

GOD'S DICE: A DRAMATIC EXPLORATION OF QUANTUM METAPHYSICS

by

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I have already written one play, *Not Eureka*, which explores one way in which theatre can give a voice to science. While not a traditional “science history” play, *Not Eureka* concerns, and I hope illuminates, several scientific experiments of historical significance.

In my current research, I have continued to explore ways to incorporate science into theatre. My project is similar to *Not Eureka* in that I am engaged in writing a new, full-length play (*City Lights, Receding*), based on research and scientific in focus. However, the project is not a repeat of my previous work. Instead of recounting and clarifying already fairly well-established scientific concepts, *City Lights, Receding* is philosophical, speculative, in nature.

My focus as a History and Philosophy of Science (HPS) major is in the philosophy of quantum physics. I find this particular area of physical-philosophical inquiry both appealing and dramatic. My play explores, in a dramatic, speculative way, the philosophical problems presented by modern physics, and the conflict between the classical and modern worlds.

I completed a graduate seminar in the philosophy of quantum mechanics in fall 2007. Since then, I have pursued research independently into the philosophy of quantum mechanics, identifying specific areas within the topic useful to the development of my script. I have focused on theories of interpretation such as GRW, many-worlds and many-minds theories. I have also been reading as many science-based plays as I can get my hands on.

Fall 2008 began my writing period. By the beginning of spring semester 2009, I had a draft in reading-ready form; a seated reading through the Theatre Arts department, directed by

Regina Connolly and featuring Charlie Brown (Verdenmacher), Parag S. Gohel (Armin), Mary Heyne (Marian), Lily Junker (Brody), and Joe McGranaghan (Albert Albert), was performed from April 9-11, 2009. Based on the reading and the response of audience and theatre/HPS faculty to it, I plan to revise the script with the goal of eventually pursuing full production opportunities.

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PREFACE

To find a form that accommodates the mess, that is the task of the artist now.

—Samuel Beckett

Our imagination is stretched to the utmost, not, as in fiction, to imagine things which are not really there, but just to comprehend those things which are there.

—Richard Feynman

Unthinkable complexity. Lines of light ranged in the nonspace of the mind, clusters and constellations of data. Like city lights, receding.

—William Gibson

Thanks to Regina Connolly for directing a heartfelt first seated reading of *City Lights, Receding*; to James Wong for the projections, and Henry Brinkerhoff, Charlie Brown, Lauren Diesch, Parag S. Gohel, Mary Heyne, Lily Junker, and Joe McGranaghan for their unparalleled stage presences; to the Theatre Arts Department for making it possible; to Brenden Gallagher for his unwavering camaraderie and support of my work; and to Kathy George, for making my undergraduate career memorable, challenging, and fruitful.

1.0 INTRODUCTION

A play that deals with scientific theories or experiments, centers on a scientist as its protagonist, or treats the history or philosophy of science in any prominent way in its plot or themes, generally gets the label of Science Play slapped on it. Bertolt Brecht's *Life of Galileo*, Michael Frayn's *Copenhagen*, most of John Mighton's work, Tom Stoppard's *Hapgood* and *Arcadia*, and David Auburn's *Proof* are all considered Science Plays.

In an article for the New York Times, Alan Lightman, a physicist, poet, and author of the pop scientific fiction book *Einstein's Dreams*, writes that "The particular way that a person trained in logical thinking must negotiate his or her way through the illogical world of human passions – that is a subject worthy of art." And indeed, that is the category many of the abovementioned plays fall into. *Galileo* and *Copenhagen* are essentially historical fiction, portraying the struggles of real scientists. *Proof* is completely fictional, but follows the same structure. The Stoppard plays are of a different breed: they are structured, with great purpose and detail, to mirror the scientific theories and laws (*Hapgood*: quantum physics, *Arcadia*: the second law of thermodynamics) that their characters peripherally discuss. But the intent is similar: humanization of science.

There is an assumption here that science is inherently, somehow, inhuman (otherwise, why talk about humanizing it?), and that furthermore, humanization is primarily what art has to offer science. Lightman's characteristic reply, when asked to define the difference between the

two disciplines, is that science is concerned with answerable questions, and art with those that have no answers, or that have many. These are popular perspectives. They are also, unfortunately, limiting ones. They are characterizations of art and science that have by now become rote – glib, simplified answers to the difficult question of how two things so intuitively different can complement one another, can interact.

City Lights, Receding is a Science Play: its main characters are physicists and they do, from time to time, discuss science. However, it interacts with science on other levels as well. There is more extensive and subtle interplay between art and science than is recognized by the current perception of Science Plays, and it deserves attention. In the following pages, I will take the example of the dialogue between modern drama and modern physics.

