

# PLACES WHERE CREATION DOES A LITTLE WORK ON ITSELF

ART AND SCIENCE AS  
PARALLEL AND DIVERGENT  
WAYS OF KNOWING

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Perhaps, to begin with, a remark by Nabakov—always a good place to start—who at the time was laying out the requisites for being a good novelist, though, for our purposes we might think of these as the requirements for being fully alive. But listen to him closely, because it's the opposite of how we usually think of these things: "You need," he said, "the *precision* of a poet and the *passion* of a scientist." The precision of a poet—and the *passion* of a scientist.

Speaking of poets, I often like to start these sorts of talks with what I call the morning prayer. In this instance, two poems. The first coming from Thomas Lynch, the great undertaker poet, the first poem from his new book *Walking Papers*, a poem, as it happens, called "Euclid":

What sort of morning was Euclid having  
when he first considered parallel lines?  
Or that business about how things equal  
to the same thing are equal to each other?  
Who's to know what the day has in it?  
This morning Burt took it into his mind  
to make a longbow out of Osage orange  
and went on eBay to find the cow horns  
from which to fashion the tips of the thing.  
You better have something to pass the time,  
he says, stirring his coffee, smiling.  
And Murray is carving a model truck  
from a block of walnut he found downstairs.  
Whittling away he thinks of the years  
he drove between Detroit and Buffalo  
delivering parts for General Motors.

Might he have nursed theorems on lines and dots  
or the properties of triangles or  
the congruence of adjacent angles?  
Or clearing customs at Niagara Falls,  
arrived at some insight on wholes and parts  
or an axiom involving radii  
and the making of circles, how distance  
from a center point can be both increased  
endlessly and endlessly split—a mystery  
whereby the local and the global share  
the same vexations and geometry?  
Possibly this is where God comes into it,  
who breathed the common notion of coincidence  
into the brain of that Alexandrian  
over breakfast twenty-three centuries back,  
who glimpsed for a moment that morning the sense  
it all made: life, killing time, the elements,  
the dots and lines and angles of connection—  
an egg's shell opened with a spoon, the sun's  
connivance with the moon's decline, Sophia  
the maidservant pouring juice; everything,  
everything coincides, the arc of memory,  
her fine parabolas, the bend of a bow,  
the curve of the earth, the turn in the road.

Sophie the maidservant, as in Sophia, the Hellenistic/Alexandrine personification of Wisdom, although, myself, I like to think of her as pouring milk, and for that matter, to think of Lynch himself having had something quite like Vermeer's *The Milkmaid* in mind.



Johannes Vermeer,  
*The Milkmaid*

Which in turn brings me to a marvelous poem by Wislawa Szymborska, the great Polish Nobel-prize winning poet (as translated in this instance by Stanislaw Baraczak and Clare Cavanaugh).

Maybe all this . . .

And she means All This—this hall, those chandeliers, that screen, this podium, me, all of you, this whole building, this city, that bay, the entire surround, all of it. . . .

Maybe all this  
is happening in some lab?  
Under one lamp by day  
and billions by night?

Maybe we're experimental generations?  
Poured from one vial to the next,  
shaken in test tubes,  
not scrutinized by eyes alone,  
each of us separately  
plucked up by tweezers in the end?

Or maybe it's more like this:  
No interference?  
The changes occur on their own  
according to plan?  
The graph's needle slowly etches  
its predictable zigzags?

Maybe thus far we haven't been of much interest?  
The control monitors aren't usually plugged in?  
Only for wars, preferably large ones,  
for the odd ascent above our clump of Earth,  
for major migrations from point A to point B?

Maybe just the opposite:  
They've got a taste for trivia up there?  
Look! on the big screen a little girl  
is sewing a button on her sleeve.  
The radar shrieks,  
the staff comes at a run.  
What a darling little being  
with its tiny heart beating inside it!  
How sweet, its solemn  
threading of the needle!

Someone cries enraptured:  
Quick, get the Boss,  
tell him he's got to see this for himself!

For surely here the image Szymborska must have in mind, the image of the girl spread up there across the big screen, must be very like Vermeer's *The Lacemaker*. ("In my dreams," she had recorded elsewhere, "I paint like Vermeer of Delft.")



