

## CHAPTER 13

### All Science Must Be Rooted in Experience

In previous chapters we have seen how organisms, as centered agents, present us with rich, narrative contexts — mortal performances that proceed, with characteristic expressiveness and intention, through the stages of a unique life drama qualitatively recognizable as belonging to a particular species. And yet, as we have also seen, a powerful urge drives biologists to ignore, as far as they can, every *living* feature of those performances. The aim is to employ strictly physical, inanimate, unliving terms of description.

They ignore, for example, what it must really mean when they say that animals “strive” to maintain their life, or that a wound “heals” itself, or that an organism “adapts” to its environment, or that an animal “perceives” a threat and “responds” to it. (Inanimate physical objects — stones, clouds, whirlpools, and dust storms — do not, in the biological sense, strive, heal, adapt, perceive, or respond.) But it is all too easy for any scientist to side-step such meanings and analyze the organism’s story into lifeless sequences of precisely lawful molecular interactions. And since there appear to be no gaps in the molecular-level picture, the resulting explanations seem complete. Only the organism is missing.

In other words, seamless as they may be in their own impoverished terms, such explanations are not in fact complete. They miss the simply observed fact that molecular-level interactions in an organism are always caught up in, and governed by, the higher-level pattern of a life story. We always find ourselves watching the meaningful *coordination of causal processes in an extended narrative* — an end-directed coordination that cannot be explained by the processes being coordinated. This is why explanations that never move beyond physics and chemistry stop short of biology.

Non-living explanations do, however, have one advantage: they conveniently avoid all those troublesome words I use throughout this book in discussing organic contexts and life stories — words such as *intention* and *purposiveness*, *idea* and *thought*, *agency* and *end-directedness*, *interests* and *meaning*. Most biologists prefer to have nothing to do with such terms.<sup>1</sup>

One stumbling block associated with those words is that they relate to features of our own inner lives — our human *experience*. It is, of course, healthy to avoid an anthropomorphic projection of human experience upon other organisms, where it does not belong. But we, too, are organisms, and therefore we have no cause to question whether conscious human experience belongs in our biological science. Instead we can only ask, “*Where* does this experience belong in our biological science?”

If we ignore the character of our own life and experience, can we fully understand a world that mustered its resources, material and otherwise, in human form — a world that ultimately came to present itself in the form of human understanding? And how can any biologist today make the evolution-denying assumption that our own experience has absolutely nothing to do with our evolutionary ancestors — was in no way pre-figured in them? Further, how can we gain legitimate scientific understanding, if it is not *empirical* — if it is not an

expression of our most rigorously considered *experience*?

Perhaps first of all we need to ask what is meant when we refer in this way to our own experience.

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### ***Two distinguishable but indivisible aspects of human experience***

It is clear enough — trivially clear, it seems — that we cannot conceive any material phenomenon, or any reality at all, that is inconceivable. If an object or phenomenon did not lend itself to our conceptualizing — if nothing of its true nature could be captured in thought — we would never know it because we would not even be able to think it. If we cannot conceive something, it cannot appear as a definite and coherent fact of our experience.

Either the world's character is at least partly given in thought, or else it is altogether alien to our understanding.

Some truths are so obvious and foundational that we easily forget them in our quest for new knowledge. The fact that anything we can understand must share in the nature of thinking — must in one way or another be meaningful — may be one such truth. If a thing cannot present itself to us as thought, it may as well not exist as far as we are concerned.

But our conceptualizing or thinking capacity is only one of the contributors to our experience, and therefore to an empirical science. Our senses also contribute. And here, too, we can say that, without the qualities of sense, we have no material world to talk about. If you open yourself to any phenomenon whatever and then (in imagination) remove all sensible qualities from it — all the given colors, sounds, touch sensations, smells, and so on — nothing will be left. You are confronting an absolute void.

Not even the most rigorous mathematics can give us a world, since nothing in mathematical thought itself tells us what the mathematics is about. We must *apply* the mathematics to sensible experience if we want to see how mathematical ideas are expressed in material reality. But the same applies to all thinking, not just to the purely quantitative ideas of mathematics: only by bringing our thought into relation with what comes through our senses do we find the world taking shape around us. This is a key idea that we will flesh out below.

