. Then, with a "Here goes nothing!" attitude as if going over Niagara Falls in a barrel, we would snort up a couple of lines and *whoosh!* Off we'd go into an incredible and chaotic hallucinatory world. There is a strange sense of the expansion of the space inside your head, the theater of your mental imagery, as you plunge into the experience. You normally imagine mental images to be located in the space inside your perceived head, in that hollow void whose center marks your egocentric point. The space that you experience when you close your eyes, or lie in pitch darkness. This space of imagination now expands outward so far as to seem as large as the vault of the night sky, and as detailed and complex as everything under the sky. It doesn't matter whether your eyes are open or closed, the only difference is the appearance or disappearance of a tiny remote world that is hardly noticeable amongst the rising crescendo of vivid experience. You are now all in your internal world, the external world has disappeared. Now it is all just imagery. You have now severed the bonds to external reality and arrived in your solipsistic universe.

The most extraordinary thing is the complete and total absence of your body. You have become like the Mind of God, you can dream whole worlds into reality just by the power of your imagination. And it takes no effort at all, the patterns just gush forth like an endless fountain. You cannot stop them! And in that confused state, you cannot tell that they are hallucinations, they seem like a bizarre and incomprehensible universe of absolutely solid energetic reality. It is a most extraordinary thing to be in reality a pattern of energy coursing through the internal universe, a veritable ghost in the machine of the brain, imbued with a powerful sense of purpose and desire and electric energy of the most intense sort. For a sober minded materialist like myself who does not believe in supernatural ghosts or spirits, here I discovered that ghosts and spirits do in fact exist, they exist in the human mind as patterns of ghostly energy that tumble and swirl and merge and dissipate like so many clouds on a summer day, and I am all of them! I myself personally experienced all kinds of magical transformations every bit as wonderous and inexplicable as mental telepathy, teleportation, levitation, astral projection, and every other kind of paranormal type of experience, except that this really did happen, only that the universe in which it happened was the internal universe of my brain, and thus never violated the laws of physics. And every so often as you head clears, you experience a mental *frisson*, a mortal shudder, when you step back and think "Oh my God! This is really happening -- and it is happening to me!" and thoughts like: "If all that exists in here is a world of the

mind, where is the rest of the world beyond my mind?" By the realization that your mind, despite its fantastic razzle-dazzle and seemingly infinite complexity, is not in fact infinite, but has a finite capacity and resolution, encompassed within a surrounding boundary beyond which you know nothing, you get an inkling of the concept of some unknowable world out beyond that boundary, beyond the bounds of the self and its mind. To quote another insight from my notebook at that time: *The highest form that intelligence takes is a recognition of its own limits and limitations. For in doing so, the intelligence conceptualizes something larger than itself.*

In the beginning the patterns are more chaotic and fragmented and nonsensical, but as the drug wears off very slowly and gradually, the images become more integrated, fused together into larger entities, a more consistent image. This is analogous to the process of annealing, cooling a chemical bath slowly and gradually to promote the spontaneous formation of crystals. The earliest stages of this coalescence is rather bizarre and very confusing. You feel like a snake twisting its way through a pile of rocks and getting tied into knots, seeing only one part of the chaotic picture at a time. The fragmentation of experience is kind of like when you lose binocular fusion and see two images instead of one. In the same way your mind fragments into separate bubbles, each an independent consciousness in its own little bubble of experience. But gradually as the drug wears off, the bubbles begin to interact more and more with their neighbors and eventually they coalesce into a single self-consistent structure of experience. The many worlds have fused into one integrated world. While the mind remains fragmented, you are not a person, you are just a fragment of experience in a vast universe packed with similar experiences. But I discovered that if you shove hard in one direction and wait, sending out a wave of energy with a mental push, after a while you get a kind of echo back from that direction, as if your shove had been passed on from entity to entity until it reflected off some remote unseen boundary of existence, to come back at you again. Figure 5.2 B through F shows a sketch of this impression from my laboratory notebook done a few hours after the experience, showing first the experience of being an element of consciousness embedded in a larger grid or matrix of similar fragments of experience. (The little body in the sketch is metaphorical, the self does not feel like a body at this stage, but just a whisp of ghostly experience complete with a sense of identity and free will) I push in one direction and get an echo in return, and that echo comes back again from the opposite direction and passes on through, to reflect back again from another boundary in that direction, eventually setting up a kind of back and

Figure 5.2. Some sketches from my notebook depicting the experience of fragmented consciousness, with an impression A: of being embedded in a vast matrix of similar fragments of consciousness. B: Pushing against neighboring fragments causes C: a reflection back from that direction passing through and D: reflecting back from the other direction until E: a resonance is established with the whole matrix wobbling like a jelly.

forth resonance across my location, thereby uniting the activity of the individual elements into a larger unified grid of synchronized oscillation. This resonance reveals the principle behind the process of integration. I often got the impression as if I were one among a crowd of ghosts in a great echoing hall, all yelling and waving in synchrony in our collective excitement. Occasionally, we would all raise a great cheer in unison, followed by silence, and we would hear as if from far away chambers echoing down distant corridors, the sound of other great multitudes of souls all cheering back in return. Or was that just an echo of our own original shout? Who knows!

The shockingly grotesque (but brilliant!) art of Robert Williams (Williams 1989) bought back to me a vivid memory of the nature of this fragmentary experience, complete with its rude inconsistencies and harsh boundaries between fragments of thought, along with a sense of a larger space within which these images are projected, an outer boundary like the dome of the night sky, that represents infinity in a finite form. This is the experience I came to refer to as the *egg world*, a vague sense of a surrounding void bounded by who knows what at some indefinite distance that is however well short of infinity. Also hauntingly familiar to my own

Figure 5.3. The art of Robert Williams gives a very vivid impression of the kind of visual chaos and confusion in the later stages of Ketamine hallucination.

experience, is the shockingly powerful and emotionally wrenching subject of my hallucinations, that I recognize in Robert William's art. Figure 5.3 shows a sample of his work.

The artist Alex Grey, who has made a career out of depicting the psychedelic experience in the most glorious and magnificent paintings, does a wonderful job at expressing this fragmented aspect of the psychedelic state. Two of his paintings are reproduced in Figure 5.4. One of the recurring themes in Alex Grey's art is a huge vortex or spiral or funnel type of pattern of interlocking webs of lines. Embedded in this tunnel or funnel or spiral matrix are little seeing eyeballs at every intersection in the grid. I find this multitude of eyeballs very evocative of my own psychedelic experience. Not that I hallucinated a multitude of eyeballs, but rather, I *was* those eyeballs, all at the same time and individually as well. This is Alex Grey's brilliant way of expressing the fragmented experience, of viewing the

Figure 5.4. The art of Alex Grey expresses many commonly reported aspects of the psychedelic experience, including a giant vortex or spiral matrix of elements of fragmentary consciousness, expressed as a multitude of individual seeing eyes.

world not from a single egocentric point, but from a multitude of them simultaneously. And yet those individual conscious entities are not completely disconnected, they find themselves embedded in a vast matrix of other similar conscious entities as seen in the paintings.

The image of a giant spiral or web-like vortex is so often reported as a component of the psychedelic experience that it must reveal some fundamental principle of organization of consciousness. Heinrich Klüver (Klüver 1966) reports that his subjects, who sat in pitch darkness after ingesting LSD, reported seeing lattice and filigree types of patterns, often in global tunnel or funnel or vortices. In his article on hallucinations, Siegel (1977) shows a picture of one such vortex inspired by one person's LSD experience, where the vortex is composed of a vast array of television screens, each showing a different scene playing simultaneously. Siegel (1992, Chapter 4) writes about a man, Rudy, who suffered from LSD "flashbacks" that took the form of a giant "black hole" of a vortex lined with geometrically arranged girders and a white light at the center, that would appear unexpectedly before him, and threaten to engulf him in its great spiral. My friend Joe, under the influence of Salvia, experienced such a vortex himself, and reported that each

panel in that vast matrix seemed to be a portal to a whole nother universe inhabited by alien creatures who invited him to abandon his world and come and join them in theirs. Now of course all this could be attributed to the mad ravings of people under extreme psychedelic intoxication, and there is no question that these are hallucinations experienced in a state of profound intoxication. And that is indeed how such reports are generally interpreted. But the common theme across all these diverse reports from different sources suggests to me that they reveal some fundamental principle of mental organization revealed by the drug intoxication. In fact, Taken all together, these reported experiences suggest that it is in the nature of consciousness, which is a spatially structured experience, to tend to fragment into periodic sub-entities, each one similar to each other, and similar to the unified experience from which they fragmented. And what principle or mechanism is known to have this property also? Harmonic resonance of course, or patterns of standing waves as seen in the Chladni figures.