Johannes Vermeer,  
*The Lacemaker*

And one of the most remarkable things about that painting, in turn, is the way that everything in it is slightly out of focus. Either too close or too far, except for the very thing the girl herself is focusing on: The two strands of gossamer-thin thread pulled taut in her hands, the locus of all her labors, that little V of concentration. Indeed, the painting is all about concentration: gradually, inspiringly, we come to concentrate on the very thing the girl herself is concentrating on, everything else receding to the periphery of our awareness. Like nothing else so much as a painter—or in this context, we might say, a scientist—lavishing his or her entire attention on his subject. Or else perhaps what happens as we ourselves pause, dumbstruck before this canvas in the midst of our museum walk.

Are we perhaps exaggerating here? Look more closely at the threads themselves. They arrange themselves, as I say, into that crisp, tight V, couched in the M-like cast of light playing upon the hand and figure behind them. The girl, godlike, momentarily focuses all her attention upon VM: the very author of her existence! And hence back to the poem, for the girl threading her needle, the little darling being with its tiny heart inside, is of course none other than the poet herself, intent over her scribbled page, laboring toward that perfected



line—or else subsequently, perhaps us, her readers, hunched over her completed poem. Though, as the creator of the poem, Szymborska is of course also simultaneously the Boss, as we, too, the readers get momentarily to be, recreating, recapitulating her epiphanic insight; seeing it cleanly for ourselves.

Indeed, Szymborska gets it just right. How in the perfected work of art, be it a poem or a painting—or, I would argue, an experiment and its conclusion—across that endlessly extended split-second of concentrated attention, artist and audience alike partake of a doubled awareness: the expansive vantage, lucidly equipoised, of God; the concentrated experience, meltingly empathic, of his most humble subject.

So I want to begin by talking about absorption, about concentration. The moment, as Leo Steinberg says somewhere, “when the artist stops asking, what can I do? and starts asking, what can Art do?” I imagine that’s similar with scientists, too. What is the World doing? Or with Diderot, noting how “painting is best when the artist steps back slack-jawed before his creation”—Diderot, who also said that the artist is merely the first observer of the completed work. Which is to say, that moment when he stops being the creator and suddenly becomes the slack-jawed witness.

For, of course, the whole distinction between art and science is of relatively recent vintage. Indeed, at the New York Institute for the Humanities at NYU, which I head, we still consider the sciences an integral part of the humanities—as would have any Renaissance magus. We do a lot of programming of scientific things, which by the way, can get extremely interesting. For example, we used to love having Tom Eisner, the great late entomologist, come down from his aerie up at Cornell to give talks about his wonderful menagerie of weird insects and their kin—cockroaches, bombardier beetles, rattlebox moths, flatid planthoppers, wolf spiders, and the like. And it turned out that the people who especially loved coming to those talks were the science students, all of whom seemed to be stuck in their ever-tapering silos, burrowing deeper and deeper into



Domenico Remps,  
*Cabinet of Curiosities*

one little tiny corner of the genome, spending their entire research life on this one little tiny kink in the chromosome, and here they got to see an entire cockroach! For them, cockroaches *were* the humanities.

But of course, as I say, this is all a very recent distinction. Not that many years ago, in the Age of Wonder of the sixteenth and seventeenth centuries, aristocrats would vie with one another gathering together wonder cabinets, such as this one here, more or less following Francis Bacon's prescription for the essential apparatus of "a compleat learned gentleman," from 1594, when he said that such a gentleman should attempt "to achieve within a small compass a model of the universal made private." Any such would-be magus would certainly want to compile, in Bacon's words, "a goodly huge cabinet, wherein whatsoever the hand of man by exquisite art or engine hath made rare in stuff, form or motion; whatsoever singularity, chance, and the shuffle of things hath produced; whatsoever Nature hath wrought in things that want life and may be kept; shall be sorted and included." And you'll notice how in this particular wonder cabinet you indeed do have various sorts of scientific apparatus, you have horns and coral and insects, and you have paintings. Most of the Dürers we now come upon at museums began their lives in cabinets such as this, right alongside the shells and the antlers and the skulls. All of them constituting occasions for marvel at the splendors, the richness, the bounty of Creation (the artist's efforts being merely a token, an instance, a shadow of the greater Creator's). And all of this occurring under the sign of absorption and concentration—what I call "pillow of air" moments, where suddenly you notice that a pillow of air has gotten lodged in your mouth and you haven't so much as breathed in ten seconds.

