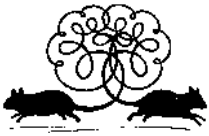
The Brain, Consciousness & Illusion of Truth

Karol Ondrias



Translated and edited by
Emma Nezinska

Universal Publishers/uPUBLISH.com
1999 • USA

ISBN: 1-58112-779-0

www.upublish.com/books/ondrias.htm

English language supervisor: Graham Reed

Front cover design: Jurko Ondrias
Back cover author photograph: Lubica Malekova

Picture Credits:
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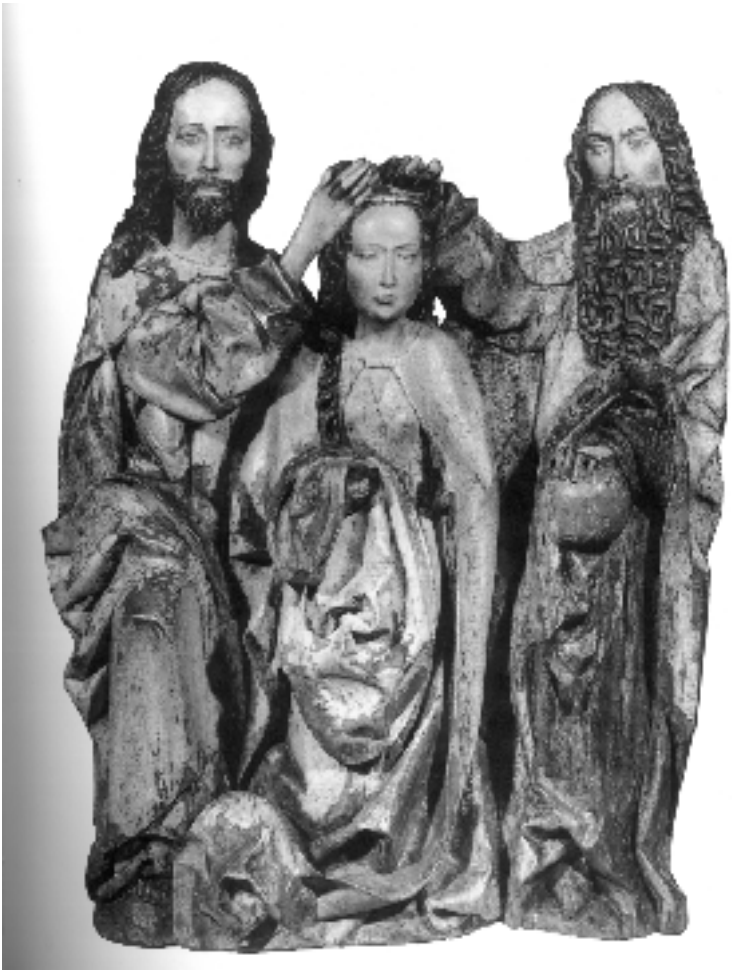
To my son Jurko and his peers
for the many lucid questions

Nothing is real, or if it is, we don't know it. We have no way of knowing the truth. Truth is at the bottom of an abyss.

– Democritus

Don't believe everything you read!

– A not very ancient maxim



Coronation of Virgin Mary, a wood carving from Spisska Kapitula, Slovakia. Before 1500.

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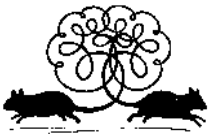

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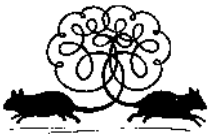
Preface



This lengthy essay, and not a sizeable book, is a format I've opted for in a bid to share with others my perception of some human phenomena that have long intrigued me. For example, why should people with reasonably equitable access to the same information contents eventually pursue widely diverging approaches to things vital to shaping their societies and personal identities?