The last stages before the final unifying fusion are some of the most breathtaking, or shocking. You see a chunk of reality over here: maybe looking down on food in a refrigerator under artificial light? And over there is something completely different: the underbelly of a truck viewed from below? (The fragments are not perfectly clear and self-consistent) But the two perspectives are totally inconsistent with each other , as if in different universes, like you pair of monocular experiences when binocular fusion breaks into fission. When binocular fusion is re-established, it occurs with a bit of a snap, as the left and right images lock back into each other as a lower energy, more stable state from which it is more difficult to dislodge, and there is a similar snap whenever disparate fragments of the experienced scene find a common visual property and fuse into a larger self-consistent Gestalt which can be sustained at a lower, more stable energy level. At some point the larger chunks of experience merge, to produce a single space: maybe a desert sunset, or a view of the rings of Saturn, or in a dark cavern deep underground, or the interior of a room, and although the hallucinated scene continues to morph between those alternatives, sometimes at an alarming rate, each one remains a (relatively) integrated scene during its brief moments of fleeting existence.

This is the dosage level that promotes "emergence" experiences. And this is the point where the experience is the most supendously magnificent! Your mind conjures up structures as vast and intricate as a Gothic cathedral, or the Eiffel Tower, or a tropical rain forest, or a vast kaleidescope, hundreds of patterns of that

degree of complexity constantly morphing into completely different but equally magnificent patterns, along with continuous changes in lighting from daylight to moonlight, or artificial light, blinding sunlight in the eyes, pitch black bottom of a deep well, and eerie neon-illuminated worlds glowing in the bright false light of a shopping mall. And there are a great many "Gestalt reversals", as you see in Salvador Dali's art. First you see an object in a hollow space, then the image reverses to become a void in a solid space. And the scale ranges abruptly from the microscopic to the universal, and everything in between. In fact at one point in the emergence sequence, there is a continuous cascade of images each of which is a Gestalt switch on the previous scene, a shockingly self-contradictory fountain of absurdity, as if the mind were constantly and continuously contradicting its current state, and flipping to one of its many absurd alternatives, like the images that children see in clouds.

The preponderance of Gestalt-switching in the hallucinating state, provides a powerful clue as to the algorithm of natural vision. First of all, the hallucinations clearly reveal a dynamic spatial image-generating capacity in the human mind, a three-dimensional projection screen into which any image that is imaginable can pop into existence, and just as quickly it can disappear, or morph into something completely different, again and again in an endless stream. The visual algorithm is dynamic, popping between alternate stable states, each stable state representing an alternative interpretation of a given stimulus. If you open your eyes during this phase of the experience, you can see the world again, in a remote and distant way, although the eyes-closed world remains just as bright and sharp and real as the world seen through open eyes. And with eyes open, the mind is extremely tolerant to visual contradiction and inconsistency in its interpretation of the retinal image. One part of the visual scene seems to have no effect on other parts, as it does in normal experience, so the world looks like a cross between an Escher puzzle and a Dali painting, with constant Gestalt reversals in different places all the time. In the normal state, there is usually only one stable state, and the mind jumps into it in a fraction of a second, simultaneously discarding a thousand alternative interpretations of the same scene. What the hallucinations reveal is that the way that the mind makes this selection is that it attempts to construct or reify every possible visual interpretation of a stimulus all at the same time, and lets them battle it out amongst themselves, with the strongest patterns having the greatest figural integrity, or absence of stark contradictions, dominating over the alternatives. In the stone-cold sober state we normally experience only the final stage of this process that occurs in an instant as a fully integrated and coherent

experience, and we instantly forget the stages of conflict and ambiguity that become manifest under the influence of the dissociative drug.

The Sound of Silence, A Roaring Cascade

Another curious phenomenon which can be easily overlooked unless one happens to notice it and make a mental note, is a background noise that carries a richer texture of rhythm and beat than the usual sound you hear ringing in your ear even in pitch silence. If you pay close attention to it, you hear the most extraordinary cacophony of sounds, and a constant and urgent drumbeat in the background, with big bass tones at the slowest pace, and higher tone drums beating at progressively faster paces, with a ticky-tacky faster rhythm, and beyond that a texture of faster ripping and zipping and hissing and whining, all locking together to make a great latticework of intermeshing gears of auditory pulsation. Surely the presence of this primal background drumbeat is a clear exposure of the mechanism underlying mind in the brain. And it exposes the primal origin of music, and why it plays such an important role in our lives. Music reveals the principle behind mental functioning as a system of resonances, whose patterns of higher harmonics define the structure of the patterns that they represent. The individual tones lock into each other to form a melody by the same dynamic principle that your mental images lock into synchrony with each other.

Music is the sound that the brain makes when it is thinking beautiful and harmonious thoughts. Music is the sound that the visual system makes when it gazes upon the stained glass window of a Gothic cathedral, or the intricate tiled patterns of an Islamic mosque, or at any ornamental and symmetrical pattern, because that is the sound that the visual system makes as it paints out that regular periodic pattern in your experience again and again many times a second, and it is by its characteristic rhythm of creation or rendering that the pattern is remembered and recognized. Each shape has its own musical melody of creation, and the score of that melody is written by the imaging mechanism of the mind when it constructs or projects that pattern into mental image space. When you experience a shape, like a green cube with silver corners, at the center of your hallucination, you hear a chunka-chunka-chunka kind of sound as your mind "paints" the hallucinated shape in cyclic back-and-forth sweeps of the projection mechanism, like the back and forth refresh pulse of a standing wave as it sweeps back and forth across its resonant cavity. Sharper shapes with abrupt surfaces make a harsher square-wave staccato sound, whereas rounder shapes or fuzzy coverings make for a rounder or smoother sound, as suggested by Gestalt theory.

I remember entering a room, and hearing a kind of background cyclic thrumming sound, slowed down, no doubt, by the effect of the drug, which slowed it enough to make it just barely audible to me. And that thrumming sound was synchronized with a strobic flashing, or flanging, as it is known in the drug literature, a term borrowed from audio sound effects to refer to a repeating echo effect. As each thrum was heard, I could see a wave of refresh sweeping through the room around me again and again. I had to photograph it in my mind and examine its fleeting details, to try to determine the direction and pattern of that sweeping refresh. And what I *think* I saw was this: First a deep base drum beat that "painted out" the broad outlines of the room, just its overall structure, a big rectangular cube. Then the next fraction of an instant some higher harmonics paint out mid-scale features such as alcoves and doorways and furniture, and finally a crashing trilling trailing sound paints out the tiniest details, all at the same time simultaneously in parallel, the whole progression sketching from coarse to fine to the finest tiny details of texture in a fraction of a second, and this whole cycle repeating endlessly giving off a Gachung - Gachung - Gachung ... type of impression. Figure 5.5 A shows some sketches of this phenomenon in my