One could likewise cite the examples of Leonardo or Michelangelo, who would never have understood a distinction between their artistic and their scientific practices. After all, the





Rembrandt van Rijn,  
*The Anatomy Lesson of  
Dr. Nicolaes Tulp*

entire field of anatomy, before it split off to become a scientific discipline, was deeply imbricated in artistic practice, culminating, of course, in the most famous painting of this genre, Rembrandt's *The Anatomy Lesson*.

I just want to stop for a second and look at this painting that you've all seen a thousand times, but perhaps to look at it a bit more carefully. The year is 1632, and this is the anatomy lesson of Professor Nicolaes Tulp, the most eminent anatomist in Amsterdam at the time. Rembrandt is 26 years old and has more or less just arrived in town; with this painting, he is effectively putting out his shingle as a portrait painter. In compositional terms, Rembrandt is portraying the professor, a cadaver (who is incidentally a recently executed thief; we even know his name, but that's another lecture) with his arm flayed (the arm being the member with which he would have stolen something), and six of the professor's onlooking students. Granted, the final painting includes seven onlookers, but it's fairly obvious that the guy over there to the far left came late and demanded to be put in. . . . Or at any rate insisted on inserting himself into the commission at a late stage. . . . Maybe forked over his share of the money late, after everyone else had agreed on the terms of the arrangement. . . . And Rembrandt said, "Okay, you get in, too, but we'll put you over here." (And the guy's even portrayed as a sort of clueless doofus.)

The point is that the entire composition is a fiction and would have been understood as such by contemporary observers: It is not a snapshot, as it were, intended to be read as the exact recording of a specific moment in time (chemical photography had not yet been invented: nobody could or would even have imagined such a thing). It recalls an event—that day's anatomy lesson—but everyone would realize that the artist, who was present at the lesson, in addition would have held a series of separate sessions with each of the individual sitters, and then constructed a scene, posing each one in a different posture, frozen

with a different aspect. (Across the length of the actual anatomy lesson itself, of course, each of them would have moved through a whole range of such aspects, and Rembrandt would doubtless have sketched all sorts of ideas, but it was only after the fact that he'd have plotted out this particular iteration.)

There are all sorts of other things we could say about the cadaver and the way it is portrayed—how the corpse's presentation, naked except for the sheet covering its midriff, recalls and no doubt intentionally alludes to images of Christ after he'd been deposed from the cross (Mantegna's and the like)—Christ who after all had himself been crucified, flanked by a pair of common thieves. Or about the flayed arm, which is unusual, since in virtually every other anatomy lesson painting or engraving from the period (and there is a whole genre of such images), the part of the body that is portrayed as having been opened out is the part that in fact always was the section first opened in such procedures, which is to say, the belly, the bowels: the part that needed most immediately to be addressed since it would have been the first to start rotting in that era before refrigeration.

The flayed arm, on the other hand, no doubt alludes to Jan Stephen van Calcar's portrait of the preeminent anatomist from the previous century, Vesalius, which appeared as the frontispiece of their great 1543 collaboration, *De Humani Corporis Fabrica (On the Fabric of the Human Body)*, in which Vesalius is likewise portrayed as holding out the flayed arm of a dissected subject. (Some commentators suggest that Professor Tulp would have asked to be portrayed in this fashion as a subtle way of identifying himself as the great Vesalius's true heir, or that Rembrandt might have been currying favor with the professor or other possible future clients in advancing this sort of suggestion, or else that Rembrandt might have been casting himself as van Calcar's true heir, van Calcar having himself been a student of Titian's.)

But I want to focus on something else for a moment, or more precisely to have you focus on something else. Let's try an experiment: Everyone, close your eyes. You've all seen this picture a hundred times, but I'm curious about how you remember it. As you will recall, there's the corpse, the professor, that doofus off to the left (who we will henceforth bracket out of this conversation), and then the six onlookers ranged, as it were, in two groups, an outer trio, and the inner trio. And those three inner students are gazing intently, awestruck, dumbfounded, at something. But at what?

Now, if you're like me, you will likely recall them gazing at the flayed arm in hushed, almost queasy astonishment. But—now open your eyes again, and you will see that they are not. Nor, incidentally, are they gazing, as countless academic exegeses of this painting have maintained, at the opened book over here way to the right—the book supposedly standing in for the weight of tradition, or the customary protocols of practice, or whatever. A book's being the sort of thing an academic book writer might indeed like to imagine they were looking at, but it's obviously not. No, they're looking at *the professor's hand*.