Take the abortion question, which came to the fore in the 1970s and has since figured quite prominently on the top of public and political agenda across many nations. There are some who are firmly convinced that induced interrupting of pregnancy as a means of birth control is something morally impermissible and appalling, if not verging on homicide. Understandably enough, the proponents of this pro-life viewpoint disapprove of any policies leading to the legitimization of induced abortion on demand. Another, pro-choice group, are equally convinced that a pregnant woman alone is entitled to take decisions on whether to give birth to a child and shoulder a life-long responsibility for its upbringing or not. The collisions between the advocates of the two horns of the abortion dilemma have reportedly involved many violent assaults and even exacted their irreversible death toll. What is stunning, in this context, is that the people on both sides of the fence must have been goaded into the incriminated violent action by roughly the same amount of shared knowledge relating the induced abortion issue and its eventually far-reaching

implications for societal efflorescence. Mind, although members of the belligerent camps have been sharing the same physical and symbolic environment, their personally valid 'worlds' must be widely apart.

More similar paradoxes inflict the issues of faith, splitting humankind into religious people and so called nonbelievers. Some may identify themselves as Catholic Christians and believe in God and the Word of the Bible. Many others, on the contrary, believe neither in God nor in the truths professed by the Scripture. This fact, again, is nothing if question-begging. How can it come about that people from my neighborhood, who must have had approximately the same amount of knowledge available as regards religious matters and could have freely chosen which facts to believe and which not, have arrived at such clean opposite conclusions when it comes to their religious feelings?

I am equally puzzled by the fact that over half of the Earth's population believes in the existence and operation of supernatural agencies which can allegedly interfere with the human world and destinies through controlling and affecting both. Isn't it pretty perplexing that today, in the age of vigorous scientific and technological progress, so many people still believe that such literary religious monuments as the Bible, the Koran, the Rig Veda, the Dhammapada or the Tanakh are *sacred* in the strict sense of the word? And that we ought to obey their moral commandments drawn for times now gone? And to embrace their cosmologies and social blueprints – the ones which have been overtaken by modern science and are presently calling for revision in the light of the changed circumstances? Further, it strikes me as particularly amazing that contemporary advances in science and scholarships have failed to win on their side most of humankind; that traditional religions and patterns of belief in the supernatural (gods and the immortal soul included), which are products of societies long extinct, keep their hold on the modern mind and

imagination. Astonishingly, scientific and scholarly accounts have failed to establish themselves in any statistically significant degree over superstition, prejudice, and a ready belief in the supernatural.

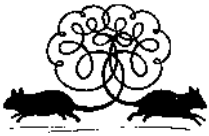
The message of this essay boils down to a simple assertion that faith, conviction, consciousness, the soul and even so called free will derive from the human brain function. The latter is, in turn, met by the brain's 'hardware and software equipment'. The ensuing considerations seek to argue that all of the cited states and forms of the human mind do have their physical correlates. Further, as one of these, the human brain creates *illusions* of truth about the world outside our heads. The contents of these illusory presentations are in each separate case conditioned on the specific hardware and software equipment of the individual brain *rather than* on the hard facts found in the outer world. I will try and show that man is just a biological machine controlled by a program supplied by its hardware and software equipment. This biological machine, it is essential to point out, displays close affinities to many other programmable entities found on the planet Earth. This is not by any means to say that I am going to deny humans a couple of very special features inherent to their species. (Contemporary science, I assume, has gleaned a great deal of evidence to endorse the above views.). But people nowadays aching to return to 'basic' values, I would like to shed some additional light on the latter's tangled roots concealed in the dark evolutionary and civilization catacombs.

Opinions highlighted on the pages of this book are, in fact, what I for now consider to be fairly defensible in light of the facts I know of and the inferences they have allowed. In other words, the views I intend to share with you are just the mental output of my brain's hardware and software work in processing the information derived from the real order. I don't think there are a great

number of people at this moment in time who would subscribe unconditionally to the thoughts and feelings this essay seeks to explicate and promote. Needless to say, this is exactly what has provoked me into writing this essay. I'd like to widen the ranks of those who don't take things happening around them for granted – through stirring doubt and possibly planting into my readers the bug of a desire to see through all guises of illusion, surrogate or make-belief. The diction of the book, as the reader may find while reading further, is tentative and in no event imposing. Lastly as it behooves a text that seeks to recruit sympathizers with ideas that are often at odds with common sense notions.