1.1 THE LIMITED SCOPE OF INTENTIONAL PHYSICS-DRAMA

Hapgood is a play “about” quantum physics in the guise of being a spy-drama. There is an elementary explanation of the Heisenberg uncertainty principle in it, delivered by a scientist; and the plot of the play is structured, elegantly, as a practical explication of that explanation. Several pairs of twins and doubles spice up the antics of the spies, forcing the audience to question notions of objective reality and of the ability to know with precision and certainty *where* a person (like a quantum particle) is at a certain time. It’s interesting and instructive to the layman, and it makes an entertaining story. But it’s necessarily simplified. Stoppard uses, for instance, the pop-understanding of the uncertainty principle, that is, we can’t know *with certainty* the values of two measurable observables (famously, location and momentum) of a particle at the same time. Language like that, however, implies that a particle with some definite value for observable A

also *has* some objective, definite value for observable B – we just can't know it. In actuality, though, certain “measurable properties...are said to be ‘incompatible’ with one another, since measurements of one will (so far as we know) always necessarily disrupt the other” (Albert 7). That is to say, if we've measured the value for a particle's observable A , and we know that B has two possible states (say, x or y), it's meaningless to think of B as actually being in x or y . B isn't in x , it isn't in y , it isn't in both and it isn't in neither. It's in a counterintuitive state called the “superposition of x and y .” The popular and simplified version of the uncertainty principle that appears in *Hapgood* and a great many other fictional explorations of quantum mechanics completely ignores superposition.

Stoppard is intelligent and knowledgeable, and has done his research. He probably knows he is greatly simplifying things, but also knows that's one of the constraints of trying to consciously dramatize such a complicated theory in a way that will be accessible to most people. There is another kind of performing artist who consciously uses science: the kind who uses it solely for inspiration.

Donna Uchizono, a choreographer, recently created a piece called “Thin Air,” inspired, too, by the ever-popular Heisenberg uncertainty principle. Though Uchizono followed up on her initial inspiration by reading and talking with physicists about quantum mechanics, she admits to never really coming to a deeper understanding of it (Hunt). And so her dance piece has its seed in a scientific theory that speaks to Uchizono creatively but which she has not come to a greater literal understanding of, not through further study or through exploring it through her art. A piece like “Thin Air” might help audiences come to a perceived “more visceral” understanding of quantum mechanics, but when it stems from an artist who herself possesses a faulty

understanding of the physics, there seems to be a danger of spreading ignorance and misconception, not deepening comprehension.

1.2 ***RIGHT YOU ARE (IF YOU THINK YOU ARE): PIRANDELLIAN SUPERPOSITION***

Italian novelist and playwright Luigi Pirandello is the famous father of absurdism in the theatre and notorious for plays that, with convoluted or ambiguous plots, question the notion of identity. In *Così è, se vi pare!*, or *Right You Are (If You Think You Are)*, we are told off the bat that one of the characters is mad; but which one? Signora Frola says that her daughter died four years ago, but her son-in-law, Ponza, is mad and believes his new wife to be his deceased one. Ponza, says Signora Frola is mad; her daughter's death drove her crazy, and she now believes that his wife is her deceased daughter. At the end, a mysterious woman, who is either Signora Frola's daughter or Ponza's current wife, arrives on the scene.

So far we have a classical setup. We can think of the mysterious woman as a particle m , which possesses a measurable quantity: identity (I). The observable I has two possible values: the mysterious woman may be Signora Frola's daughter (D), or she may be Ponza's current wife (W). D and W are mutually exclusive properties. In traditional interpretations of identity, the mysterious woman would have to have just one of the two possible identities: the play sets them up as being mutually exclusive. This is just the same as treating m as a classical particle, and saying that its observable I must have a value of either D or W , because it can't have both, and it can't have neither.

But Pirandello pulls the carpet out from beneath our feet. The mysterious woman reveals herself to be Signora Frola's daughter. The onlookers sigh in relief – but she cuts them short: she is also Ponza's second wife. When one of the characters insists, "You must be either one or the other," she replies that she is "she whom you believe me to be." And the play ends there. Mystery unsolved.

Pirandello was pioneering a new form of drama at the same time that Werner Heisenberg and countless other physicists were pioneering a new physics. Pirandello wrote *Right You Are* in 1917, nine years before Heisenberg's formulation of the uncertainty principle. If we return to our particle analogy, m , in the context of *Right You Are*'s ending, becomes a *quantum* particle. Now, m 's observable I is in a superposition of D and W . It isn't D , it isn't W , it isn't both, it isn't neither. This is impossible for a classical particle, but within the scope of quantum mechanics, it's not only possible – it makes perfect sense.