There seems to be no basis for assigning priority either to our sensing or our thinking. These are two inseparable yet distinguishable aspects of a single reality. Our access to them via the more or less distinct human functions of thinking and sensing happens to be a characteristic of the structure of our being as cognitive agents, not a bifurcation in the world itself. This structure of our cognitive experience, we will see in [Chapter 23](#) (“The Evolution of Consciousness”), has changed over the course of human evolution.

For the moment, it is enough to ask ourselves: Do we have any knowledge of the material world that is not an intimate marriage of sense and thought?<sup>2</sup> It will not require much work to realize that the answer is “No”.

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***Without relations  
of thought, we  
have only chaos***

Many of us (especially as we grow older) have had the experience of “losing our bearings” while driving or riding in normally familiar territory. Suddenly a powerful sense of disorientation takes hold of us, and the entire landscape becomes a disconcerting question mark. For a moment we have no sense for where we are or where we are headed, so that our usual feeling of comfort with our surroundings is lost. The confusion that sets in, however short-lasting, is one of profound lostness. The connections linking where we are at the moment to a

wider, coherent context have gone missing. The conceptual map through which we grasp the meaningful arrangement of the larger landscape is no longer anchored to our current location.

One might think that the problem here applies only to matters of spatial location. After all, when I become disoriented while driving, all the particular objects around me — houses, trees, road surfaces, animals — continue to make perfectly natural sense. My disorientation applies only to a certain contextual aspect of my environment.

But the fact is that all the particular things around me also depend on the thinking that weaves parts into a meaningful whole — not only spatially, but also, for example, functionally.

Suppose I were to lose all conceptual grasp of the relations governing the scene outside the window where I am now writing — a scene with a great white pine tree standing just a few meters beyond my desk. I would then have no more reason to connect the particular branch I am now looking at with the trunk of the tree than I would have for connecting it with the contiguous patch of blue sky. The idea that the sky is *up there* while the tree is *here*, or that the pressure of the wind against the branches is responsible for their waving, or that the roots in the ground provide mechanical strength in support of the tree’s uprightness, or that the entire tree as an integral unity is *growing* — these would no longer serve to hold the tree together in my understanding as the unitary kind of thing, or being, it really is.

A wholly unformed content of sense perception is something we presumably never experience as such — because it would not yet be *experience*. It can assume meaningful, experiential form only so far as it is informed by thought. In routine perception, this informing is already accomplished before we are aware of it. Through long training, our senses are educated by our thinking, so that we do not need to reflect anew, over and over again, upon familiar contents in order to form them into elements of our experience.

We can see the issues more clearly when we consider cases where the normal education of the senses has been partly lacking.

## We do not see with our eyes alone

It can be hard for us to recognize all the thinking that is woven into our perceptual experience, much of it originating far back in childhood. But there are now well-studied cases where some aspects of the usual marriage of sense and thought never occurred in the first place — not until adulthood. I have in mind those individuals, born blind, who were much later given sight through operations.<sup>3</sup> Here we find vivid evidence for the insufficiency of mere sense impressions, and for the role of thinking in giving us lucid, intelligible experience of the world.

The British neuropsychologist, R. L. Gregory, describes the case of “S.B.,” who received donated corneas to replace his own congenitally opaque ones at age fifty-two. After the operation, the bandages were removed from his eyes, and

he heard the voice of the surgeon. He turned to the voice, and saw nothing but a blur. He realised that this must be a face, because of the voice, but he could not see it. He did not suddenly see the world of objects as we do when we open our eyes.

He made progress while still in the hospital, but it all involved learning *how to understand what he was looking at* so as to bring it to coherent and meaningful form. At first he judged that he could hang from the window ledge of his room with his feet touching the ground when the distance was in fact at least ten times his own height. When, on the other hand, he had had previous touch experience with objects, he could estimate visual distances much more realistically.

S.B., like many such patients, found it stressful to adjust to his new powers of sight. For example, he had difficulty “in trusting and coming to use his vision when crossing a busy road”:

Before the operation he was undaunted by traffic. We were told that previously he would cross roads alone, holding his arm or his stick stubbornly before him, when the traffic would subside as the waters before Christ. But after the operation it took two of us, on either side, to force him across: he was terrified, as never before in his life.

Following his operation, S.B. fell into an increasingly deep depression. Making sense of things was hard work, and he would often prefer to encounter new objects with the familiar sense of touch alone. “Some of these people”, Gregory writes, “revert very soon to living without light, making no attempt to see. S.B. would often not trouble to turn on the light in the evening, but would sit in darkness.” Over time “he gradually gave up active living, and three years later he died.” (Gregory 1978, pp. 193-98).