Karol Ondrias
9/9/1999
Bratislava, Slovakia

Introduction



Res natura and their secrets

On completing my university and doctoral studies in physics, biophysics and molecular biology, I have acquired a fairly consistent appreciation of natural laws and regulations controlling organic and inorganic matter. Also, a patchwork of humanities we used to be exposed to during the university course, has provided me with some helpful insights into the regularities on which the entire magnificent enigma of the universe, human society included, runs. Many tantalizing mysteries left loose on the fringes have never ceased to intrigue me. Nevertheless, what has always puzzled me yet more is the approach most people take to the things that, in my opinion, just cannot help striking one as mysterious and inexplicable. Oddly though that may be, nine times out of ten people are not interested in what is *really* going on all around. They, for instance, tend to relegate a host of biological and physical processes, particularly the ones which defy immediate pigeonholing, to the realm of *natural* phenomena to be taken in a matter-of-course manner. It does seldom occur to lay men and women to stop and challenge the commonly accepted accounts of such phenomena, let alone to try and dig deeper for the sake of unveiling the reality hidden behind.

With me, too, a television set used to be an enigmatic and over-sophisticated devise until, at my university course in Applied Electrical Technologies, I was exposed to the laws and principles guiding its work. I used to believe at that time that people with little education and

training in physics and electrical engineering could not help being perplexed and fascinated by this technological miracle, actually by the fact they could see moving pictures behind the glassy screen – people, cars, and planes – and even hear voices, noises, and tunes. I remember asking people if they were not surprised by that. No, they weren't. Most of my respondents were perfectly content to know that a television set would be functional when plugged in and equipped with an antenna to catch some sort of waves. On the contrary, their 'telly' would not function, they had been instructed, when unplugged or disconnected from that all-important antenna. That's it. This much was just enough for them to enjoy their favorite programs, the rest having been discarded as irrelevant or unexciting. Yet what my representative sample would so readily dismiss was *the Mystery* clamoring for attention. No one seemed keen on the processes involved in the performance of the gratifying invention. None felt like learning more about the regularities operating behind the screen.

Equally, people would just shrug their shoulders when asked about their conception of such ordinary miracle as growing up of a tree from a seed. You throw a tiny seed into the soil to have it sprouting forth and gradually uncoiling, just like that, into a huge, ramified tree! But people would not be altogether surprised. They just would take the whole thing for granted, i.e., as something 'natural'. Rather, they would be puzzled should a tree grow without any seed having been sown. *That* could be worthy of the name of 'mystery'! But this very disinterest in what really underpins appearances – along with the consequences of this deficient popular curiosity – have sparked my inquisitiveness. Why don't people find such things essential? Why do most men and women contend themselves with fuzzy folk notions? Are humans just 'dull of soul'? Why are they overwhelmingly immune to wonder or to the temptations of the virtual appreciation of what's going on all around? What hides at

the root of universal human penchant for comfortable half-truths and self-deception? One thing is sure: it is not their alleged muddle-headedness that is to blame. Rather, what may be at stake is some sort of the inherited wisdom out of the old days. If so, isn't it long antiquated?