This is our first example of an *unintentional* correlation between theatre and quantum physics. It is organic and subtle. It is not a function of Pirandello researching a scientific theory or the life of a prominent physicist. It can't be: *Right You Are* was written before Heisenberg's discovery. Rather, it is a powerful example of the way that theatre and physics often evolve together. This question of how fully we can know the properties of a being or an object was becoming a part of the universal consciousness, and it affected both science and art.

1.3 HIDDEN MEANINGS, HIDDEN VARIABLES

We need not think of the only correlations between physics and theatre as structural, plot-related ones. Another area where we can look for dialogue is in the way that an audience member is expected to experience a theatre piece.

Drama was, for a long while, expected to operate much as Aristotle defines it in the *Poetics*: as imitation of life. Imitation, Aristotle argues, is central to human learning and understanding, for people see an imitation in the form of art and learn by the recognition of what it is imitating. The implication is that every member of the audience should experience the play, the imitation, in the same way; they should all recognize the shape of the action as referring to something universal and specific in the human experience. From Aeschylus to Shakespeare to Ibsen and beyond, this interpretation of the ideal play/audience dynamic remained relatively constant.

Pirandello began the revolution by requiring his characters to question one another's stories and, often, receive no definitive answers. Other playwrights took up the thread, and began to put the onus of questioning and interpreting on the audience. Two of the most enigmatic playwrights in the canon bear mentioning here: Samuel Beckett (*Waiting for Godot*, *Endgame*, *Krapp's Last Tape*, *Happy Days*) and Harold Pinter (*The Birthday Party*, *Old Times*, *The Homecoming*, *Betrayal*). Nearly contemporaries, their contrasting types of textual obscurity can be correlated to two conflicting interpretations of quantum mechanics. First on the table are Beckett and hidden variables theories.

Beckett, most dramatically prolific from the early 1950's through 1960, is commonly described as an Existentialist playwright; his plays deal with the inherent lack of meaning and ultimate absurdity of existence. A meticulous craftsman, Beckett was notorious during his

lifetime for forbidding directors of his work to deviate from the copious stage directions in his scripts: his estate continues to enforce that stipulation today. And yet, for all their detailed precision, his scripts are puzzles without solutions. Two men wait without beginning or end in a void for a third man to come; they say they are leaving, but they never go (*Godot*). A woman buried first to her waist, then to her neck in sand plays with a toothpaste, spectacles, a gun, and tries to get her silent companion to pay attention to her (*Happy Days*). Given circumstances and relationships are intentionally vague. Every move and choice is so carefully proscribed for actors, director, and designers that there is little room for artistic reinterpretation, and yet Beckett's original textual intent is never crystal clear no matter how carefully his directions are followed.

Back to physics for a moment. For the kind of theorist who believes that physics is a search for ways to get closer and closer to the fundamental truths of the universe, the *way things work*; for the kind of theorist who believes that the universe is deterministic, and that a physicist's ultimate goal is to be able to enumerate all of the physical laws that determine precisely the future of the universe – uncertainty is a bothersome idea. It seems to say that at a quantum level, observables are not in any one state until they are measured. This seems to put a limitation on what we can know about the world. It also limits how definite it is. If the states of observables are determined probabilistically and emerge or are determined in some strange way only after measurement is taken, doesn't that mean that at a fundamental level everything is based on chance – that God, as Einstein famously put it, plays dice?

Hidden variables theories are in response to this concern. They state that

QM is not really mysterious at all. It is just a glorified statistical mechanics. There exists an objective external world of entities with well-defined properties which are simply discovered by measurement. The existence of precise possessed values for observables in the pre-measurement state serves to explain why we get a precise result or measurement. Nothing is ever unsharp or fuzzy or undefined or meaningless. (Redhead 45-46)

These theories, taking their model from the Einstein-Podolsky-Rosen (EPR) paper criticizing quantum mechanics, generally hold that QM is an incomplete theory because it simply doesn't go far enough. Observables *do* have precise, pre-determined values; QM just doesn't allow us to discover what they are at certain times (i.e. without measurement). It states the *probability* that an observable has a value, but it can't tell us what that value is. Yet for hidden variables theorists, the observable *nonetheless has a value*. This necessitates the introduction of the thing that gives the theory its name: hidden variables. Things that we can't measure, things that we aren't even sure of what they are, but that determine the values and states of observables.