Such cases highlight for us the extent of work required to make rational sense of the unformed content supplied by our senses. This depends a great deal on the availability of relevant prior experience — that is, experience that results from already having made sense of prior perceptions. But the unnatural work of suddenly having to cope in adulthood with an overwhelming mass of unfamiliar sensations so as to find the connecting thoughts that form them into a coherent and satisfying picture can clearly prove exhausting.

## How do things around us become what they are?

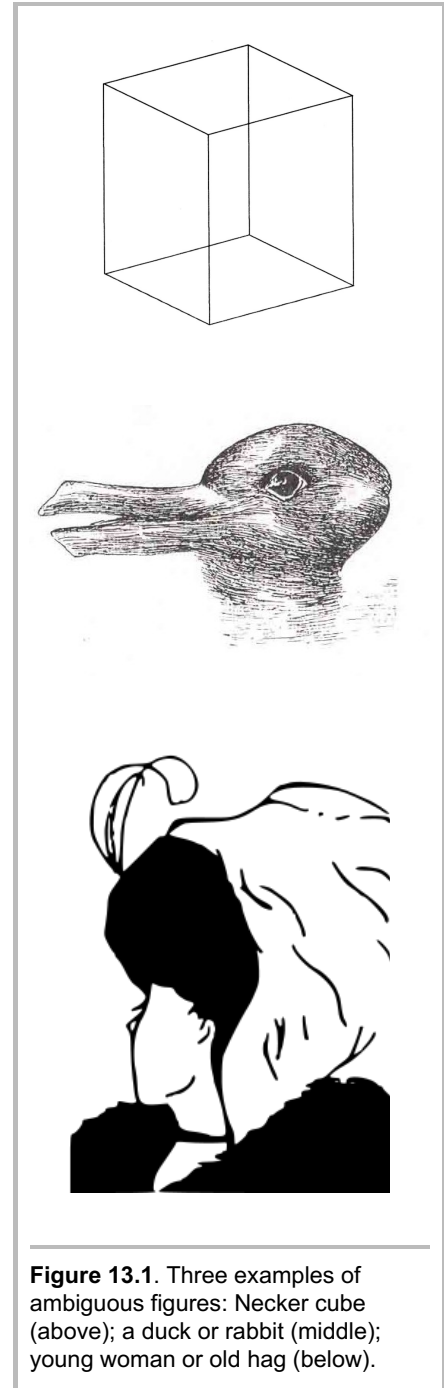
We have all been exposed to so-called ambiguous figures — images cunningly contrived like those of [Figure 13.1](#) so that they can come to meaningful appearance with the aid of at least two altogether different and conflicting conceptions of their governing relations. While the “image on our retinas” remains the same, the way we *think* the image makes a huge difference in what we see.

This usefully draws attention to how we must *participate with our thinking* in the appearance if in fact its potentials as an actual phenomenon are to be realized. However, the fact that the ambiguous figure allows different interpretations does not mean that the contribution of thought is arbitrary or merely subjective. If we try to think the Necker cube with the idea of a sphere, we will not come to a meaningful image. Our thoughts must be those already implicit in the sensible aspect of the appearance.

Ambiguous figures are an unusual case. What remains true even in the more general case of great art is that we can always deepen our thoughtful understanding of it. Anyone as artistically unaware as the present writer may have the experience of hearing an art historian lecture about a particular painting or a particular cultural tradition of painting, and then find that he looks at certain works with newly and refreshingly informed eyes. The picture he sees now is not the same one he saw before.

But this is true also of natural scenes. Confronted by a violent thunderstorm, Stone Age man did not actually see the same atmospheric phenomenon we see today. Our “art lecturer” in this case has been the scientist, whose conceptualizations have been assimilated by the entire culture of the last few hundred years. The lecture has ceaselessly entered our ears through the words and meanings we have learned from childhood onward. We see with the perceptual and conceptual resources of our own era. (As for Stone Age man and ourselves, it may be that we *both* miss important aspects of the thunderstorm. But that is a point for [Chapter 23](#), “The Evolution of Consciousness”.)