The professor is saying, “With these muscles here—do you want to see something really amazing?—you can do this. You can rotate your arm in this fashion.” And they are looking at *that* as if they have never seen anything like it. And indeed, never before have they seen it in this way. Actually, when you look at the painting closely (as you can the next time you are in The Hague at the Mauritshuis where it resides, a room over from Vermeer’s *Girl with a Pearl Earring*), one of the things that’s really interesting is the way that guy in the middle, the goateed fellow craning out over the corpse’s head, has one eye looking at the flayed arm and the other looking at the professor’s. And it’s like a movie: up down, up down.

The point, though, is that this is not a painting about death. It’s a painting about life. And specifically about two of the most astonishing aspects of human life: manipulability and vision: hand and eye. About the ability to move one’s hand and the ability to see. In other words, *about painting*: the capacities that specifically make painting possible. A point further reinforced when we now look at the other three onlookers, the so-called outliers. For what are they gazing at? At us, yes. Or at the audience, yes—and there was an audience; these dissections often took place before an audience of variously distinguished guests, as we know did this one. But if you think about it, what they are actually looking at (within the fictional terms of this painting) is Rembrandt himself painting: the painter, his canvas perpendicular to the scene so he can take it all in, gazing at them gazing at him, expertly wielding his brush with his arm by way of the very muscles the professor is describing. And those onlookers in turn are no less dumbfounded by the miracle of what is transpiring before them. They are, as we say, getting it.

I mention all of this stuff about looking because one of the things that connects art and science—the practice of the artist with the practice of the scientist—is that moment that goes, “Oh, I see.” I get it. That’s what the scientist says when he or she finally figures something out. *I see*. The scales, we say, fall from their eyes. They are vouchsafed a fresh perspective. What scientists are striving after is what artists are doing all that time. David Bohm, the physicist, says that “physics is a form of insight and hence a form of art.” Einstein always claimed that imagination was more important than knowledge. Leonard Shlian has written

a book about art and physics in which he charts how, time and again, the artists were out in front of the scientists. For example, Giotto was working on conic sections and ellipses long before Kepler. Or the ways in which Manet and Monet and Cezanne were playing with compressions of time and space—the plasticity of time and space—decades before Einstein.

Having said that, there's something else that's important about this specific painting. As I said, these things would take place in public theaters. Special guests would be invited to come to such dissections. And although quite common in Leiden (from where, incidentally, Rembrandt had only just arrived), they were relatively rare in Amsterdam. We even know the date, for it was a fairly unusual occurrence and it was recorded in public records: January 16, 1632. And it's almost certain that there in the room—or such at any rate is the contention of W. G. Sebald in the opening chapters of his magisterial *The Rings of Saturn*—Dr. Tulp's students would have been gazing out past Rembrandt at, among others, an anatomy-besotted exile, then resident in Amsterdam, named René Descartes. Sebald convincingly argues that Descartes would not have dreamed of missing the event. And Descartes is important because, only a few years later, in 1637, he would be publishing both his *Discourse on Method* and his *Geometry*, with *Meditations on First Philosophy* coming only a few years after that, in 1641. And that body of work constitutes, arguably, one of the places where you begin to see the break, the delamination between art and science as modernly understood. Not only by way of the mind/body split that comes with Descartes's dualistic conception (the body no longer conceived of as seat of the soul but rather almost as a robotic automaton, and subject to study as such), but also with his analytic geometry, with its seminal grid of X and Y axes. You begin to have this split in ways of knowing that will get wider and wider as the years go by, with calculus being invented (or discovered) virtually simultaneously by Newton and Leibnitz only a few decades after that, in the 1680s.

That discovery of calculus puts me in mind of one of my favorite formulations—people who know me get bored with it, but I can't help but share it with you here in this context. One of my all-time favorite metaphors was provided by Nicholas of Cusa (1401–64), who was a late medieval jurist, astronomer, diplomat, cardinal, and a mathematician—and in that final capacity something of a number mystic. His great masterpiece in that latter regard was called *Learned Ignorance* (scientists, take note: Einstein would have savored such a title; perhaps he did). At any rate, at one point Nicholas, a good Neoplatonist, was engaged in a sort of argument with Aquinas about ways of getting to knowledge of the whole, which was to say, in those days, knowledge of God. Aquinas, a good Aristotelian, was of the line that if you just cataloged everything—if you composed a book on botany, a book on zoology, a book on ethics, on astronomy, and so forth, which is to say to the extent that you were able to catalog all of Creation—you would eventually achieve knowledge of God the Creator. But Nicholas, for his part, suggested that it wasn't quite like that. Imagine, he challenged his readers, a circle with an  $n$ -sided regular polygon inscribed inside. Say, an equilateral triangle. Add a side and you get a square. Add another side and you get a pentagon. Keep adding sides and eventually you get a million-sided polygon. Granted, at some point it

starts looking more and more like its surrounding circle—here he was anticipating calculus by over two centuries.