There is an analogy between Beckettian obscurity and the idea of hidden variables. A Beckett script is *so* specific, *so* precise, in its stage directions, rhythmic instructions, and everything else, that we feel there *must* be some very specific and precise meaning to it. Why else would it be so important that the play be played the same way every time it's produced? Still, there's no way to discover that meaning with certainty. Even while alive, Beckett was famously unforthcoming about the meaning of his work. We can guess at Beckett's intent, we feel that it is there, but without the ability to get him to give us direct answers, we can never know it for sure.

A looseness is inherent in this analogy: we *can* discover the specific value of an observable, in QM hidden variables theories, when we take a measurement; a Beckett play is never entirely clear even when his instructions are followed to a T. But there is a sense in which “measuring” a Beckett play – presenting it to an audience – does allow us to find the meaning inherent in it. We may never be exactly sure what it’s supposed to mean, but an audience will take something from it nonetheless, and if we give them what Beckett tells us to perhaps they’ll take from it what Beckett intends.

1.4 ENGAGING THE AUDIENCE, COLLAPSING THE WAVE

Pinter’s earliest plays were written near the end of Beckett’s most fertile years, in 1957, and he was certainly influenced by his contemporary. Pinter’s work is, like Beckett’s, intentionally unclear; by contrast, though, Pinter offers precious few stage directions. There is the sense of a clear logic underlying everything that happens in a Pinter play, a specific story, but *what* that story is can never be certain. Unlike Beckett, Pinter allows artists working on his plays free rein to create their own interpretations of the work by virtue of the spareness of his stage directions. In *Old Times*, are Kate and Anna the same person? Are Deeley and Anna manifestations of separate parts of Kate’s psyche? Whose memory is it? In *The Birthday Party*, what has Stanley done? Is he crazy or was he once a criminal, or a spy? Who are Goldberg and McCann? Where do they take Stanley at the end – to an institution, to a prison, to his death? There are many, many interpretations that would be consistent with the events of each play. A director selects his favorite and tries to convey it through direction of actors and collaboration with designers, but

there is no getting around the fact that the text will remain vague. It will give no answers, justify no reasonable interpretation over another. And it will not get any more specific.

And so no two members of the audience are expected to experience these plays in the same way. The meaning of the play is dependent on those who rehearse and perform it, but even more importantly, on those watching it. It emerges only by way of being watched.

And so what has all this to do with quantum physics?

Uncertainty, as I've said before, is a bothersome idea. Superposition is a strange notion, but not insurmountably so; however, trying to understand how a particle can go from being in a superposition of states to being in just *one* of those states is more troubling. It seems like a particle is in a superposition of states until we take a measurement; but the measurement determines definitively which of those states the particle is in. There is no way of knowing, until we take the measurement, what the measurement will show (that is, after all, the function of the measurement). And so it appears that actually *making* the measurement is what causes the particle to choose between possible states. This is the idea of collapse. The particle's state in superposition is described by a probability wave; taking a measurement *collapses* the wave function, causing the particle to go from an indeterminate state to a determinate one.

This leads to some serious metaphysical trouble. If a measurement is what causes collapse, how do we define "measurement"? Does the measurement happen when a measuring apparatus records a measurement, or when a sentient being reads the measurement? Is consciousness capable of affecting, of *changing* reality? Does reality depend on the observer?

Whatever the implications of collapse, it is a central idea in the Copenhagen interpretation, the most prevalent and consistently widely accepted interpretation of quantum mechanics until at least the 1980's and possibly still to this day, despite avid competition from

other possible interpretations. (And the Copenhagen interpretation certainly had a stronghold throughout Beckett's productive period and for a large portion of Pinter's.)

A Pinter play has many possible meanings. The meanings are not necessarily infinite, or at least, not unbounded: they are constrained by some inherent meaning in the structure and specifics of the text. But there are many of them, all existing at once in some strange potential world. A given play cannot be said to have just one meaning, because it has the potential for many different interpretations; but it cannot be said to have *all* of them, either, because each individual person will interpret it a specific way when he or she watches it. In that sense, a Pinter play or any similar work can be thought of as being in a superposition, described by a sort of figurative wave function delineating the probabilities that it will be interpreted a certain way. But it has no meaning until an individual sits down and watches it. Until an observer observes it. Until a conscious being takes a measurement. This is in agreement with John Cage's idea of how a play should be experienced: "Audience members should be made aware that the performance is different for each observer and from performance to performance" (Schmitt 11).