I would be saying nothing unusual if I were to remark that we have no *theories* except by virtue of the thinking that constitutes them as what they are. It is a vastly more difficult matter, however, to realize, as we surely must, that we have no *things* to theorize about in the first place except by virtue of the thinking that constitutes them



**Figure 13.1.** Three examples of ambiguous figures: Necker cube (above); a duck or rabbit (middle); young woman or old hag (below).

as the things they are. So if we are content merely to accept things as they are now given to us, then before we even begin our scientific work, we have already committed ourselves to the particular, culturally influenced thoughts that bring to appearance the objects and phenomena currently available to our scientific curiosity.<sup>4</sup>

There remains the question, then: “How adequate are the thoughts through which our natural surroundings have gained whatever meaningful form they now have for us?” Every bit of nature can be seen more or less profoundly, with deep insight or a superficial glance; with an intense, trained perception, or a lazy attention that merely glides over surfaces; with loving, qualitative detail or with remote abstraction. We may not easily misconceive a cube as a sphere, but we *can* be content to see far less of the world than is actually available to a more penetrating vision. From force of habit we of the past few centuries may, for example, see merely “mindless objects”, despite the fact that it is our own, culturally informed minds through which the objects come to the only appearance we are given.

Recognizing the element of our own thinking in the data of science — both the truth of this thinking and its limitations — would seem to be a prerequisite for any rigorous scientific understanding.

## Do we really want an empirical science?

The fact that thinking is already present in the only phenomena available to scientific investigation is one of those fundamental truths, easily recognized yet widely ignored, that can change everything. It tells us something about how intimately we as thinking beings are woven into a universe that invested in us powers of thought coordinate with the thinking already inherent in that universe. Or, in the lower-level (molecular) context of the preceding chapters: it reminds us how intimately the world’s wisdom has been woven into the directed activity through which our bodies, including our brains, have been formed ([Chapter 8](#), “The Mystery of an Unexpected Coherence”).

But, important as thinking is, we have seen that it cannot by itself give us a world. There is also the “something” that thinking illuminates — the unformed contents provided by our senses. If, as we saw above, our senses cannot give us identifiable or nameable or recognizable *things* without first being informed by thinking, neither can thinking give us any such *things* without there first existing a sensible content capable of being so informed.

A new kind of attention to the senses was the glory of the Scientific Revolution — a revolution that was felt to be, in part, a reaction against the empirically untethered intellectual flights of the medieval doctors. The pioneers of modern science sought to bring their thinking into disciplined connection with careful observation and manipulation of the world around them. Thus was born the ideal of an *empirical* science — a science of practical experience rather than speculation. To this day the ideal remains sacrosanct among scientists.

But here a curious contradiction emerges. For, the ideal is directly belied by an entrenched conviction (elaborated in the following section) that human sense experience is irreducibly subjective and illusory. If this is true, how is an empirical science supposed to give us an objective understanding of the world? Doubt on this score has been met by an ever greater



reliance on the extremely thin “experience” of instrument dials, gauges, and read-outs.

The idea behind this reliance is that the quantitative rigor and sensitivity of the instruments can compensate for the limitations of the human senses. But whatever those limitations might be, the senses are what give us access to the world. Numbers are not material entities. They are conceptual, and the fact remains that thinking alone — including, as I have already indicated, mathematical thinking — cannot give us a world. We must *apply* the mathematics to sensible experience if we want it to tell us something about material reality. Where are we to gain that experience (so as to have actual things to talk scientifically *about*), if not through our supposedly unreliable senses?

Our contradictory attitude toward human experience — hailing it as the foundation of any true science, while denigrating it as the source of confusing subjectivity — has long been an open wound in the body of science. Yet the issue is rarely given thought by the working scientist. Philosophers, meanwhile, continue picking at the wound as they have for the past few centuries, to little avail.

Nevertheless, the entire problem, having been falsely posed, can be simply resolved.

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***It is careless thought that  
deceives us, not our senses***

Who has not heard the various clichés about how our senses “lie” to us. Try immersing one hand in a bowl of hot water, and the other in a bowl of crushed ice, holding them there for a while. Then remove them both and place them together in lukewarm water. Initially, one hand will feel the

water as cool and the other as warm. So goes the “proof” that the felt qualities of things are subjective and misleading compared to the objective report of a thermometer.