But in a profound sense, Nicholas went on to argue, that compounding figure would have been getting less and less like a circle. For that thing has a million sides, whereas a circle has only one. That thing has a million angles, and a circle has none. At some point, he argued, you were going to have to make a leap (and he coined the phrase, “leap of faith”) from the angle to the arc—a leap that could only be accomplished in grace, for free. And those would constitute two essentially different ways of knowing. As a writer, I’ve always liked that formulation. You keep piling on detail after detail, and somehow the thing just doesn’t come together, which you can tell, because when you tap it, it just doesn’t ring true. But then suddenly, almost unaccountably, it pops into shape. There’s all that work, which was preparation, preparation, as it were, for receptivity, but when things finally come together they seem to come together of their own accord. I wonder how much that too is like the work, the practice, of science.

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Anyway, I wanted to float some of those notions before going on to talk about two artists who I’ve spent a good deal of time with over the years, which is to say Robert Irwin and David Hockney, and in particular about their growing involvement, across their separate careers, with the scientific worldview. In so doing, I will be deploying passages from my recently released pair of contrapuntal biographies about the two of them—a new edition of *Seeing Is Forgetting the Name of the Thing One Sees* and *True to Life*, respectively—as a way into some of these issues. As different as the two of artists are (and they often conceive of each other as diametrical opposites), they do have many things in common: for starters, the extent to which they are both largely self-taught in matters beyond the art world (and in particular science), and how both of them are so endlessly, omnivorously curious.

I’ll start with Irwin. If one had asked him back in 1965, about a decade into his artistic career, how he viewed the relationship between his activity and that of a scientist, he might well have replied that he saw none whatsoever. By 1970, however, after he’d been working for over a year on an Art and Technology project at the Los Angeles County Museum of Art, which paired him with life sciences engineer Ed Worts of NASA and Garrett Aerospace, he had developed a rich sense of the interpenetration of the two endeavors. “Take a chemist, for example,” he elaborated for me one afternoon a few years later:

He starts out with a hypothesis about what might be created if he combined a few chemicals and he begins by simply doing trial and error. Two thirds of this and one third of that, and he marks down the result. He tries one third of this and one third of that plus one third of something else; and then he tries one quarter and three quarters; and he proceeds on that basis, a sort of yes-no trial and error.

What the artist does is essentially the same. In other words, what you do when you start to do a painting is that you begin with a basic idea, a hypothesis of what it is you're setting out to do (a figurative painting or nonfigurative or whatever). Say you're going to paint a figurative painting about that model over there and the trees outside behind her and the oranges on the table. It's just a million yes-no decisions. You try something in the painting, you look at it, and you say, "N-n-no." You sort of erase it out, you move it around a little bit, put in a new line; you go through a million weighings. It's the same thing. The only difference is the character of the product.

Let's say at a particular point the scientist gets what he has set out to get, he arrives at what he projected would happen if he mixed this particular combination of chemicals in the right way. But the same thing is true of the artist when he finally gets to the right combination. He stops. He knows he's finished.

For Irwin, however, if art is in many ways like science, it is at the same time not science, and the ways in which the two differ are as revealing as their similarities. "Once the scientist is finished," he went on,

you can look back over his notes to consider the precise sequence of yes-no weighings that brought him to that solution. It's all quite logical and structured. The artist, on the other hand, keeps no such record (although historians would love it if he did). Rather he literally paints over his errors. Six months later when you ask him, "Why did you stop there?" and he says, "Well, because it felt right," his answer may not seem acceptable from a logical point of view—I mean, it seems as if he just chanced upon the final version. But in fact it's quite reasonable. Given the basic fundamentals, he's tried just about every damn combination possible, every way possible, until he's finally arrived at what makes sense to him. The critical difference is that the artist measures from his intuition, his feeling. In other words, he uses himself as the measure. Whereas the scientist measures out of an external logic process and makes his decision finally on whether it fits the process in terms of various external abstract measures.