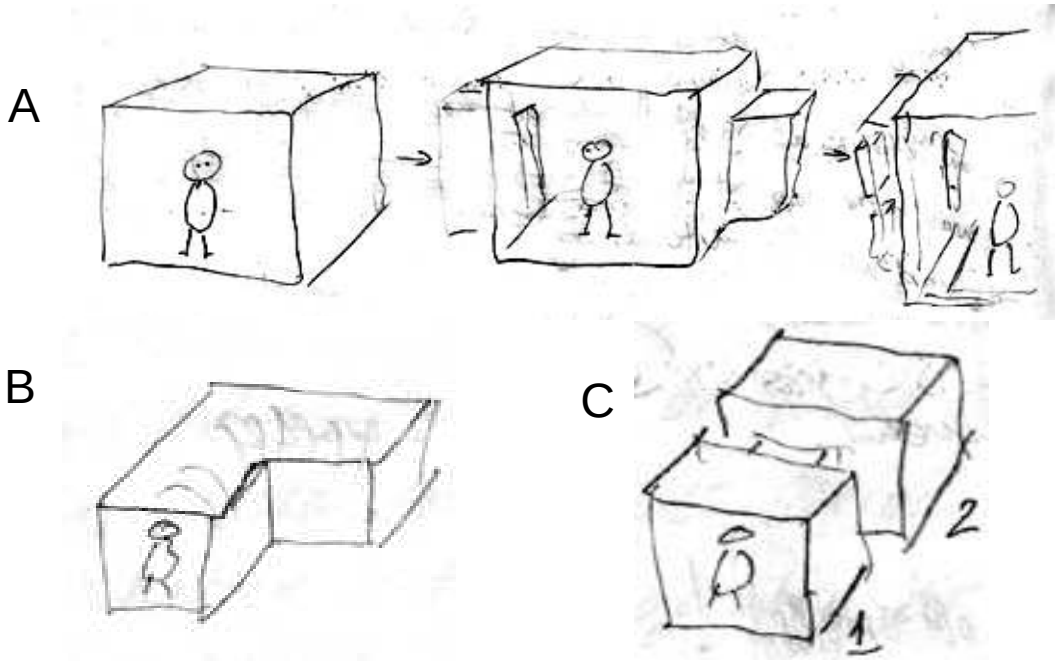


Figure 5.5. Sketches from my notebook expressing A: the perceptual experience of the sweeping out of a surrounding room, painting first the coarse outlines, then ever finer details. A characteristic bimodal sound is heard in B: an L-shaped room, and even more so C: when standing in a pair of joined rooms.

notebook.

And when I entered an "L" shaped room, as in Figure 5.5 B, the sound of the refresh wave became partly dualized, a kind of Gaashzum - Gaashzum - Gaashzum... As I walked toward the apex of the "L", the sound became more symmetrical, GashZum - GashZum - GashZum... And if I stood in a pair of rooms joined by a doorway, the sound was something like the sweep of an hourglass shape, Bah-Pom - Bah-Pom - Bah-Pom ... , as depicted in my sketch in Figure 5.5 C. Now these were all extremely brief fleeting impressions, and I am almost certain that very few others who take Ketamine, even in the rich mixed cocktail of intoxicants that we had perfected, would see this same feature of the hallucinatory world, or even notice the sound amongst all that sensory confusion. And it may well have all been my imagination, which indeed it was in any case, although observations of the nature of those hallucinations can reveal their operational principles.

Phase Conjugation

In the periods between trips, I would often sit and ponder these experiences very intensely, often while sitting in my chair puffing on my pipe, and drawing sketches, trying to make some kind of sense of it for myself. Figure 5.6 shows some of my sketches from my notebook during that period, as I played around with different mental images trying to puzzle out the meaning of what I had observed. Figure 5.6 A shows an inkling whereby some kind of strobe or periodic flashbulb stimulates a 3-D model of a scene, causing every surface of that scene to emit waves parallel to the plane of the surface. Figure 5.6 B shows how the waves from a spherical, cylindrical, and cubical shape, would propagate inward to their centers, and make a characteristic sound as the wave fronts first collided, then reflected back outward from the center of symmetry. Figure 5.6 C shows this idea maturing to a periodic cycle of such resonances, establishing a cyclic back-and-forth wave from the surface of the cylinder to its axis of symmetry and back out again, many times a second. These were all nothing more than tantalizing hints, flashes of insight, of which I had not yet made any kind of sense. But a few years later while I was investigating the phenomenon of *phase conjugation*, an exotic nonlinear variation on the harmonic resonance theme, I discovered to my delight and amazement that phase conjugation involves the same kind of back and forth reciprocal cycling between a resonant cavity and its axes of symmetry, and eventually these musings matured into a theory of visual perception by *phase conjugation* (Lehar 2008).

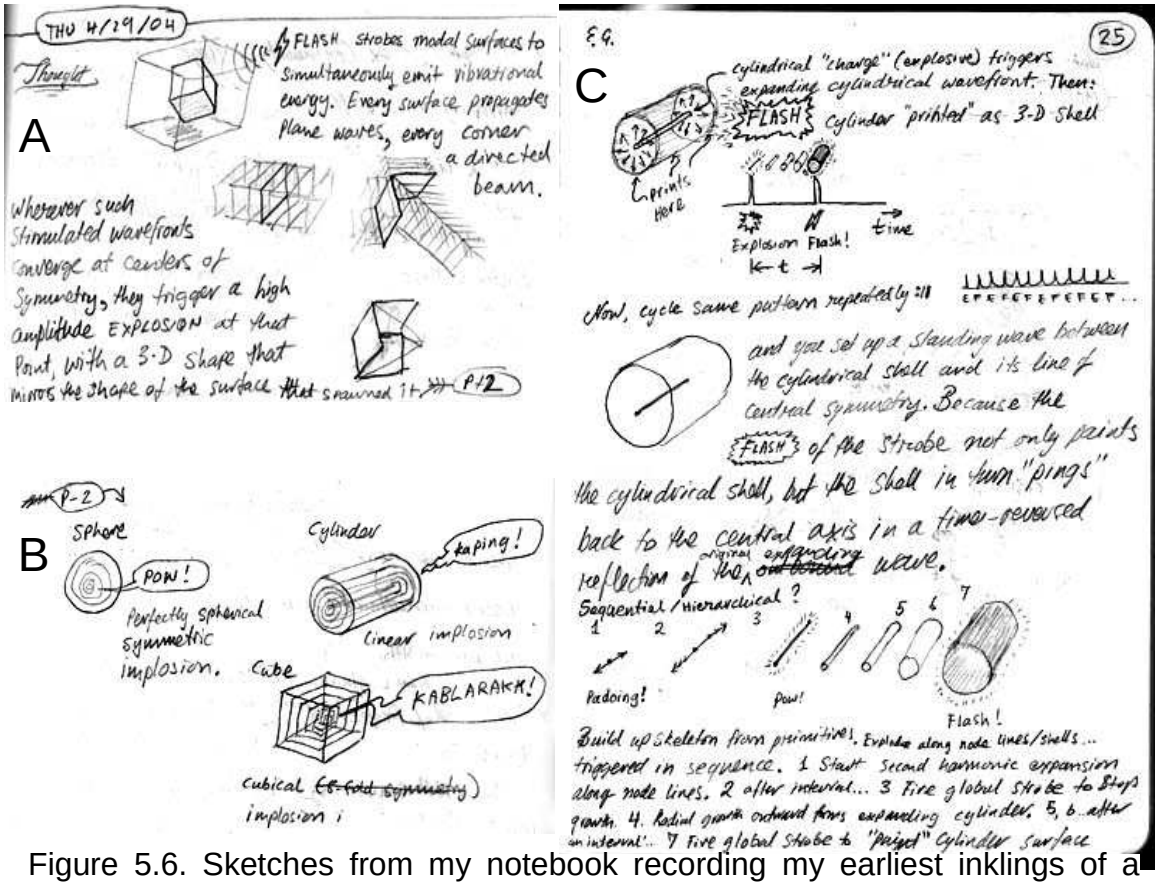


Figure 5.6. Sketches from my notebook recording my earliest inklings of a theory of perception by a sweeping out of three-dimensional shapes accompanied by characteristic sounds. This later matured to my phase conjugate mirror theory of perceptual computation.