The conclusion is wrong. If you follow an identical procedure with two thermometers, you get a similar result: the two columns of mercury initially show different temperatures. Over time they move in opposite directions until, as happens with our hands, equilibrium is reached. Nor does hand or thermometer offer false reports during the period of adjustment. At every moment the reading correctly reflects the changing *relations* between water and measuring instrument. Such relations must be grasped in thought, which is the only way we ever make sense of our senses.

How many school children have been given an experience of these bowls of water! And how many have been taught the lesson that their experience is worthless and deceptive! All the better, I suppose, to prepare them for further misconceptions of the sort we will now consider.

## Earth and sun

Another classic example of our “lying” senses has to do with an appearance we witness every day: it *looks*, we are told, as if the sun goes around the earth, not as if the earth is rotating as it goes around the sun. In his play, *Jumpers*, Tom Stoppard skewered this particular claim by having one of his characters ask: “Well, what would it have looked like if it had looked as if the earth was rotating?”

Surely it *should* look exactly as it *does* look; any other appearance would have been false to the fact of rotation. It’s just that we have to employ our thinking in order to make sense of *any* appearance. Once we grasp this truth, we cannot help realizing how wrong it is to declare the appearances from earth to be false. We are free to take up any vantage point we choose. Copernicus chose to look, in imagination, from the vantage point of the sun. This was a decisively important step. But

surely we have no more right to absolutize that perspective than we do the one from earth. The heliocentric view is as “parochial” as the geocentric view compared, say, to a galactocentric view, where observations over time would make it clear that both the earth and the sun engage in a complex dance around an ever-changing point that is neither at the center of the earth nor the center of the sun — a dance that is influenced by all the other planets.

Scientists, in their research, do in fact routinely and justifiably employ purely local coordinate systems for their immediate purposes wherever they happen to be on earth. It would make no sense to use a heliocentric coordinate system when mapping out the placement of plants in an experimental garden. And neither scientists nor the rest of us have any particular difficulty holding all the various possible perspectives harmoniously together. When standing in a group around a tree, we all perceive the same tree, even if no two of us see exactly the “same” image of it. Our senses must be informed by our thinking. Only then does a coherent appearance — as opposed to a chaotic aggregation of disconnected sense impressions — present itself.



**Figure 13.2.** Nicolaus Copernicus.<sup>5</sup>



## The atom and beyond

Here is another scientifically sanctioned “old wives’ tale”, taken from a PBS television special written by science journalist, Timothy Ferris:

The baseball and the bat are mostly empty space. Their solidity is an illusion created by the electromagnetic force field that binds their atoms together ... We credit the home run to the batter, but the fundamental force responsible is electromagnetism (Ferris 1985).

The picture we are invited to contemplate is one of atoms. Each atom is said to consist of minuscule particles packed into an infinitesimally small nucleus. Added to these are even more minute electrons traversing enormous tracts of empty space as they orbit the nucleus at a vast distance. It is, we are told, the electromagnetic force binding the particles together that deludes us into losing sight of all that empty space comprising nearly the whole of the individual atom, and therefore also nearly the whole of the bat and ball.

But notice: “empty space” gains its meaning here only when we picture the nucleus and the orbiting electrons as a collection of nicely solid particles — solid like little space-occupying bits of the actually experienced world. We are then supposed to contrast these particles in our minds with the great expanses occupied by no particles at all.

But this is the picture that physicists labored throughout much of the twentieth-century to eradicate from our imaginations. For good reason: they well know that the erstwhile “particles” of atomic theory do not exist — not as bits of material stuff occupying discrete volumes of space that we can contrast with empty space. The only *material stuff* we are given in the universe is the sensible content of our perception.<sup>6</sup>

Look at what is happening here. Ferris is trying to get us to doubt our perception of the material world. Yet he is doing so by asking us to imagine imperceptible “particles” as if they were little bits of perceived material stuff. Rather than discrediting our perception, he is in fact illustrating the impossibility of imagining a world otherwise than in terms of perception. The only illusion is on his part: he is projecting the contents of perception into a theory-laden, falsely imagined, submicroscopic realm where in fact no perceptible content is given to us.

To reinforce the point, listen to neuroscientist and philosopher, Paul Churchland, assuring us that our various forms of observation — sight, hearing, touch, and so on — are not to be trusted:

The red surface of an apple does not *look* like a matrix of molecules reflecting photons at certain critical wavelengths, but that is what it is (Churchland 1988, p. 15).