Elsewhere Irwin has characterized this distinction as that between logic and reason. It's funny because he would always talk to me about logic or reason and, for a long time, I thought they were the same thing. But the distinction, as he explained it to me one day, is that I can reason, but I cannot logic. I *use* logic. Another afternoon, Irwin phrased it this way:

Scientists tend to operate through a logical process in the material world. In science, it seems necessary that your facts be concrete, repeatable and predictable,

which means there has to be an existing reliable form of measure. And the only reliable forms of measure as far as scientists are concerned are pure abstractions—that is, abstract systems that can be overlaid onto the world of experience. Euclidean geometry or clocks or scales are pure abstractions. You can count on them to be same every time, and as long as you have that kind of measure, then what you're getting can be held to be factual, as it were, in line with the original hypothesis or proved in performance.

Irwin, however, argues that the artist's enterprise is different both in terms of its way of measuring and what it sets out to measure:

Reasoning appears to be more confused, more haphazard, partly because of the scale of what it tries to deal with. The logical, in a sense, seems more successful because it cuts the scale down. In fact, that's what makes it logical: it takes a very concise cut in the world [we're back to Descartes here] and simply defines or refines by deduction the properties of that cut. But it never deals with the overall complexities of the situation. It only applies within the confines in which it operates, so it seems much clearer.

In this context, I'm reminded of Jaron Lanier, who recently wrote about the way that "information systems need to have information in order to run. But information underrepresents reality. What makes something fully real is that it's impossible to fully represent it to completion." And here again we're back with Nicholas of Cusa: Information is the million-sided polygon, whereas The Real is the circle. Kant says somewhere that a work of art is a specific instance of a general law that cannot be stated. "The artist, however," and now I'm back with Irwin,

as a reasoning being, attempts to deal with the overall complexity of which all the logical subsystems are merely segments. He deals with them through the intuitive side of his human potential—and here inconsistencies are as meaningful as consistencies.

Things that would fall outside the scientist's purview are precisely the kinds of things that activate the artist's curiosity. Irwin went on to talk about Leonardo, and the days when science and art were more together, and about what then happened across the eighteenth century, with the rise of logic, which is the organizing principle of our civilization today, and the way in which, from that point forward, art began to fall away from that.

The civilization which you and I live in makes most of its critical decisions based on logic. I feel that maybe 150 years ago, which is a legacy we're now having to deal with, art began to drop out of that; it began to become less logical. Even though it proceeded logically, it found questions that could not be answered logically.



Now I want to go over to Hockney for a few seconds. After I published the original edition of my book about Irwin—my first, back in 1982—I got a call from Hockney, whom I’d never met. He said he’d been reading the book and he couldn’t get it out of his head, though he disagreed with just about everything in it. Hockney is obviously a much more figurative artist, and Irwin more abstract and perceptual, though in the end it seems to me that they evince far more similarities than either is prepared to acknowledge. Both of them, for one thing, believe that cubism was the most important development during the last century, and it was not merely a historical style or fashion, nor even a project confined to the artistic realm; that indeed if you were to take it seriously you would see that it proposed a revolution in our entire way not just of seeing but of being in the world—a liberation from the tyrannical hegemony of one-point perspective that had been holding sway for the previous four hundred years, with all that entailed in terms of hierarchical relations—and a revolution that is still far from complete.

Indeed, and here the divergence begins, each believes himself to be the true heir of that revolution: that if you took the cubist revolution seriously you’d be doing the kind of thing he was doing and specifically not the sort of art that the other one was doing. The text I went on to compose for Hockney, covering the photocollage work he was at the time launching into, thus served, in addition to being an overview of that work, as a sort of refutation of Irwin’s interpretation of history. Just as the retrospective catalog I subsequently composed for Irwin in part functioned as his response to Hockney, and so on, in a sort of back-and-forth call-and-response that has been going on for over twenty-five years now. Even though the two have never actually met. And even though, as I say, the two seem to me to agree on much more than they disagree, if they could only hear each other. (Such at any rate was part of my intention last year in gathering up all my writings about each of them into those two parallel and contrapuntal books: to bring out those crosscurrents, while at the same time trying to be true to each, and in a sense to lay the argument to rest.)