The physics world during the time in question was concerned deeply with the question of how consciousness affects reality. The theatrical world, too, was clearly exploring that same question, by redefining the way the audience and the play interact. Physicists were forced to consider the possibility that consciousness and the existence of definite physical states are inextricably intertwined. Playwrights and theatremakers were forcing their audiences to participate in the creation of a play's meaning through their conscious presence at the performance. No longer was observation a necessarily passive act, in science or in art. Instead, it was a possible form of participation in the evolution and meaning of our world.

1.5 RADICAL THEORIES OF AUDIENCES AND OBSERVATION

It should come as no surprise that an audience has an effect of some kind on a play in the modern theatre. Theatre is a live art, after all, and if a performance had no dependence on audience reaction then it might as well be a movie. British theatrical director Peter Brook describes countless examples, one of the most interesting concerning the way that audiences in Budapest and Moscow affected the Royal Shakespeare Company's touring production of *King Lear*:

It was fascinating to see how an audience composed largely of people with little knowledge of English could so influence a cast...The quality of the attention that this audience brought expressed itself in silence and concentration; a feeling in the house that affected the actors as though a brilliant light were turned on their work. As a result, the most obscure passages were illuminated; they were played with a complexity of meaning and a fine use of the English language that few of the audience could literally follow, but which all could sense. (Brook 21-22)

Brook goes on to describe how the same production changed for the worse when it toured the United States because "this audience was composed largely of people who were not interested in the play." An audience is asked to be involved in the live theatre. Engaged. In a movie theatre you can talk to your friends and yell at the screen and throw popcorn and have no effect on what's happening on the screen in front of you. Do that in a live theatre and you'll tear down the performance – and one of the actors might step off of the stage and slap you.

Movies are not a demanding art form to watch in that they don't ask anything of an audience member. Everything is provided for the audience – just as everything is provided in the

world of classical physics. Sounds, sights, tempo, tone, everything is set in stone in a film. You have limited control, as a viewer, over your experience of a film. That is, you can decide not to see the film, or not to pay attention when you go, or to show up too drunk to make sense of it – but none of this changes the objective reality of the film. And the same in the world of classical physics. Whether or not you choose to open the refrigerator and look for the milk, the milk is still there. If a tree falls in a forest with no one there to hear it, it still makes a sound. There is a sense in which it feels, in both of these worlds (the world of film and the world of classical physics), that simply *observing* something has no fundamental effect on the thing we’re observing.

We have already talked about why this is not at all true of some forms of theatre and about an interpretation of QM that gives observers a much more active role, as well. But if we’re talking specifically about observer interaction with theatre and physics, we can afford to get much more radical.

The Elizabethan theatre was an extremely interactive one. Audience members would bring picnics to the Globe Theatre to watch Shakespeare’s latest, and they would shout at the actors and throw food and stomp their feet to emphasize applause (hence the well-wishing phrase “Break a leg!”). Mainstream modern theatre, however, has done away with that kind of informal atmosphere. When an audience is asked to participate in a way that is more active than merely being actively attentive, it’s out of the norm and can take some coaxing. The tamest versions of that sort of coaxing are plays that use direct address or bring an audience member briefly onto the stage to dance or do something else silly. There are plays that involve the audience via voting (*The Mystery of Edwin Drood*, a musical in which the audience votes on the ending; a recent production of *Vinegar Tom* by the University of Pittsburgh Repertory Theatre, where the audience voted on which character would sing which song) – these increase the level to which

audiences feel they have control over, and are participating in, what they are seeing. But these are just the beginning when it comes to ways the audience can be more deeply and explicitly involved in theatre.

Site-specific theatre is one way in which we involve audiences more actively. The company in Pittsburgh that does site-specific theatre is named (incidentally) Quantum Theatre and has no permanent home: instead, the company performs in Mellon Park (*The Crucible*, 2006), a church on the North Side (*The Red Shoes*, 2007), a pool in the Braddock Library (*Therese Raquin*, 2007). Watching theatre in a space that isn't a theatre forces re-evaluation of what theatre is. It forces a silent dialogue between actors and audience on the nature of theatre. The surrounding atmosphere becomes a part of the theatre piece and the piece a part of the atmosphere.

Moving up the scale of high-impact performance takes us deeper into the world of avant-garde theatre. Brazilian theatre activist Augusto Boal created the Theatre of the Oppressed, which emerged in the 1960s. Boal's techniques seek to break down the barriers between actor and spectator in many ways. In fact, he refers to both by the same name, the combined word "spect-actor." One form of Theatre of the Oppressed is Forum Theatre: members of a community create a theatre piece based on something that happened to them or in their community, a "moment of oppression," that the protagonist succumbs to. They perform the piece for an "audience" of spect-actors, running it once through so that the spect-actors know what happens and can identify the oppression. The piece is then re-started, and any spect-actor can yell "Freeze!" and stop the scene at any time. She then replaces the protagonist in the piece and tries her own method of escaping the oppression. If it doesn't work, the process continues. Boal perceives this kind of theatre as "rehearsal for real life."