There is a curious phenomenon that is reported in the drug literature of people claiming to hear "crickets". (Jansen 2001, p. 77) And one late night in the wee hours after one of my psychonautical extravaganzas, I was sitting on the toilet before going to bed in the glowing aftermath of the trip, I too suddenly noticed that there was a faint sound of crickets in the background. A very familiar kind of sound, as if it had been there all along, but I only noticed it then. Crickets? Why crickets? Then I noticed, as I stared at the tufted bathroom mat, that the texture of the rug seemed to shimmer and pulsate slightly in synchrony with that remote chirping sound. That was it! I thought to myself. The sound of crickets was the faint sound of that visual refresh cycle that I had seen much more powerfully in the more intense phase of the experience. This is the kind of thing that gave me great pleasure, to suddenly make sense of some bizarre feature of the altered state and come up with an explanation for it. I may be the only psychonaut to report on a visual refresh cycle, but I was not the only one to hear the crickets. I was however the first to understand their significance.

Another extraordinary aspect of the experience is the rate at which you habituate to this rather extreme state of mind. Once your mind has broken the bonds of credulity that what you are experiencing is *really* real, then to some extent it can never really matter what appears next in this hallucinatory world. The crazy nonsensical antics of the hallucinations reveal their unreal nature, and thus they are easily ignored. For example one time I saw the tops of the living room furniture all at once, waver in synchrony, then drift upward separating from the bottoms of the furniture, and float away like so many colored blobs of whipped cream, before they disappeared and the furniture promptly grew new tops. What caught my attention at that moment was not this most bizarre behavior of living room furniture, because I was apparently saturated with visual absurdity at this point, and this was nowhere near as absurd as other things I had experienced only recently. What I noticed was the blasé attitude I had, like "Oh well, there goes the furniture, doing its funky thing", instead of the proper shock and amazement rightly due to misbehavior of such magnitude. So you have to positively wake yourself out of your "ho hum" attitude, and remind yourself occasionally to observe and make note of this rare and magnificent state, to be able to report on it later, which, for me, was the whole purpose of the exercise.

Time Dilation

Perhaps one of the most telling aspects of the experience is a pervasive sense of time dilation, or time going by very very slowly! It seemed like the propagation rate of the sensory signals up to and within your brain has suddenly slowed from a flash to a crawl. For example I would think "I'll take a sip of wine", and that thought would echo back and forth in the chambers of my mind, before eventually triggering a cascade of motor motions that got my arm into motion to slowly close the gap between the wine glass and my hand, and the glass arrives at my mouth so much later that by that time I have almost forgotten the original impulse. There is a noticeable time delay in the visual image, and it updates in jerky sweeps, like the delayed pixilation of a bad video signal. If you moved too fast, you could only see where your hand had been half a second earlier, so you would tend to overshoot back and forth when trying to grab something if you move too fast. If you stand up and walk, you can only move at the pace of a sloth, otherwise you risk losing your balance in the delayed feedback loop and toppling to the floor. One time when I stood up to go to the kitchen, I got a distinct sensation that my visual space and my somatosensory space were no longer superimposed, but remained separate, like two images , each containing its own copy of my body.

Figure 5.7 shows a few sketches of the experience that I made the day after having it.

Figure 5.7. A few sketches from my notebook of a peculiar experience I had, where my visual and somatosensory experiences remained separate and distinct, one much larger than the other, in the same manner as the left and right eye views during binocular fissionj.

This idea of the effect of the dissociative drug as retarding the propagation rate of the neural signal is consistent with a number of the phenomena mentioned earlier. If the different parts of the brain, or different cortical areas, each maintain standing wave patterns, and those patterns remain synchronized during unified perception, a time delay in the propagation velocity would tend to decouple the oscillations, and lead to a fragmented consciousness not unlike the double vision of binocular fission. This is also consistent with my subjective experience of being cast in cement, and being only able to move the tiniest extremities of my mind, and the way the effect tapers off in stages as the drug wears off. The abruptness of the final steps of the recovery can be explained by the same principle of hysteresis by which binocular fusion occurs -- it is easier to snap into fusion than to break back out of it again. And this explains the fact that under intensive doses of dissociative drugs, one often tends to get severe double vision, an inability to fuse the eyes again, due to a failure to co-resonate between the patterns of standing waves for each eye.

Representation of Infinity

Another curious insight I acquired during deep dissociated states, was a new understanding of how the mind makes sense of infinity. For example when

considering the integers arrayed along the number line, the mind sees one, then another, then another, then another, and then it does a curious thing, it continues to accelerate faster and faster along that number line, arriving at “infinity” with a kind of trill or flourish that makes a sound something like “*drrrrrrroip!*” Kind of like the sound a ball bearing makes when it bounces on a pane of glass, taking shorter and shorter hops at higher and higher frequency until it essentially reaches an “infinite” frequency and stops. This is a very literal expression of the concept of infinity, and I saw it again and again in different manifestations. When looking down a long hallway or corridor, you would see first this section, then the next, then the next, and next, and next and then “*drrrrrrroip!*” all the way to “infinity” at the vanishing point, all occuring in a flash of a momentary instant. Or when considering a reciprocal relation -- I know ... that you know ... that I know that you know, that I know you know I-know you-know and “*drrrrrrroip!*” We understand each other! Figure 5.8 shows a sketch from my notebook expressing this concept of infinity.

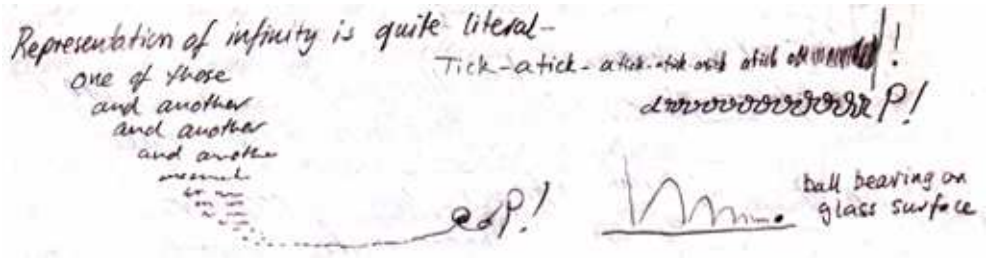


Figure 5.8. A sketch from my notebook of the way the mind understands infinity in a very literal way, as one of these, and another, and another, and another, and then “*drrrrrrroip!*” all the way to infinity all in a finite instant of time, making a sould like a ball bearing bouncing on a pane of glass.

Encounters With Alien Intelligences

Another curious phenomenon reported in the drug literature is a recurring reference to encounters with alien intelligences. A great number of different people have reported this phenomenon under the effect of a variety of dissociative drugs, including John Lilly, the Grand Master of ketamine promotion. The creatures are often reported to be friendly, intelligent, and inquisitive, seen as if through a portal that leads to another universe where they live. Some report that the aliens invite them to come over into their world. Some report that the aliens are malicious, and that they inhabit the "real" universe, and spend their efforts perversely creating the false hallucination of your world of experience. Some report the appearance of elves, which they can describe with great specificity. What is the origin of these alien intelligences, I wondered, and why is it that

different people have reported the same thing? It seemed just a bit too coincidental to say that these are just hallucinations, even though in one sense that is exactly what they are. If you fall victim to the *Grand Illusion*, you may suppose, as John Lilly insisted, that these are actual telepathic communications with alien entities from a distant galaxy. And that is exactly what they *seem* to be, if you take the experience at face value. But that explanation is far too bizarre for a hard-nosed scientific realist such as myself, and I sought to find an alternative explanation more consistent with scientific reality. In pondering this question between trips I suddenly stumbled on a possible explanation. If the effect of the dissociative drug is to disassociate different parts of your brain, then surely your mind, in a very real sense, breaks up into separate fragments, each of which is like an independent consciousness, a separate "person", in the same way as the double-vision experience of binocular fission. But the fragments are not completely separated, they remain partially connected, and perhaps they "see" each other at the borders where they meet, and thus those "alien intelligences" are merely fragments of your own dis-integrated consciousness encountering each other across the fissures in your brain.