Anyway, as I was starting to say, a few years on in those conversations, Hockney’s interest in cubism brought him into an ever more intense engagement with the revolutions in physics that were taking place around the same time. “I was at a friend’s house in Canada,” he recalled for me one day,

and I was just browsing through some of his books about physics. And in one of them there were two or three sentences that got me going. Coming back, I picked up several other books and to my amazement I found that I could follow them and their arguments. I mean, quantum physics is something way outside my ordinary understanding or involvement, but I quickly found incredible connections with the sorts of things I was concerned about. For instance, in the old Newtonian view of the world, in Newtonian physics [or as we might call it in the present context, in post-Cartesian physics], it’s as if the world exists outside of us. It’s over there, out there. It works mechanically and it will do so with or without us. In short, we’re really not part of nature; it virtually comes to that. Whereas modern physics has increasingly thrown that model into question and shown how that cannot be.

Mr. Einstein makes things more human by making measurement at least relative to us, or anyway, to some observer. The supposedly neutral viewpoint is obliterated. There can be no measurement without a measurer. Heisenberg's uncertainty principle is, of course, highly technical and specialized. It deals with a paradox in particle physics, showing how if you attempt to measure the velocity of a given particle you won't be able to identify its exact location and vice versa. Previous to this, of course, scientists believed that given enough technical advancements, they would eventually be able to measure anything. But Heisenberg showed that this was not just a problem of not yet having the right measuring devices, but the problem was inherent in the nature of physical reality itself. The old conception of scientific inquiry had gone on as if we could measure the world as if we weren't in it. Heisenberg showed that the observer, in effect, affects that which he is observing so that some of those old borders and boundaries begin to blur. Just as they do with cubism.

"But perhaps my greatest excitement about these lines," he continued, "came from reading a fairly recent book by physicist David Bohm entitled *Wholeness and the Implicate Order*. Just a second." He bounded out of his chair, out of the house, over to the studio, returning a few minutes later, flipping through an obviously well-thumbed copy of the book. "Here, listen to this." He proceeded to read a long passage from Bohm's introduction: "The notion that the one who thinks (the Ego) is in principle completely separate from and independent of the reality he thinks about," Bohm writes (and Hockney read), "is of course firmly embedded in our tradition. But general experience along with a great deal of scientific knowledge suggests that such a division cannot be maintained consistently."

After he'd read several more paragraphs along these lines, Hockney put down the book, thoroughly invigorated.

You can see why I was so excited. That insistence on the need to break down borders, to entertain the interconnectedness of things and of ourselves with things; the notion that in science today it is no longer possible to have ideas about reality without taking our consciousness into account. And beyond that just the language that Bohm shares with that of other physicists. They're always talking about "overall worldview," the need for "new horizons" or "wider perspectives" or "a new picture of reality"—all of these visual metaphors, which a painter of pictures can understand and which have relevance for how he thinks about his own pictures. There's that famous phrase of Gombrich's about the triumph of Renaissance perspective—"We have conquered reality" [which, again, in our context is basically the neo-Cartesian boast]—a phrase that has always seemed to me such a Pyrrhic victory, as if reality were somehow separate from us and the world now hopelessly dull because everything was now known and accounted for. These physicists, by contrast, were suggesting a much more dynamic situation, and I

realized how deeply what they were saying had to do with how we depict the world, not what we depict but the way we depict it.

And he goes on from there.

Which brings us back to Irwin. Because for all his thoughts on the differences between science and art, Irwin has nevertheless come to feel that “at the periphery of any body of knowledge,” whether we’re speaking about chemistry, physics, mathematics, psychology, or art, there are laborers who are working beyond the sovereignty of the techniques of their disciplines. They are all guided principally by reason, as opposed to logic, quite simply because past a certain point the tether of their logic no longer extends. (Or more accurately phrased, perhaps, it is they who are extending it.) These researchers, in Irwin’s view, have more to do with each other than they do with the technicians in their respective disciplines. He has dubbed their colleagueship “the dialogue of imminence.” As he explains,

I really feel that there is this kind of dialogue of imminence, that certain questions become demanding and potentially answerable at a certain point in time, and that everyone involved on a particular level of asking questions, whether he’s a physicist or a philosopher or an artist, is essentially involved in the same questions. They are universal in that sense. And although we may use different methods to come at them, even different thought forms in terms of how we deal with them—and we will eventually use a different methodology in terms of how we innovate them—still, really those questions are happening at the same moment in time. So that when we find these so-called accidental interrelationships between art and science, I don’t think they’re accidental at all.

Another word that Irwin uses in this context is *inquiry*. All these researchers are engaged in their own way in the process of inquiry. And the most salient feature of inquiry is its open-endedness. It is pursued for no reason whatsoever; it is the project of the passionately curious. The wilderness is stalked by explorers without maps and without any particular goals, and their principal compass is their reason.