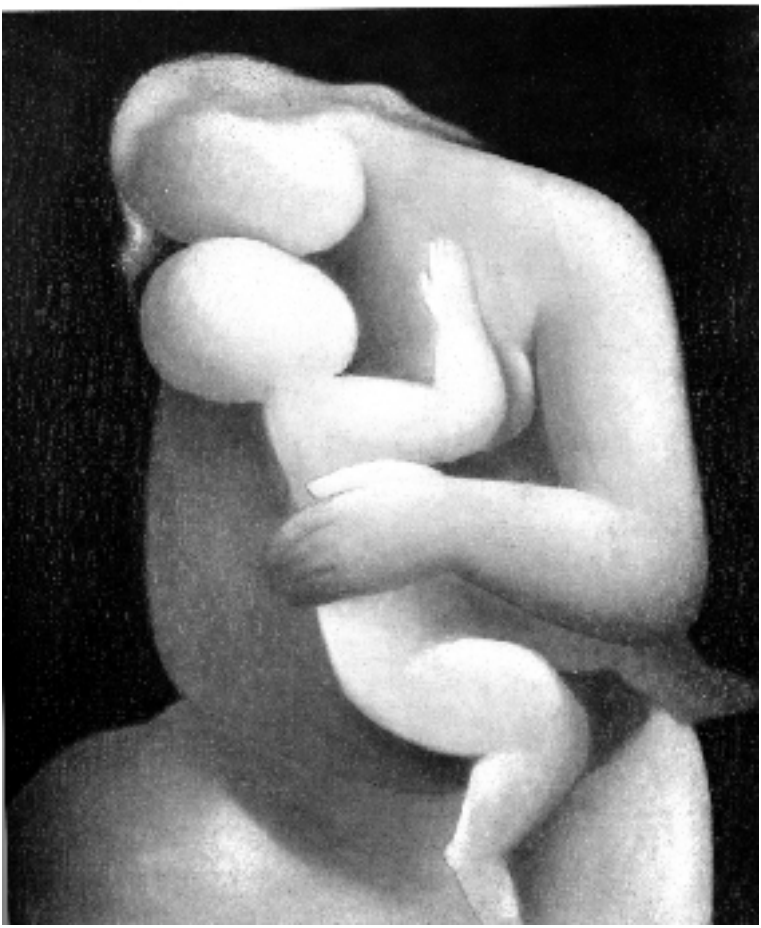
Our early ancestors, I'm inclined to suggest, must have shared with us this alienated, black-box approach to the enigmatic. Extensive historic evidence indicates that most people in olden times did not bother about the 'why' and 'how' of things they had to deal with in their daily lives. It came to them as natural to be able to see, to hear, to think, and to breathe. Again, they were not wont to question a seed transforming itself into a tree. Nobody suspected a potent mystery behind, let alone a catch. Part of such awkward questions have been addressed by a negligible fraction of humanity, others have never been raised. The intellectuals in the remote past tried to account for some of the mysteries by writing and compiling sacred books. These would supply tales of the beginning of the world and the man, and of the human soul – the ultimate enigma of old times, the close secret of *all* times. The invention of a God as the absolute prime mover has turned out to be a smart solution to many standing puzzles and anxieties. What's more, the newly discovered supernatural agency has added more coherence and cogency to previously pretty disparate accounts of the world. But today we find ourselves confronted with many new and no less challenging mysteries than the ones that used to vex the dawning minds of our early ancestors. It may well be the case that in one or two thousand years the questions which seem so compelling today will have fallen into insignificance. Or future generations might find them infinitely petty and severely embarrassing. This is for one thing. For another, people nowadays just cannot anticipate the many tantalizing mysteries and riddles that are most likely to spring up in, let's say, the fourth or fifth millennium for

our posterity to meet head-on or postpone for the lack of evidence.

Discerning a mystery and unlocking it takes a very special ability, or a talent for such things. Some among us may be quite advanced in recognizing where to pause and to dig deeper. How do people identify problems that no one else has thought of before? Among the many fascinating tales of serendipity, the one of the British bacteriologist and a Nobel laureate Alexander Fleming, also knighted in 1944 for his contributions to science, is a textbook case. While working for St Mary's Hospital Medical School in London, he noticed that the mould, called penicillin, contaminating a culture plate with deadly staphyloccocus bacteria destroyed these deadly microorganisms. In those days, the late 1920s, such contamination of cultures with penicillin, a type of bread mold related to mildews and mushrooms, and their ensuing destruction was a fairly common occurrence. Some of the cases were even cited in a number of scientific papers well before Fleming's discovery. Their authors literally pointed out that the deadly bacteria had been killed. But Fleming alone saw through this mystery and made the best of its unveiling. How? Well, unlike so many before him, he just did not dispose of the jelly-like contents of the petri dish needed to be cleaned, but got to study it. The mold, he discovered, was able to produce a chemical which was a powerful germ killer. This eventually led him to the discovery of the miracle antibiotic known as penicillin. The list of such tales of serendipity from the field of science could be fairly long. Another foremost relevant example is from the new frontier, as it were. It is a story of the information gold rush, the Web, and its inventor. The founder of the Web, the British Tim Berners-Lee, now leads the World Wide Web Consortium. When asked about his invention, he would recall his time at the CERN laboratory in Geneva where, instead of smashing atoms, he determined to build something. With a personal need to simplify the amount

of information he was receiving each day, he used the mouse, personal computer and hypertext to conjure up the new world. Back in 1989, this was a simple but revolutionary idea. Using text, sound and video, individuals can now buy a book, search for a life partner or make a global protest on-line.