Our senses, in other words, are said to fail us because they do not show us the red surface of the apple as *really* consisting of unimaginably small “billiard balls” or “wave packets” reflecting other balls or packets. And so, again, apart from such sense-based imagery — the very thing that physics today forbids us from projecting into atomic theory — Churchland’s argument would be wholly unpersuasive.

The point is decisive. Only by picturing particles (or waves) as little bits of the qualitatively experienced world can the reader fill in Churchland’s description in a way that makes it sound meaningful. But this sensible perception of the world’s qualities is exactly what Churchland is trying to dismiss. While telling us that the familiar qualities of the world are

illusions, he invites us to project these same qualities into the sub-microscopic realm. That realm then becomes proof that the familiar qualities aren't to be taken seriously. Apparently sensory qualities, such as the firmness and solidity of material things, are illusions *here* (where we can experience them), but real *there* (where we cannot).<sup>7</sup>

The moral of the story? Even when we are trying to talk about a world without the qualities of our senses, we end up talking about the qualities of our senses — but in a nonsensical way.

## Our “missing” bat sense

One last example. Those who disparage our experience love to point to creatures who perceive things we cannot. Wouldn't we live in a different reality if, say, we had the infrared vision of some snakes or the “sonar” (echolocation) sense of a bat? Of course we would — but only in the way those who are deaf or blind would live in a different reality if their senses were unimpaired. Perhaps the most striking thing about our perceptual worlds is their continuity and coherence, despite the supposedly discrete nature of the sense data and of the different senses themselves. Adding a new sense gives us a richer picture, but it is a richer picture of the unified world we already know.

We heard above in the case of S.B. that it can be difficult, as an adult, to cope with an overwhelming content of sense perception through organs of sense that have not, in the normal course of things, already been educated by thinking. But the fact remains that the normal course of education presents no particular difficulty at all.

If the bat's echolocation were suddenly and miraculously added to our own array of senses, we would presumably suffer some disorientation, just as S.B. did when the bandages were removed from his eyes. Like all our other senses, our new sense would need to be educated by our thinking. But we would have no reason to think that our new world stood in contradiction to our previous experience.

Nor is there any reason to think that a person naturally born with a capacity for echolocation would find his world *conflicting* with that of the rest of us. The two worlds would certainly vary in the richness of the contributions made by the different senses, but they would no more disagree with each other than the truly vast difference between the most sensitive musician's ear and the dullest, least attentive ear among the rest of us would spell a disagreement of sense perception.

To believe that we can truly know the world is not to believe that our present knowledge is exhaustive, or that the world cannot present itself within many modes of consciousness, or that our present powers of perception cannot be deepened beyond anything we can now imagine.

One reason we can be confident that newly developed senses — whether those of a bat or otherwise — would harmonize perfectly with our previously existing senses is that the harmony results from the thinking aspect of things. It seems safe to say that the education of our senses by thinking is essential to the unity of our experience of the world. Thinking has the quality that all thoughts can enter into harmonious relation with all other thoughts. The thought-

world knows nothing of absolute disconnection or contradiction. To take a trivial example, we bring “truth” and “falsehood” into meaningful and harmonious relation when we say, “Truth and falsehood are contradictories”.

The world of thought is, in a profound sense, *one*, and this is what enables us to have *one tree* despite the fact that we view the tree from many sides and never have two identical visual impressions of it. This unity of the thought-world also explains how it can be that, in any text or speech, individual words can be informed by their context. Their meanings are shaped by the thought of the context as if they were essentially of one substance with it. They merge their own identity into the integral and coherent unity of the whole.

Even the recognition of a logical contradiction requires a perspective wherein we can see particular thoughts joined together by a relation of sameness as well as significant difference. There can be no *absolute* opposites, for if they had nothing at all in common, there would be no way for us to think them together in order to compare them or pronounce them “opposite”. We can have contrary things to say only about ideas participating in a common realm of meaning.

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## Closing thoughts

The bare contents of our senses — if we could somehow know them before they were illuminated and given form by thinking<sup>8</sup> — could not possibly lie to us. Our senses just are not in the business of being either true or false. Truth and falsehood are features of thinking. In fact, as the ambiguous images in [Figure 13.1](#) were meant to illustrate, particular sensible

contents are not even *there* for us in any meaningful sense — and certainly not in a manner we could call “true” or “false” — until the illumination by thinking has occurred. It is only this thinking that can be more or less faithful to whatever comes through our senses.