Another form of Theatre of the Oppressed is Invisible Theatre, which is performed in public places – restaurants, grocery stores, on public transportation, the street – by actors who don't appear to be actors. It, too, is tied to the political climate of the community where it takes place. In one Invisible Theatre performance created by Boal and his group for Liege, 1978, a man in a supermarket has no money to pay for his food because he is unemployed, and though he has tried to find a job, there are just too many out-of-work people. Some onlookers (actors) stand up for him, and other spectators join in. Another person (an actor) starts to take up a collection to help him pay for his food. These pieces are never meant to be exposed as theatre and if all goes well, no one watching who didn't already know it was a theatre piece would ever know. Again, the intent is to make people think, to engage them in meaningful dialogue about the problems facing their community, society, families, selves.

Some theatre pieces blur the line, not only between actors and audience, but between theatre and life. The phenomenon *Tony n' Tina's Wedding* (there's one in Pittsburgh! – and many other cities across the nation) is a “show,” or at least a theatrical event, but attending it is similar to attending a wedding. The website for Chicago's *Tony n' Tina* proclaims, “You won't just see a show – you'll be a part of it!” It describes the show as a “complete entertainment package,” and your ticket gets you a pre-wedding cocktail cash bar, a ceremony full of “mishaps and madcap comedy,” an unlimited Italian buffet, wedding cake, dancing, and so on. Stephen Pellegrino, a Pittsburgh playwright, actor, director, and drywall specialist, staged a show called *22 Drywall Macbeth* in 2006, in a long-neglected Oakland Square house that he had bought in 2001 with the intent of fixing it up. The main intent of the piece – which was, indeed, an adaptation of *Macbeth* – was to bring people into Oakland Square and get them to see it as a viable option for home ownership, not just another place for college students to live. The play

began each night with a walking tour led by Pellegrino from the Boulevard of the Allies to the house itself; the three Weird Sisters became Three Witches Realty Co.; the audience was given a tour of the house; in an upstairs room, there was a party to which Macbeth invited Duncan – the audience became guests, and enjoyed live music and food. It was not only a theatrical event, it was “‘a pre-house tour’ for anyone in the audience who might be thinking about buying in Oakland Square” (Jones).

These are the radical avant-garde theatre productions that are really seeking to tear down the actor-audience barrier, and to make explicit that which is merely implicit in more traditional theatre: theatre is about the audience. The audience creates theatre by watching it.

There are radical theories of quantum mechanics to match. Two related and extremely strange approaches to the quantum realm that both deal with the collapse of the wave packet, and that both respond to Bell’s theorem “by rejecting the assumption that when a measurement is carried out, *one* of the possible outcomes occurs *to the exclusion* of all the others” (Lockwood 164), are the Many Worlds and the Many Minds interpretations. These interpretations both depend on the observer in very important ways, and in ways that are even more bizarre than the simplest collapse theory, which is, of course, bizarre enough.

The Many Worlds interpretation indicates that at the moment a measurement is made, a single world in which the measurement is taken, or the single observer who observes those measurement outcomes, splits into the number of possible readings. If there are two possibilities, A and B, then two worlds or observers are created, one in/for which/whom the result of the measurement was A and one in/for which/whom it was B. There are plenty of problems cited with this theory: for one thing, it “involves an extreme violation of conservation of particles, mass etc. If every quantum transition leads to a splitting of the universe the mass of the universe

is constantly increasing” (Albert and Loewer 181). But this worry doesn’t even begin to address the larger worry that the theory just *seems* so “out there.” Can we convince ourselves that every time anyone becomes conscious of a measurement – and, mind, we still aren’t sure *what* constitutes a measurement, but it seems to include an awful lot of processes – an entire new reality comes into being? Which reality is the real reality? Which reality are we in? Despite the issues with Many Worlds, it’s an interpretation that has received a fair amount of attention as of late.

The Many Minds interpretation says, by contrast, that an observer’s mental state need not describe accurately the physical reality of a situation. A measurement is taken, a sentient observer observes the outcome; there is a definite outcome to the measurement, and, furthermore, the observer’s mental state is such that she believes she knows, definitively, what the outcome of the measurement was. However, her mental state is based on a probabilistic evolution of mental states and not on an experience of a determinate outcome, even though that is, necessarily, what she believes she has experienced.