Left-Brain Right-Brain Dichotomy

It was with some of these theoretical preconceptions that I entered into some of my later trips, to see if I could observe these phenomena for myself. I was fascinated at the time by the neuropsychological phenomenon of brain *lateralization*, or the fact that it is split into left and right halves, joined across the midline by the relatively thin *corpus callosum*. In humans, it seems, these two halves of the brain are not identical, but they have a curious specialization whereby the left brain (that controls the right half of the body) is specialized for processing language and logic and detailed precision, whereas the right brain (controlling the left side) is specialized for music and intuition and global spatial thinking, although the two halves of the brain are normally integrated across the corpus callosum. With the whole brain pinched off into this hourglass type of topology, one might expect that the two halves of the brain would tend to dissociate under the proper drugs, and separate into a distinct left-brain and right-brain persons. In fact this phenomenon is indeed reported in the literature in the famous "callosectomy" patients whose corpus callosum had been surgically severed, in order to control severe epileptic seizures, to prevent them from propagating across the callosum, and thus confine the seizure to one half of the brain. At first, patients who had had this radical surgery seemed completely normal, as if the callosum served no purpose. But later it turned out that under

more rigorous experimental conditions they appeared to be like two separate persons. A stimulus presented in the left visual field was only seen by the right brain, and thus could only be reported (with a button press) by the left hand, while a stimulus in the right field could only be seen by the left hemisphere, and reported with the right hand. These experiments confirmed earlier findings that lesions (damage) in the left half of the brain impaired language and logical thought, whereas lesions in the right half impaired music, intuition, and spatial perception. With this information in mind, I launched into one of my trips with the question, can I see my right brain person as separate from my left?

After the wild confusion of the initial stages of the trip had settled into the more placid "egg world" experience, I remembered my question and, thinking verbally, I asked myself the question "Hallo there right brain person! Can you hear me?" There was a momentary pause, after which there flashed into my mind the most absurdly rude mental image that was so shocking to me that I almost jumped out of my chair! What I saw in a flash in my mental image space was the image of my own *erect penis* popping out of my pants, and then, the head of *my own dear father* "going down" on it! Now you have to understand that my father was a very proper European gentleman, strictly religious, and never given to bawdy jokes or crude language. And thus this image was about the most preposterous and improper conjunction imaginable! And as I sat there in stunned shock, I heard as if in the cavernous background, a mighty peal of laughter, and came to realize that my right brain had played a joke on my left brain, and was now laughing at my shocked indignation! It was a funny joke indeed, and my left brain soon joined in as I started laughing myself at the humor of it. Now of course all this happened entirely within my own imagination, and thus was obviously a hallucination. But I had indeed been truly shocked and taken totally aback by a thought that originated from my own mind, something I would have thought was impossible! And in retrospect, *of course* the right brain would not shout back "Hello there left brain, here I am!" using the verbal mode of communication. The right brain must respond in its own language which is the language of mental imagery. And that right hemisphere guy is apparently quite the jokester, pulling a prank like that, so rude and shocking that I hesitate even to recount the tale here. That was his way of saying "I am over here!", with a vivid image that also revealed his true nature. The experience gave me a new appreciation for the two different characters of thought expressed by the different hemispheres, I can now, even in the sober state, distinguish these two characters of my own mind, for example when I am puzzling over some problem. As an intensely visual thinker, a lot of my thinking

takes place in the form of mental imagery. I can see myself manipulating the spatial concepts and assembling them in different configurations in search of some solution, as depicted in Figure 5.5, and this mental image manipulation occurs in a flash, faster than my verbal thoughts can follow. It is only a half second or so later that my verbal mind can finds words for the visuospatial manipulations being performed. It is curious that the product of "right brain" thinking is often described as "unconscious", whereas the term "conscious" or deliberate purposeful thought is often associated with a logical verbal type of process, something we hear subliminally as a running narrative in our head continually speaking our thoughts. But the reason why right brain function is often thought to be "unconscious" is simply that it is nonverbal but visuospatial. But I am vividly aware of the nonverbal mental images by which I seek to understand new concepts. The principal product of right brain function is the visuospatial world of experience we see around us, and the great majority of us who suffer under the *Grand Illusion*, simply take it for granted as the world itself. It is there because it is there, no mental effort required just to see it. This is why we tend to indentify our "self" with that invisible verbal stream of thought, and the rest of that visible stuff out there is merely the world itself, as if seen directly, unmediated by the retina, the optic nerve, and the brain. Once you see through the Grand Illusion however, you realize that the world around us is the not the world itself, but is itself a construct of our mind, and is thus just as much a part of our "self" as anything else in our mental experience, and that particular component of our experience is principally a product of right brain function.

Salvia

Round about the time that I was playing around with Ketamine, I came across another bizarre hallucinogenic substance, a natural herbal product by the name of *Salvia Divinorum*. Unlike other psychedelics, Salvia was perfectly legal, and could be obtained by mail order from the appropriate web sites. In some ways Salvia was similar to Ketamine, but in other ways it was quite different, perhaps more akin to the abrupt unconsciousness of Nitrous Oxide. My friend Joe was the first to try it, and he had the most extraordinary experience. At first, he saw that giant vortex, which held a multitude of alternative universes, each populated with alien intelligences, as mentioned earlier. Joe said these creatures were somewhat evil and deceptive, they lived in the “real” universe, and spent their efforts generating Joe’s “unreal” hallucinated universe. These alien creatures invited Joe to come join them in their universe, and this frightened Joe so profoundly that he jumped up out of his chair, ran out of his appartment, and all the way downstairs two floors

to the street, before he came back to himself again. He found the experience so profoundly shocking and terrifying that it was only with some difficulty that he could bring himself to try it again.

My own experiences with Salvia were also very powerful and not particularly pleasant, but interesting nonetheless. I felt as if my consciousness was squeezed, as if in a vice, as shown in my sketch of the experience in Figure 5.9 A. But the

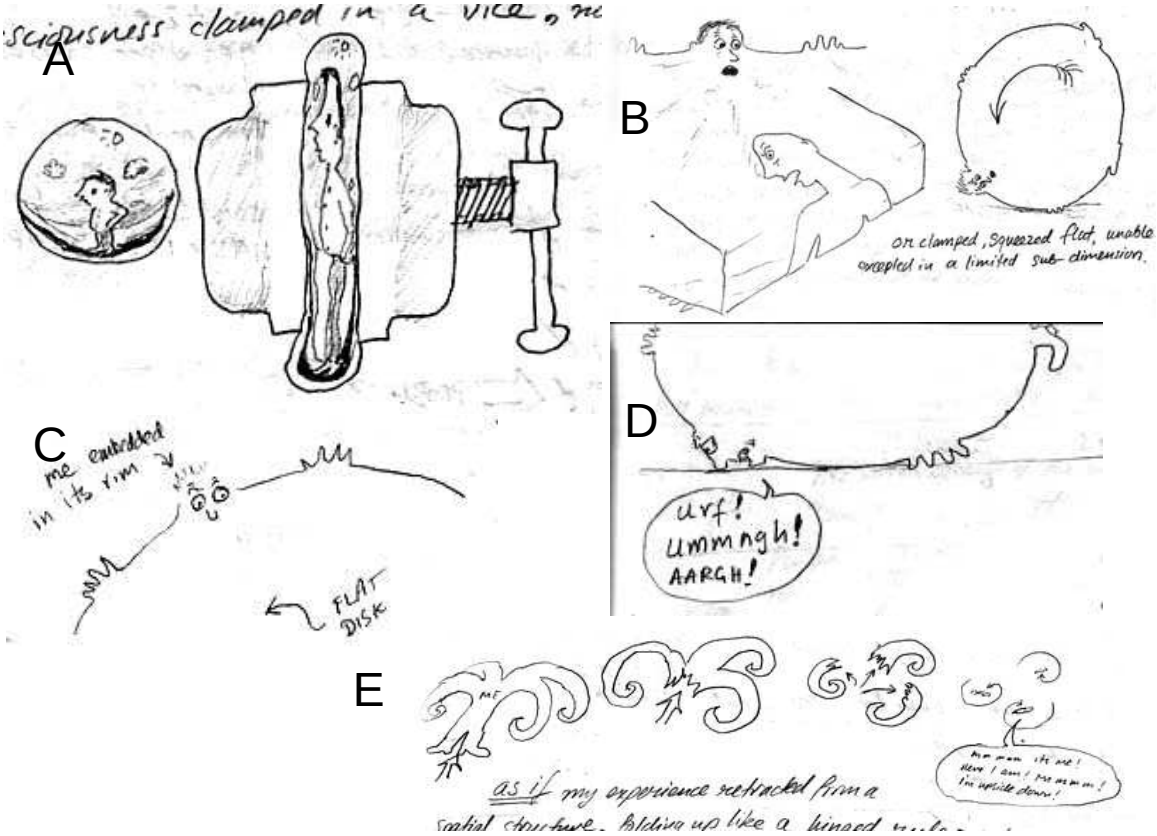


Figure 5.9. Impressions from a Salvia trip A: as if consciousness is squeezed as in a vice. B But not uniformly, feeling as if embedded in a surface. C and D: Feeling as if embedded in a rolling cartwheel. E: Very fleeting impression of consciousness folding up like an umbrella.