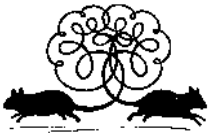
The above brings me to the conclusion that asking ultimately simple questions perhaps entails the anticipation of a 'higher' order just lurking behind them. Such capacity for 'smelling a mystery' is a qualitative attribute of 'select' brains that enables them to do the job of thinking in a way not to be mimicked or learnt. In some people this ability to identify problems that no one else thought of before may be more vigorously present than in others. So, the brains of some people, equipped with their more 'nosy' individual hardware and software – which might have been additionally honed and tuned in through training – normally smell the mystery where others just stay unexcited and pass by. The negligence of the puzzles nestling in natural and pedestrian things is ubiquitous. Quite a number of my acquaintances and some fellow researchers at the institute seem to overlook, for instance, glaring 'enigmas' hidden in visual illusions (I shall address these in the ensuing chapter). Yet the deconstruction and appreciation of 'obvious' things is, to my mind, essential for shaping opinions on the brain function and on what is involved in the pursuit of the self. For bearing with me through the pages of this essay, it may be instrumental for the reader to postulate that the ensuing descriptions of such visual phenomena as the Necker cube, black-and-white bands, etc. *do* involve some sort of mystery. And we both know only too well that the dissected secret will beget another and another and another. The act of recognizing a mystery gets us to ask a 'why' question. The answers, at times, may be nothing but trivial.



Mikulas Galanda: Mother. 1933.

Chapter One

Illusion of Vision



"Out of the shadows and imaginings into the truth"
– THE WORDS ON THE GRAVE OF GEORGE GRANT, CANADA'S MOST ORIGINAL THINKER

A. "*This is how everything has happened, I've seen that with my own eyes.*"
B. "*I'm not sure enough how everything has really happened, this is only what I've seen.*"
– TWO STATEMENTS OF AN EYEWITNESS TO A NASTY BIKE ACCIDENT

Which of one eyewitness's two attempts to correctly phrase her testimony do you think is more successful? Take your time and think it over because much is at stake. In this chapter, I will seek to give you some clues to the answer I favor. One caveat, perhaps, before we start. If you accept the point I would like to make and identify with my answer, the world may lose for you much of its charm. You will come to realize that there is hardly any room for the natural and spontaneous in human life. You, like other people, are programmed and manipulated all through. Worse, your brain, on which alone you depend for the contact with the outer world, deceives you. Your mother's love has been genetically

given. Now Romeo and Juliet probably owe their immortal romance to some idiosyncrasies in their brains neuronal networking (and, posthumously, to Shakespeare's genius). A belief in God, in this evolutionary stage, is more of a hindrance than a help. Much of your behavior is drug-seeking and belongs in the cave in civilization and ethical terms. A new spiral of postmodern struggle for survival has produced new, mass, afflictions 'tailor-made' for less lucky nations and cultural regions. And this is not the end of the disenchantment chain eventually to open by the informed answer to the above unexciting question. *Bon voyage*!

To come back to the question proposed at the very onset. Let us start small. By way of helping you to choose and ground your answer, I undertake to show that it is the human brain that actually decides on *what* we are like and what we see 'out there'. More specifically, the point I am making is that a certain brain region, *not our eyes*, is ultimately responsible for the 'finishing' of the coarse image of a certain outer object initially perceived with the eyes. The brain appears to do so in accordance with a rule of thumb of its own (an algorithm), dispatching afterwards thus 'finished' picture to its other region – a physical correlate of consciousness. In other words, to 'us'. Yet thus groomed image need not necessarily display a one-to-one correspondence with the empirical facts of the world out there – commonly and erroneously referred to as 'objective' reality. Because there is none we can cognize with the help of our necessarily individualized senses (complete with their high-tech extensions) and vantage points. *There is no view from nowhere*, hence there is no knowing matter of fact impartially, i.e., in-itself.