And of course this view of the world is a thoroughly realist one (that is: this view entails that there is invariably a single correct objective description of the entire physical and mental universe, even if nobody happens to know what that description *is*); and this view...entails that the mental parts of the world have no effects whatever on its physical parts. (Albert 130)

Earlier I mentioned Cage and his somewhat conventional, at least by the standards of contemporary theatre, belief that an audience should be made constantly aware that it is watching

something. But Cage is more radical than that. He describes the ideal mental state for an audience member as “no-mindedness,” a Zen Buddhist term. Such an observer

has a lesser role in the universe than does Aristotle’s knower. In a universe that has no center, human beings lose their own centrality: they have no special vantage point...If reality is perspectival and continually changing, no human can know it once and for all. (Schmitt 14)

This sounds a lot like Many Minds. Both theories treat our experience of the world/art as one based on perspective and individual experience and one that may, in fact, have little to do with the way that the world/art actually is.

1.6 HIDDEN MEANINGS, HIDDEN VARIABLES

Theatre artists and other kinds of artists frequently draw literal, conscious inspiration from science. But there is a danger in that particular practice. When it is made explicit that a play draws inspiration from science, we may be quick to decide that it is *about* science; that it is didactic, educational, “not really theatre.” We keep science and art so separate in our minds that we are not willing to entertain the possibility that they may be correlated in ways that are not so explicit. Either a play is wholly about science, or it has nothing to do with science at all.

This is not, in fact, true. Theatre is a reflection of humanity’s changing mindscape, which is fed largely by science. Science tells us how the world works; our perception of the way the

world works affects and alters our understanding of our place in it; and this is, was, and ever will be one function of art: making sense of the chaos inherent in trying to find our place in the world. So in reality, it should come as no surprise that there are many correlations to be drawn.

I am constantly being asked to defend my joint interests in physics and theatre, and have had the last five years as a student of both to formulate my answer. The first part of that answer is that, as I've argued above, I believe that physics and theatre are already inherently linked, in ways richer and subtler than a cursory glance can appreciate. The second part of that answer is my attempt to contribute to the ongoing dialogue between physics and theatre with a Science Play of my own. In *City Lights, Receding* I have tried to interact consciously with physics on many of the levels that the plays and playwrights discussed above interact with it unconsciously.

2.0 CITY LIGHTS, RECEDING

CHARACTERS

NEIL VERDENMACHER, early 60's. Professor of physics.

ALBERT ALBERT, late 30's-early 40's. Theoretical physicist.

CLEO BRODY, 20's. Physicist.

MARIAN ROSE, late 30's-early 40's. Physicist.

ARMIN WEBB, late 30's-early 40's. Marian's ex-lover.

VOICES, two of them. Male, female, or both.

PRESHOW. Needs to set up the world, the VOICES. Something like this: We get to see NEIL VERDENMACHER, ALBERT ALBERT, and CLEO BRODY at their daily routine, coming and going – as if they're on mute; the two bored VOICES, belonging to bodies we can't see, converse over the action. Sometimes the VOICES might comment on what's happening onstage. Sometimes, they don't. They might perform checks of their technical equipment – if they check sound, we might hear snippets of conversation onstage, a brief hiccup of noise. This always drowns out the VOICES instantly. Either we can hear the VOICES, or we can hear what's going on onstage. This is true throughout the play.

At times, ARMIN WEBB appears projected on a screen, doing various incongruous things – jogging along a wooded path, holding hands with Croatian teenagers, singing karaoke into a dirty mic, painting, whatever you'd like. Sometimes it is just a video of one of his eyes, which is sometimes blue, sometimes green. The screen isn't visible to VERDENMACHER, ALBERT, or BRODY, but the VOICES can see it.

As the play is getting ready to start, the VOICES notice a commotion onstage. Things are getting interesting. They decide it is important to turn on the volume.

2.1 SCENE 1

A spacious room in an equally spacious house. Not long before, VERDENMACHER was at work on his star charts, which are plastered all over the walls. ALBERT has interrupted, dragging BRODY along.

ALBERT

We're all physicists that's all I'm saying

VERDENMACHER

Granted, granted, you're aware that we agree

ALBERT

It has to have some significance. That's what I'd like to make clear here

VERDENMACHER

You have said this before Albert

ALBERT

But Brody hasn't told you about this morning. Tell him Brody tell him about this morning.

BRODY

Not much to tell

ALBERT

There's enough, anyway

VERDENMACHER

Go on, why don't you tell me if it will make him happy.

BRODY

One of the guards talked to me.
That's all.

VERDENMACHER

They never talk to us.

BRODY

That's all

ALBERT

No, it *isn't* it *isn't* all – say what he said to you

BRODY

Who?