squeezing was not uniform: some parts of my consciousness were clamped while others remained free, giving the impression of my self being somehow embedded in a surface, as suggested in Figure 5.9 B, which turns out to be a common theme in the Salvia literature. I found it extremely disconcerting at the time, not at all a pleasant experience, because at the same time I felt embedded or pinned down somehow, I had absolutely no memory of who I was or where I was, or more accurately *what* I was, because at the time I was in a completely timeless state, I felt as if I had been embedded in the surface for ever, and would be there for all eternity. It was a really strange experience, and strange experiences are always instructive. At one point the surface in which I was embedded turned into a circle

rolling along the ground like a cartwheel, and I, embedded in the cartwheel, felt myself rolling upside-down and my face being pressed into the mud, as suggested in Figure 5.9 B, C, and D. I find this inscription in my notes from the time: “I have been the clop of dirt on the wheel of fortune and tragedy”.

On another occasion I found myself in a world in which every surface was as bright and shiny as chrome, and I stood up from the bed I was lying on, and started wandering around in this chrome world before coming back to my senses. The experience is very brief, a matter of a few minutes at most, and yet it is one of the most abrupt and extreme distortions of consciousness around, similar to the effect of Nitrous Oxide. However as with Nitrous, I found that after doing Salvia a mere handful of times, it no longer had magical effects for me, my mind had compensated for its absurdities, and I could no longer enjoy this particular intoxicant any more. The effects varied considerably among my friends, some of whom never felt any effect at all, no matter how much they consumed, while others were thrown into the most intense hallucinations. In any case, this drug has the danger of making people in a deep state of hallucination get up and walk about, without seeing the real world they were in, which is a truly hazardous condition. I recommend to anyone who takes Salvia, to strap themselves to their bed or chair, to prevent them moving about and possibly doing harm to themselves.

The idea of a shining chrome world was interesting to me, and I saw quite a bit of chrome in the art of Robert Williams, as seen for example in Figure 5.2. Why chrome? It is reminiscent of certain biblical visions where the face of Christ is seen as shining like the sun. I came to believe that the shine of chrome has a special meaning in perception. Like sparkling water, the reflections off a shiny chrome surface are so complex and chaotic that you cannot really see the reflections as such, beyond some vague texture, you see the shape of the shiny surface *through* those reflections, or almost *despite* those reflections. There is nothing substantial on the surface itself for your visual system to lock on to, and the perceived chrome surface has no perceived surface properties such as color or texture. The reflections don’t even belong to the surface they are seen on, but rather, like reflections in a mirror, the colors and shapes in a chrome reflection are perceived beyond the surface, “in” the mirror, leaving the surface through which they are reflected without any color or texture of its own. I came to believe that this shiny chrome world is the experience of a world that is so chaotic and confused that chrome is the best approximation or representation of a surface whose actual

surface properties cannot be fathomed. That the chrome world is an expression of the visual system giving up on trying to make sense of every surface and its properties, and presenting instead the barest sketch of the objects in the hallucinated world as mirrored reflecting surfaces. That this shiny chrome world is a very primitive form of perception when the visual system is overwhelmed with visual chaos.

I also had one brief fleeting impression depicted in Figure 5.8 E, of my conscious experience in the instant of fragmentation as the drug first took effect, which had the effect of coiling up various fragments of my experience simultaneously, somewhat like the leaves of a Fiddlehead Fern rolling up (instead of unrolling as they do in the spring), before breaking up into completely different fragments. It was like a fleeting glimps of the disintegration of my experience caught in an instant of time.

All in all, my Salvia experiences were never quite as impressive as my Ketamine and DXM trips, and they were very quickly subject to Lehar’s Law, to the point that Salvia no longer has any magical effect for me, but I understand that its effect varies considerably across individuals, so your experience may differ.

Chapter 6

Aftermath

Are you starting to get the picture that was revealed to me through that series of psychedelic experiences? Are you beginning to see the same story retold again and again? I certainly was. I was beginning to see the common thread that ran through all my various drug experiences, all the way back to my first spinning experiences as a child, and my first “spins” from alcohol intoxication. Even that most extreme and bizarre of experiences, the LSD-Marijuana-Ketamine extravaganza, was beginning to be so familiar and predictable that there came a point where I was no longer shocked or awed by it any more, and thus, in yet another manifestation of Lehar's law, I was no longer learning new and interesting things, each trip became pretty much a repeat of the last one, re-confirming earlier observations with still more of the same evidence. Don’t get me wrong -- the trips were still mighty impressive and thoroughly enjoyable, and they were especially meaningful to me, because again and again they provided irrefutable *proof* that the brain *does* construct explicit spatial structures of our experience. See? There they are! Look, Daniel Dennett! Look Zenon Pylyshyn, Max Velmans, Kevin O’Regan, and the rest of you naive realists -- Actual Pictures-In-The-Head! Its plain for all to see, if they would only look! But there was nobody else in my head to see the evidence with me. But my trips were no longer profoundly shocking or unexpected, just another trip again. It was at that point that I realized that perhaps my days of psychonautical exploration were over, and it was time to refocus myself again to the outside world, and return to my life in consensual reality. Returning to my life in the real world, I found myself in a very strange place. Even as each of my wild psychonautical trips further confirmed my growing understanding of the essential principles of mental function, to my amazement, even *years* after publication of my book (Lehar 2003 *a)* and some key papers (Lehar 2003 *b* and *c*) in peer reviewed journals, there was virtually no acknowledgement whatsoever from the world of academia. My ideas, which I believed to be a bombshell of new understanding, failed to raise even the tiniest ripple of interest in the pond of academic orthodoxy. This left me high and dry career-wise. By now I had been out of work for about a decade from my original "career track" as a computer programmer and image analyst, and a lot of things had happened in the world of computers and imaging during my absence. I had never really expected much in the way of an academic career. I had gone back to school purely for the intellectual curiosity of trying to understand biological vision,

I did it because I could afford to do so. I have always been a kind of a carefree fuck-up in life. I never did great in school, and I had no illusions of a career in academia from the outset. The competitive pressures for the prestigeous title of Professor are so great, that that honor is awarded only to young people with flawless career profiles, and despite protestations to the contrary in public postings for academic openings, it sure helps if you are of the right race and gender and age, and I was three strikes on all three counts, being a middle-aged white male and a late starter in life. I had no academic aspirations beyond a deep curiosity about the process of natural vision, which I was convinced must involve some beautifully simple and elegant principle that remained to be discovered. I had discovered over the last few years since my PhD that I had two substantial advantages over my peers. The first was a profound belief that much can be learned about the algorithm of natural vision by examination of the properties of subjective experience. How could it possibly be otherwise? If everything that I see or experience comes as a result of some kind of processing going on in my brain, then surely the nature of that processing must be revealed by the product that it generates. It was just a matter of “stepping back” far enough to see the vision problem in the proper context, and abandoning the powerfully seductive naive realist instinct. And I was to discover that most of my peers were not only unwilling to step back far enough, but objected vehemently to the very idea, convinced from the outset that it was fundamentally wrong, and it was *so* wrong that it did not even deserve to be published as a serious scientific hypothesis! I was to discover to my complete and total amazement, that the biggest name researchers at the heads of our most prestigeous academic institutions were almost universally *naive realists!* Even professional philosophers! Who would have ever thunk it, that a drunken stoner flunkie fuck-up like *me* could get a better grasp on the *real* problem of vision than all those high-flying richly-endowed super-educated professors? Certainly not me! I had begun with a deep respect for those professors, and an earnest desire to learn from them what they knew. Who could have known that many of them didn’t have the *first idea* of the most essential principles of vision! And, as I discovered later, I was not the first to discover it. If my professors had only read their Wolfgang Köhler and understood his empassioned message of the Gestalt theory of Isomorphism, that what we see in our experience is not the world itself. Or they should have read Bertrand Russell who had made the same argument with equal clarity, with his analysis of the *causal chain of vision*, that goes from the world, through the eye, to the brain. There is *no way*, Russell argued, that the end point of that causal chain could snap back out of the brain to appear out in the world again, to become irretrievably co-mingled with the original