This chapter may justifiably seem to the reader to be dragging on too much. That has been a deliberate decision on my part; in trying to get the reader a sense of the machinery concealed behind visual illusions, I have to lay a groundwork before I make any other moves. This is

going to claim the lion's share of attention and space in this chapter. Just referring my readers to the extensive literature on the many related topics might not have been, I'm afraid, the right avenue to follow. For all that, at this spot I cannot help recommending the lay readers with interest in visual neuroscience at least Francis Crick's remarkably elucidating and insightful *The Astonishing Hypothesis. The Scientific Search for the soul* [1]. Many facts scattered throughout my book have been borrowed from this compelling and inspiring volume. Now there's one technical thing I deem helpful to agree upon at this stage. 'I' ('me' or 'self') shall signify, for the purposes of this essay, a construct of our brains; it is used throughout this text synonymously with "consciousness", the latter's physical correlate being thought as localized in the brain.

It has recently been the trend-du-jour, with children and adults alike, to entertain themselves with so called fun things. These are graphs capable of fooling people by producing an illusion that one can see in them something which is not really there. Some modifications of these are represented in Figures 1-4 contained in this book. The likes of such illusions number literally hundreds (e.g., an impossible staircase or an impossible triangle), and their impressive array is mediated by the Internet web sites at: http://ww.yorku.ca/eye/index.htm and http://www.illusionworks.com/html.

The four plain graphs provided here will suffice, I believe, for an outline grasp of the role our brains perform in seeing. I have adapted these figures from the designs of illusion works found on the web sites cited above.

***

The brain: Not a mirror of truth

" Someone is not as green as he is cabbage-looking".
– FROM THE EU FOLKLORE

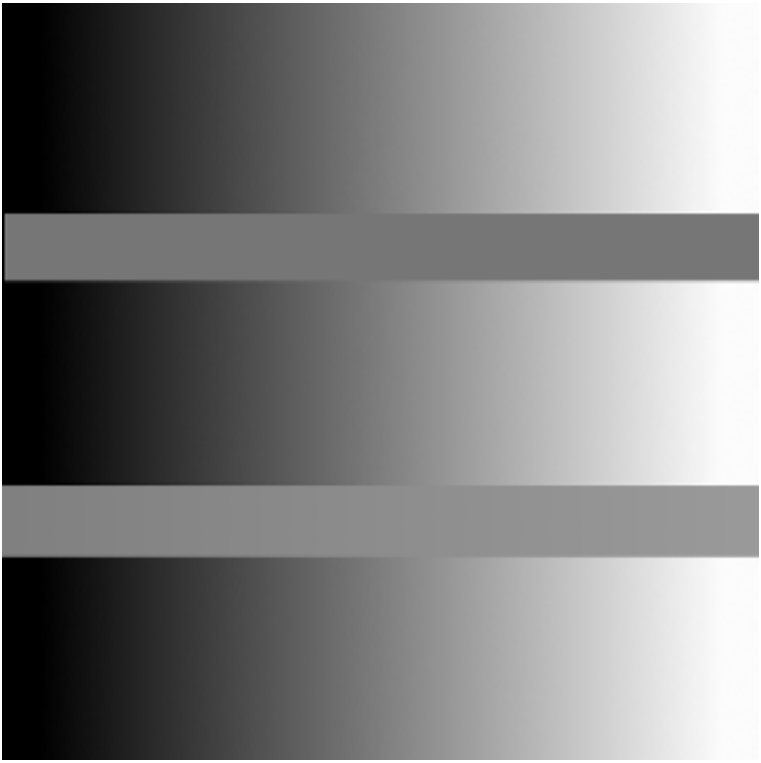


Figure 1

Consider Figure 1. This simple graph consists of five horizontal bands. If you observe the drawing as a whole, you will probably notice that bands 1, 3, and 5 appear the darkest on the left (0 per cent lightness), getting ever lighter on the right with the lightness reaching 100 per cent at the very extreme. At the same time, horizontal bands 2 and 4 look the darkest on the right, getting

lighter in the direction of the left edge. Now the reader can take two pieces of paper to screen off band 1 as well as bands 3,4 and 5 with each. This done, look at the only band left exposed, which is band 2. In viewing it, the reader will find that its texture is of uniform brightness over its entire width. I know that for sure, for I have executed the graph on the computer myself and can confirm that the entered brightness is indeed equal all over and stands at 54 per cent.