You may recall a few occasions when you saw a slowly moving object high in the sky that might have been a bird or a plane. If you initially and unquestioningly took it for a bird, then that was the appearance you saw. But if, due to a sound reaching you or the hint of a contrail, you eventually realized that it was a plane, then the appearance changed and now became stable in the way that your first impression was not. Your initial judgment was, you might want to say, false.

But even though our perceptual judgments may need to be corrected, they are rarely if ever *absolutely* false. Even when you falsely thought you were looking at a bird, you correctly believed you were looking at a moving object in the sky — unless, perhaps, you later discovered that it was neither a bird nor a plane, but a floater in your eye. Even so, you would at least have been correct to note a real object in your field of vision — unless it turned out that you were mentally disturbed and starting to hallucinate.

The thought-aspect of perception — the bringing of perceived contents into this or that form — is a complex matter, sometimes requiring high skill and practiced judgment. And it is only this thought that we can evaluate for adequacy or inadequacy, truth or error. Eventually — and with reinforcement from our social surroundings — we do reach a stable judgment of some sort about most objects in our immediate environment. But even so, we can always deepen

those judgments. I do not know the woods through which I walk with anything like the insight of a life-long forester. Which is to say that I have not yet begun to bring the woods to profound appearance in the way the forester has.

And then there is the problem inherent in what we might call “collective illusions” or “historical aberrations”. Such might be, for example, the contemporary experience of the world’s objects as wholly “out there”, separate from ourselves in a mind-independent way, even though we know very well that we play a role in how they come to appearance. This, in fact, is a confusion intimately related to our present discussion. So let’s pause for a moment to ask ourselves, “What if the world is not mind-independent? What if its essential nature lies in its power of *manifestation* — its power of coming to *real and substantive appearance* for percipient beings precisely in terms of their various cognitive capacities, including their sense of touch and other senses, as well as their power of making sense of things?”

This is an issue we will look at more closely in (Chapter 24, “Is the Inanimate World an Interior Reality?”). For the moment it is perhaps enough to remark that I have never seen evidence produced in favor of the view that the mind-dependence of our cognition somehow demonstrates the unreliability of our knowledge. It would be just as logical to conclude that the interior qualities of our cognition are exactly the right prerequisites for our understanding a mind-dependent world. A mind-dependent world, after all, has the advantage that it would presumably be a mind-accessible world. Granted, this accessibility may in certain matters require a rigorous, skillful, and highly developed cognitive activity. But just about all worthwhile achievements on earth similarly demand effort and skill.

It is easy to forget that the cognitive capacities by which we bring the world to appearance are the cognitive capacities the world itself has brought to fruition within us. We are certainly free to doubt them, but we ought at least to ask whether the capacities by which we daily judge ourselves to be knowers of the world — capacities born of the world and through which we make sense of the world — might be just what they seem to be and ultimately perfectible without limit. Nothing about the development of human cognitive capabilities in almost every direction, from science to the arts, seems to suggest that we face narrow constraints, or that our minds are fundamentally alien to reality. Every time we gain understanding of anything to any degree, we seem to find ourselves invited “further up and further in”. That is, we find ourselves becoming ever more familiar with a mind-soaked reality.

Actually, a mind-soaked reality is the only sort of reality we could ever hope to know. In fact, it’s the only sort of world to which the idea of *knowing* could be applied. So even to ask whether we can know reality *in truth* may already be to assume that something knowable, something mind-soaked, is potentially waiting to be known — ready to be embraced, mind to mind.

There seems something rather odd about the turn in thought of the past few centuries whereby we have come to assume, without evident reason, that the world’s knowability is somehow compromised by the fact that we happen to know things by means of our own capacities and from our own vantage point. Who else’s vantage point would we want to assume? Is it even conceivable that any phenomenon of the world should present itself “neutrally”, as if from no vantage point at all? What could this mean? Could a real, material ice cube present itself other than from a particular point of view? Perhaps the unthinkability of what

we might consider the strictly “objective” view only confirms that it is in the nature of the world to be a content of particularized experience.

In any case, for the student of the evolution of consciousness (Chapter 23), the question is not, “How can anyone arrive at the ‘crazy’ idea that thinking belongs to the warp and woof of the world?” but rather, “How did it happen, in this last brief, historical moment, that we have come, ‘crazily’, to doubt a world humming with the high tension of creative thought?”