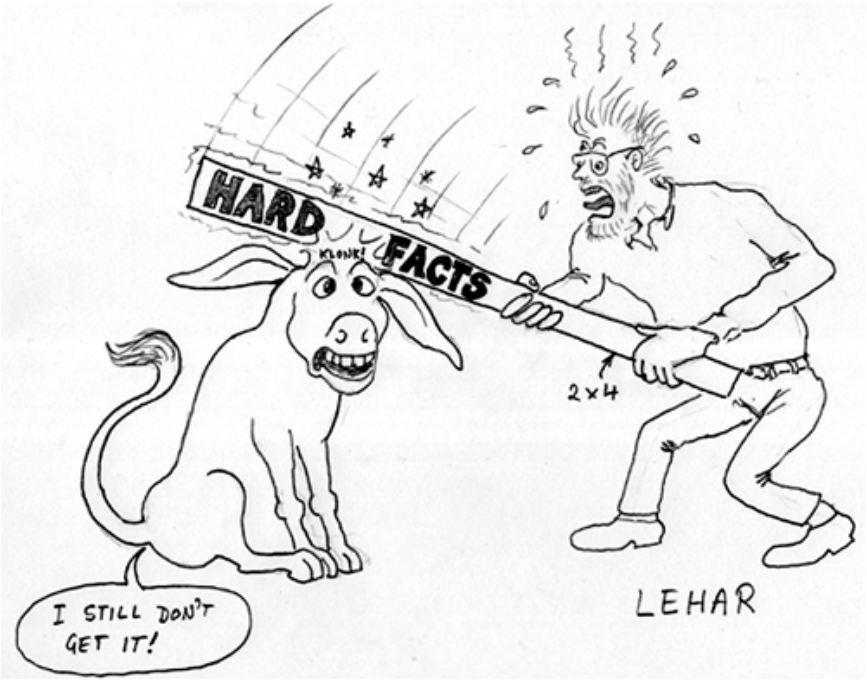
cause. The space of experience, Russell argued, is *not* to be confused with the physical space known to science. One is outside our head, and extends virtually to infinity, while the other is inside our head and uses a squashed diorama perspective that encodes infinity within a finite representation. Or my professors should have read Immanuel Kant, who had first posed the dichotomy between the *noumenal* and the *phenomenal*, world, and that the only way we can see the noumenal world is by its effects on the phenomenal world. If my professors had only read and understood these authors, then maybe *they* could have taught *me* that vision is like a guided hallucination, a world of mind fabricated by the brain. As it was, not only did they not tell me, neither did they want to *hear* it from me when I discovered it for myself, even when I later cited those original authors and their irrefutable logic. You have to pick the right intellectual giants of science if you are to gain any advantage from standing on their shoulders.

The second advantage I had over my peers was my past experience with hallucinogenic drugs, and my conviction of their value as a path to inner discovery. When I went back to school for my PhD I honestly believed that my professors would have been experienced psychonauts, especially those who studied psychology, neuroscience, and biological vision. But prestigeous professorships are awarded only to the most squeaky-clean and upstanding citizens, most of whom would never dream of tarnishing their images by consuming illicit substances. Most of my professors had never had any of the experiences that I had had. How could they know what I had discovered? This stuff wasn't taught in their schools of thought.

So what was it that I had discovered in my long psychonautical odyssey? The first thing that I discovered was that almost everything we knew about vision was either outright *wrong*, or at best highly misleading. The *neural network* theory that was taught in my department proposed that the spatial aspect of visual processing is performed by spatial receptive fields, neurons with hard-coded patterns of excitatory and inhibitory synapses that served like little image templates. But just one glance of a hallucinatory scene, for example Robert Williams' painting in Figure 5.2, or Alex Gray's paintings in Figure 5.3, should tell us that that couldn't possibly be right. If the brain encoded spatial pattern using little hard-wired spatial templates, then the world of our experience would appear more like a South Park cartoon, with rigid little images moving about on a static background. What I saw in my hallucinations was an elastic stretchy cartoon world much more like Disney or Pixar than South Park.

Another thing I had discovered, thanks to LSD, is the powerful propensity of the visual system to break into periodic and symmetrical patterns. In retrospect this perceptual tendency is plainly evident in ornamental art of all cultures throughout history. We just *love* symmetry and periodicity for decorating our clothing, dishes, pots, wallpaper, and just about everything else that we use, especially those items of particular value or significance to us, such as jewelry, ceremonial swords, victory cups and sacred chalices, churches, mosques, and cathedrals. And we love patterns of symmetry and periodicity in our music, poetry, and dance. The existence and meaning of human music, dance, and ornamental art have been a long-standing and deep mystery since time immemorial. I made the significant discovery that this pervasive symmetry and periodicity are evidence for a harmonic resonance principle of mental function. That idea is either totally and completely wrong (and music art and dance remain deep unfathomable mysteries!) or, if there is even the smallest fragment of truth to it, this Harmonic Resonance theory is nothing short of a revolutionary advance in our understanding of the principles of biocomputation! Excuse me if I sound like I am tooting my own horn. Inside the covers of this book I feel like I am at home in my solipsistic universe where I can speak freely about what I believe to be true. And besides, if I don’t toot my own horn, clearly nobody else is going to toot it for me. I’ve been waiting in vain for nearly a decade for even the tiniest little toot of appreciation from academic officialdom. Instead, I have been blackballed for daring to stand up and complain publicly to editors and reviewers about unjustified rejection of my papers for publication simply because my ideas are unconventional. Ok, maybe I was blackballed for rude rebuttals like this one:

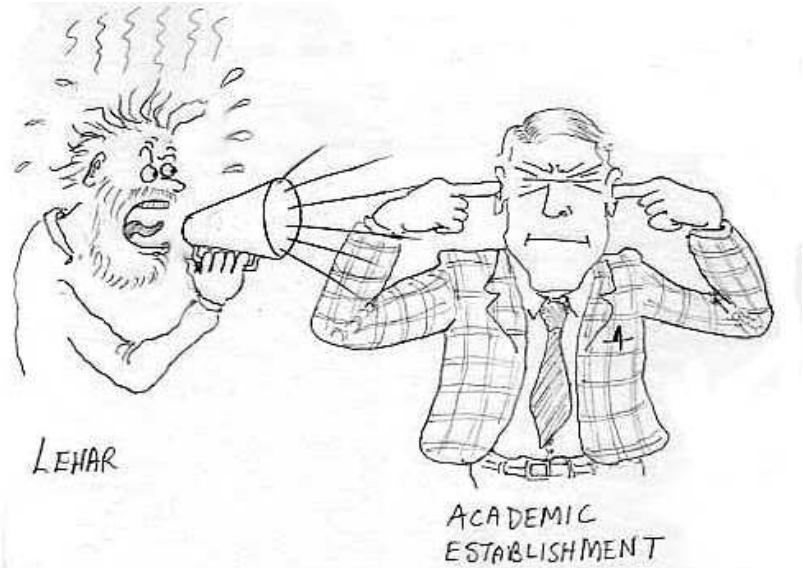
“You, Dr. Baars, are a **Donkey’s Ass** of the highest caliber!”