Now cover with the two pieces of paper bands 1,2,3 and 5. The non-occluded band 4 appears darker on the left and gets slightly lighter to the right. It is exactly how I have executed it on the computer: the darkest region on the left (50 per cent) with the band's darkness gradually diminishing in the horizontal direction to fall down to 40 per cent at the right end. This experiment works better if you view the figure at twilight or in dim light. It is noteworthy that the darker and lighter regions on bands 2 and 4 are perceived differently depending on whether you look at them as part of the whole drawing or as separate shapes, i.e., with bands 1, 3 and 5 screened off. Furthermore, yet more fascinating is the fact that you tend to see band 4, when it is viewed as part of the entire graph, as the lightest on the left and the darkest on the right, though its physical brightness is the exact opposite of this illusion.

A conclusion to be drawn from this simple demonstration is equally plain: Our brain deceives us. It just does not report to us truthfully what it perceives. Alternatively, pictures we are offered by the brain bear no one-to-one correspondence with the outward world. On the face of the above, the correct answer to the question asked at the opening of this chapter should obviously be 'B': *I'm not sure enough how everything has really happened, this is only what I've seen.* Very much the same inferences could be drawn from experimenting with most of other illusions, the mentioned Internet web sites included.

Deception for the sake of survival

"Owing to this struggle [for life], variations, however slight and from whatever cause proceeding, if they be in any degree profitable to the individuals of a species, in their infinitely complex relations to other organic beings and to their physical conditions of life, will tend to the preservation of such individuals, and will generally be inherited by the offspring."
– CHARLES DARWIN: THE ORIGIN OF SPECIES

Now our experiment inevitably raises more further questions and adumbrates many topics. How can it come about that on the whole Figure 1 we see the regions of darkness and of lightness on bands 2 and 4 localized differently from their real position? Why does our brain give us inadequate information on the shading of bands 2 and 4? Why does it baffle us?

There is no quick answer to this question. Even if we may have some rough notion of why the brain persists in telling us lies about the outer world, we are still in the dark about the way in which it performs this obvious distortion. What are the contents of our visual awareness and what is its neural stuff? It is plausible to believe that the human brain scans a projection of the object found on the retina of the eye to further process it and, unlike a video camera, to eventually alter it. What needs to be realized is that it is not the case that the image coming from the visual world and falling on the retina will be straightforwardly recorded on either any sort of template or an actual display screen localized inside the brain, and then passed on to our consciousness to view. Rather, the case is that a picture we initially perceive presents in itself a coarsely sorted set of electric and chemical pulses dispatched to the brain from the retina of the eye. Then this cluster of signals is further handled in the brain according to a definite rule/algorithm yet not discovered.

A particular kind of algorithm involved (or the way the image we receive is constructed) as well as a specific modification of the initially obtained sensory percept we will eventually have seen are contingent on both genetically encoded anatomical patterns of connections binding brain neurons (our 'hardware' and the province of 'genes' as units of inheritance) and on temporal patterns of neural activity. These secure the brain's additional, more *ad hoc* tuning-in by means of extrinsic cues provided by previously accumulated cultural experience (our 'software' and the province of 'memes' as units of cultural memory).

In other words, specific patterns of neuronal associations, which have developed in our brains throughout the long evolutionary course, handle impulses they receive from the retina of the eye to further process them and thus arrive at 'images' that are forwarded to our consciousness for 'viewing'. It is exactly these neural bindings that determine what we will or will not eventually see. In evolutionary terms, the outlined system of image formation is involved in the survival and reproduction of species and their individual members in the incessant and ubiquitous struggle for existence. In this light, it would be fairly reasonable to infer that there must have been not as yet any urgent evolutionary 'demand' for a more perfect visual system in humans. In all likelihood, an ideal system, which would secure the one-to-one correspondence between the percept and the external object did not use to be of any survival advantage for the human brain (itself, by the way, a sophisticated product of the hundreds of millions of the evolutionary development, which is in charge of survival and reproduction). I am inclined to agree with the view that it didn't use to be mortally important for the human brain to be capable of discerning whether band 2 is uniformly shaded along its entire length or it is not. Therefore, the brain in our experiment has accorded band 2 its level of brightness in sticking to the guidelines of