## Is Our Way of Knowing the World Truly Revelatory?

Biologists have studiously applied themselves to continual reinforcement of a materialist attitude that aims to ignore everything *living* about organisms. And this attitude is most intense when it comes to ignoring the reality of human experience — human interiority — through which alone we can have an empirical science. It all makes for a science that is extraordinarily inattentive to the ground upon which it stands.

This ignoring of the ground on which we stand is a strange thing, and (as I have tried to show in this chapter) has led to all sorts of self-contradictory claims about the uselessness of direct human experience for science. We have considered arguments such as, “It doesn’t look as though the earth rotates on its axis and revolves around the sun”; or “Putting our hands in separate bowls of cold and hot water, and then putting them both in a bowl of tepid water proves the fallibility of our sense for warmth”; or “The red surface of an apple does not *look* like a matrix of molecules reflecting photons at certain critical wavelengths, but that is what it is”.

The proper conclusion is that our senses, considered by themselves (and it takes some critical work to consider them that way) *never* lie to us. They’re not in the business of being true or false; they just are what they are. Truth and falsehood are features of thinking, not of the raw givenness of sense. They apply, for example, to the thinking that, joined to the reports of our senses, brings the world to more or less coherent and revealing appearance.

Humans belong to the world, are nurtured by the world, and are naturally given means to know the world in which we are so intimately immersed and from which our own substance and capacities are derived.

Putting it in slightly different terms: If we believe in practice, as virtually everyone does, that we can know the world, we must believe that, by nature, it lends itself to our understanding. It “speaks” to us in the language of our own experience, which is to say that its native language is also our language. The language of the world’s expression is the language of our experience.

In Chapter 23 (“The Evolution of Consciousness”) we will look at the powerful historical evidence grounding this understanding of the relation between the world’s speaking and our own speaking. And in Chapter 24 (“Is the Inanimate World an Interior Reality?”) I will attempt to carry the considerations of this present chapter as far toward a conclusion as I can.

## Notes

1. There is also the phenomenon I have referred to as biological blindsight. Biologists certainly



do recognize an end-directed coordination of events in organisms. They want to understand how cells, by means of almost unthinkable complex organizational activity, prepare for and go through cell division. Or how predators strategically mobilize all their physical resources in order to capture prey. It's just that the *explanations* for such coordinated activities are, for artificial reasons, required to consist, at bottom, of causal processes that make no reference to the fact of higher-level coordination.

2. I take the phrase, “marriage of sense and thought”, from a wonderful book of that title (Edelglass et al. 1997).

3. The classic study is that of M. von Senden. See also the discussion of “S.B.” in Gregory 1978 and that of “Virgil” in Sacks 1995.

4. Anyone who would like a fuller exposition of the role of thought in what we perceive might want to read the three chapters by philosopher Ronald Brady in the freely available online book, *Being on Earth: Practice In Tending the Appearances*. See also Chapter 23 (“The Evolution of Consciousness”) of the present book.

5. Figure 13.2 credit: District Museum in Toruń (Public domain, via Wikimedia Commons).

6. If you wanted to speak in terms of physics, you would have to talk about forces *entirely filling* the space of the atom (and extending far beyond it). Such forces can be measured, but bits of atomic or subatomic “stuff” are *never* seen. The “pictures of atoms” we are sometimes shown are in fact graphs — for example, graphs of measured forces — designed to look like material objects. And if the space of the atom is wholly permeated with forces, *that* fact gives us no basis for contrasting substantive particles with empty space. It merely shows that particle physicists have abstracted their understanding so far from the perceptible world that many of their theoretical constructs do not refer to anything like familiar elements of experience. These constructs are undoubtedly rooted in meaningful structure at the submicroscopic level — structure such as that given in a pattern of forces — but this is not yet to be speaking about *things* in the sense of material reality. As we have seen above, such *things* are always products of the “marriage of sense and thought”. Without both of these together, nothing is *there* for us.

7. Physicists, having learned long ago not to assert the existence of real particles and waves in the sub-microscopic realm, came to speak instead of mathematical probabilities corresponding to various instrumental read-outs. What material reality these probabilities correspond to cannot be meaningfully discussed — so they often tell us. And this should be no surprise, given that the only reality we have is a reality of *experience*. Talking about contents of experience that we cannot actually experience leads to gibberish.

8. To know a content of our senses would, of course, already be to have illuminated that content with thinking.

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