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Freeman Dyson, writing in the *New York Review of Books* the other day, argued that “the public has a distorted view of science because children are taught in school, falsely, that science is a collection of firmly established truths. In fact, science is not a collection of truths. It is a continuing exploration of mysteries.”

Coming from the other side, James Baldwin once wrote that “the purpose of art is to lay bare the questions which have been occluded by the answers.”

In closing, I’d like to evoke a few last thoughts from other people. One of my favorite writers is the *New Yorker*’s Ian Frazier. He once had a wonderful piece in the magazine called “Bear

News,” one of those pieces that only goes to show that a real writer can make a marvelous piece out of just about anything. In this case, he had been collecting clippings of bear-human encounters, and he eventually decided to inventory the results, concluding finally as to how

it’s possible to walk for a long time through the woods and not see much of anything. Beautiful scenery makes its point quickly; then you have to pay attention or it starts to slide by like a looped background in a Saturday-morning cartoon. A pinecone falls from one limb to another, a rock clatters down a canyon, and your own thoughts talk on inside your head. People sometimes say that what is great about bears, and especially grizzlies, is the large tracks of wilderness that they imply—that a good bear population implies a healthy, unspoiled habitat. But bears don’t simply imply wilderness—bears are wilderness. Bears are what all the trees and rocks and meadows and mountains and drainages must add up to. When you see a bear, the spot where you see it becomes instantly different from every place you’ve seen. Bears make you pay attention. They keep the mountains from turning to a blur, and they stop your self from bullying you like nothing else in nature. A woods with a bear in it is real to a man walking through it in a way that a woods with no bear in it is not. Roscoe Black [and how I love that name, it’s perfect in this context!], a man who survived a grizzly attack in Glacier Park several years ago, described the moment when the bear had him on the ground. “He laid on me for a few seconds, not doing anything. . . . I could feel his heart beating against my heart.” The idea of that heart beating some place just the other side of ours is what makes people read about bears and tell stories about bears and argue about bears and theorize about bears and dream about bears. Bears are one of the places in the world where the big mysteries run close to the surface.

I began with some poems and I think I’ll end with a poem as well. This one is from Tomas Tranströmer, the great, great Swedish poet. (If there were any justice in the world he would have been awarded the Nobel Prize a long time ago, but unfortunately the Nobel Prize is given by Swedes and these days they appear to be too shy and self-effacing to give one to themselves.)\* But he has a great poem called “Sentry Duty,” here translated by Robert Bly. Apparently in Sweden they have, or used to have, some form of universal conscription; everyone had to serve in the army for a year or something like that, to guard the Finnish border, or some such. And this is a poem about one of the nights, back in his younger days, when he’d been staked out, doing just that.

I’m ordered out to a big hump of stones  
as if I were an aristocratic corpse from the Iron Age.  
The rest are still back in the tent sleeping,  
stretched out like spokes in a wheel.

\*On October 6, 2011, Tomas Tranströmer was awarded the Nobel Prize in literature. “The Swedish modesty . . . has postponed Tranströmer’s award by at least 10 years,” Swedish poet Bob Hansson wrote after the announcement. Ed.

In the tent the stove is boss: it is a big snake  
that swallows a ball of fire and hisses.  
But it is silent out here in the spring night  
among chill stones waiting for the dawn.

Out here in the cold I start to fly  
like a shaman, straight to her body—  
some places pale from her swimming suit.  
The sun shone right on us. The moss was hot.

I brush along the side of warm moments,  
but I can't stay there long.  
I'm whistled back though space—  
I crawl among the stones. Back to here and now.

Task: to be where I am.  
Even in this solemn and absurd  
role: I am still the place  
where creation does some work on itself.

Dawn comes, the sparse tree trunks  
take on color now, the frostbitten  
forest flowers form a silent search party  
after something that has disappeared in the dark.

But to be where I am . . . and to wait.  
I am full of anxiety, obstinate, confused.  
Things not yet happened are already here!  
I feel that. They're just out there:

a murmuring mass outside the barrier.  
They can only slip in one by one.  
They want to slip in. Why? They do  
one by one. I am the turnstile.

To be the turnstile, and to wait. To be the place where Creation gets to do a little work on  
itself. One could hardly do better by way of characterization of the scientist's lot, and the  
artist's. Only attend.