Read the whole review that merited this treatment at ...

http://cns-alumni.bu.edu/~slehar/webstuff/consc1/response.html

And this one:



“I've had my share of rejections in science, in fact I 've had ***more*** than my share of them. But this one is by far the most shameful and disgraceful rejection yet! This "review", if it can be called such, is a vivid demonstration of exactly what is wrong with the anonymous peer review process! There is ***no accountability*** on the part of the anonymous reviewers to

stand behind their statements, some of which are so absurd and indefensible as to be ***laughable!*** *“*

http://cns-alumni.bu.edu/~slehar/webstuff/consc/response.html

These were posted on my web site only after I had finally realized the absurdity and unfairness of the anonymous peer review system, and was collecting trophies for my web site for all the world to see. But really, what is the *point* of scientific journals if creative and challenging new ideas are rejected out of hand for being outside the mainstream? If those boring old rags only publish what is already mainstream consensus, then there is little incentive to read them.

Another thing I discovered in my psychonautical journeys was the spatial nature of cognitive thought. Cognition is generally considered to be a purely abstract, non-spatial symbolic entity, as is human language. What I discovered, this time thanks to PCP, was that abstract thoughts are spatial after all. Like that head that I saw in a hallucination, flashing rapidly between a young girl, an old man, black, white, oriental, thin, fat, and every other possibility, flashing through all those alternatives as fast as a dealer shuffling a pack of cards. I could see a sentence, “The block - is on - the table” turning into a vivid mental image before my eyes in stages, modifying itself as each new word was added like a dynamic cartoon scenario. I discovered that the secret of the general concept is an imaging mechanism that can express spatial patterns as a kind of superposition of states, like the disk of a spinning propellor that represents the propellor at all orientations simultaneously.

And finally, thanks this time to PCP, DXM, and Ketamine, I saw some telling hints of a flashing, strobing, flanging world accompanied by a richly textured cacophany of sounds, that suggested a three-dimensional sweeping or scanning mechanism that sweeps out the shapes of our experience many times a second, so fast that we can’t normally see it.

But perhaps the biggest discovery of all was that first early insight, that the entire world of experience is entirely contained within our physical brain. That key discovery is what made all the rest of them possible.

None of my observations of my drug-induced experiences, nor my conclusions drawn from them, are to be taken as scientific evidence for the principles of mental function. That is not at all what psychonautical observation is for. But before we can begin the scientific investigation of the mind, we must begin with at least some initial preconceptions: Does the brain work like a telephone network? Or

does it work like a digital computer? And *at least* equally valid among such questions is whether the brain works by harmonic resonance, an idea that would never have even *occurred* to me if I had never had this series of bizarre confabulous experiences. Most people, and most scientists, consider science to be a rigorous plodding affair of logic and proof and hard evidence, that requires a clear and uncluttered mind. How can anyone possibly do science while in a state of profound intoxication? But what is true for *normal science* is not quite true for paradigmatic science, when one sets out from the very beginning and asks the most basic questions such as “How does vision work?”

Ketamine marked for me the final shattering of the last vestiges of the nave illusion that what we are seeing in experience is the world itself. After you have lived through as many free-wheeling hallucinations as I have, you realize that your mind is first and foremost, a magnificent three-dimensional holographic image projection mechanism, capable of rendering some truly awesome experienced scenes, with incredible capacities for generating texture, patterns, shapes, transparency, color, light and shadow, multiple illumination, radiance or self-illuminance, mirror reflections, and refraction as through water or glass. Our visual mind works like a modern ray-tracing algorithm that creates synthetic scenes using fractal algorithms complete with illumination and shadow, except it is capable of generating the most complex scenes in a fraction of a second, and hundreds of these images per second! Once you have seen how vivid and clear and complex a world your mind is capable of fabricating in an instant of time, you must acknowledge both a deep appreciation for the outstanding capacity of the brain to pull off that stunt, and at the same time, a deep awe at the thought of the real world itself, beyond our experience, of which the world of experience is no more than a cartoon caricature over-simplification.

I look back fondly on those years of abject retreat from the consensual world, to a universe where I was *God*, and could make anything appear or happen as I chose. Who needs reality when they have a world in which they are God? There was an urgent sense of power and purpose and significance in the energetic images and feelings that coursed through my brain during those power-boosted trips. For a hard-nosed scientific type like myself, this is the closest I could come to having a spiritual experience. Because in the solipsistic world of the K-hole, you are no longer anchored to your physical body, but you soar free as the flimsiest most ethereal but powerfully energetic ghost. Inside your own brain, ghosts and spirits do actually exist! I have experienced mental telepathy, psychokinesis,

levitation, and every other magical and paranormal phenomenon, and they were as real as anything in my experience ever was, and I can believe in them without betraying my scientific belief that there is no such thing as supernatural phenomena nor life after death. As a devout atheist, I chose to enjoy my heaven right here on earth before my death, and thus avoid the disappointment of the faithful when they are cheated of their promised heaven when they die. Mind is a physical process taking place in the physical mechanism of the brain. And what a process it is! Those ghostly fleeting images packed with intense creative power. That is raw pure magic taking place in the physical matter of the brain. I have *been* those powerful mental images coursing round and round in my brain. I have *been* that creative spirit that brings whole new worlds into existence. I have felt the vital primal force of those electrically charged pulses of mental energy, and it was the most beautiful thing to behold! The mind is truly a magnificent machine, when instead of viewing the world *through* the mind, you shift your gaze to the mind itself. In many ways, those years of surrender and retreat to the internal world, were the most powerfully moving and emotionally fulfilling experiences of my life, the very pinnacle of existence in my paltry life on this planet, a true world of discovery in the chambers of my own mind.

Have I suffered any permanent deterioration of mental function from all this illicit experimentation? That was a possibility that I had considered all along, as a risk to balance the potential rewards of discovery that it allowed. I guess I have always had issues of self-esteem as a consequence of a confused and chaotic adolescence. What else of significance would I have ever accomplished in this world? In drugs, I found myself a unique niche that gave me an inside track on my peers. But as it turns out, after all those years of the most extensive indulgence in the most powerful drugs, the biggest detriment to my life, by far, was not through the effects of the drugs. I seem to have survived without any noticeable impairment to my mental faculties. I can still fly an airplane upside-down, and figure my way through a triple-nested loop in a computer program without losing track of the variables. My mind seems to be about as sharp and clear as one might expect of someone of my age despite the mental wringing I have undergone. No, the biggest toll I have suffered from my years of drug use is the profound sense of isolation and retreat from the academic community occasioned by my discovery of the truth of visual function in the brain. I know that I am right, although I suppose I will have to take my kudos posthumously, at this point I doubt I will receive any acknowledgment in my own lifetime, if ever. And thus whether I am one or not, I am condemned to live the life of a harmless delusional kook, an

object of sympathy rather than of respect, and if that is the part I have been scripted to play, I will have to play it, because it is becoming too painful to play the role of the mad vision scientist with a radically new idea in the absence of any acknowledgement from the world outside my head. My advice to young people is don't do drugs. You may not have the strength to handle the truth you may discover through them.

So here, back in the world of consensual reality, I remain trapped in a solipsistic universe where I alone see myself as a radical visionary scientist who has made some breathtaking discoveries about the nature of mind and brain, while most everyone else who knows me sees me as a delusional crank tilting at windmills, with a fondness for intoxication. For all the strange and incredible things I have experienced in other universes in my mind, none can match the bizarre and inexplicable nature of the so-called real world. I am that politically-incorrect creature, an old white male of European descent, soon to be a dead white male. Will all my great discoveries be burried with me in my grave? When I eventually blink out, will all my theoretical observations and conclusions vanish without leaving the tinest ripple on the sea of human knowledge? Maybe I have been wrong all along. I will never know. Maybe this whole crazy world of ours is the biggest and craziest hallucination of them all. Maybe none of it really happened after all. Did it? Who knows!

Disclaimer:

This book is a complete and total fiction. Any resemblance between the characters in this narrative and real people, either living or dead, is either complete and total coincidence, or more often, deliberate misrepresentation for the purpose of humorous defamation of old friends. Nobody in the real world, including the author, is remotely guilty of any of the acts and practices committed by the wild fantasy characters in this book.

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