The guard. ALBERT

He just asked BRODY

What ALBERT

Shut up Albert VERDENMACHER

asked if there was anything I needed that's all BRODY

The tin man has a heart after all VERDENMACHER

No no no don't you see? He meant *materials*. For *experimentation*. It's clear as daylight ALBERT

It is nothing of the sort VERDENMACHER

they are observing us ALBERT

Yes it is called being imprisoned against one's will. They watch us to make sure that we do not attempt escape. Perfectly clear VERDENMACHER

just like at the Farm ALBERT

You are interrupting my charts
I was making excellent progress
Go away VERDENMACHER

It makes perfect sense. Brody agrees. ALBERT

Is that so Brody VERDENMACHER

ALBERT
She just doesn't want to say anything.

Silence.

BRODY
I've got a
thing to do
Excuse me

She exits.

ALBERT
It's the Farm all over again. It makes perfect sense. That guard was under instruction

VERDENMACHER
Please, Albert

ALBERT
whoever is keeping us here wants us to work. They want us to talk about what we're working on.
They want to know what we're working on

VERDENMACHER
For my sanity

ALBERT
They want to know how far we are along

VERDENMACHER
At what, for the love of God? At what?

ALBERT
That's what we have to figure out.

VERDENMACHER
You see it doesn't *work*, Albert, not remotely. At Farm Hall they quite specifically wanted to know where Germany stood in the arms race. There was a war.
There's no race here.
I'm hardly a physicist any longer. I am a professor. And a husband.
My research is not important. I rarely publish. How do I fit into this equation

ALBERT
They brought Max von Laue to the Farm and he'd had no involvement with wartime physics at all

VERDENMACHER

It's ludicrous. There's no race.
As a hypothesis it is complete rubbish

ALBERT

There's always a race. We don't have religious wars anymore science is our god

VERDENMACHER

THERE IS NO WAR
OUR COUNTRY IS NOT AT WAR RIGHT NOW

ALBERT

You can't trust the media anymore look how they mucked up the Middle East thing

VERDENMACHER

You paranoid fuck.

Enter MARIAN. She is elaborately dressed
in evening wear.

MARIAN

Sorry
they told me to come in here
I

(Silence.)

All right
Well
What do you want from me
With me

ALBERT

We're only visitors here.

VERDENMACHER

Involuntary guests. Like yourself, presumably.

She sits.

VERDENMACHER

Are you all right?

MARIAN

I can't stop shaking.
I just spent god knows how many hours with a gun jammed into my gut.
I've never even seen a gun before.

ALBERT
Are you a physicist

VERDENMACHER
Shut up Albert.

MARIAN
What are we doing here?
Is it just us?

ALBERT
The two of us and one other – Brody
Cleo Brody. The physicist. This is Neil Verdenmacher. I'm Albert. We're both physicists.

MARIAN
Albert...?

ALBERT
Albert. I have the same first and last name

MARIAN
Cleo Brody...she just won the Nobel

ALBERT
Who are you?

MARIAN
I
sorry
I'm Marian Rose
I've forgotten your names

VERDENMACHER
It's all right. You're still in a bit of shock.

ALBERT
Marian Rose
You work at MIT
Quantum Hall effect
You're a physicist

VERDENMACHER
ALBERT. LEAVE. NOW.

ALBERT
How can you not see it. You mindless hulk.

He exits.

VERDENMACHER

I'm sorry about that. We're all a little bit on edge.

MARIAN

How long have you three been here?

VERDENMACHER

A few weeks. We all...arrived at once.
I'm surprised there's a new addition. We thought that we were the whole gang.

MARIAN

But you have no idea why they've brought us here. Or who they are?

VERDENMACHER

Albert thinks he does. That it's the Farm all over again.

MARIAN

The Farm?

VERDENMACHER

Farm Hall.
World War II.
Heisenberg?

MARIAN

I'm not a historian.

VERDENMACHER

Nor I, but
Near the end of the war the Allies rounded up a bunch of German physicists, most of whom they thought had been at work on creating an atom bomb
Many famous scientists – Heisenberg was among them
They took them to a great big house
They fed them elaborate meals
They gave them newspapers and radio
Every comfort except freedom
And they recorded all of the physicists' conversations
They wanted to know how near of a thing it was; how close the Germans had come to an atom bomb. If perhaps they even had one already.
Albert thinks it's something like that

MARIAN

But there's no war

VERDENMACHER

No

MARIAN

Nobody's on the verge of any breakthrough with implications like nuclear fission

VERDENMACHER

We're all under a great deal of stress. We each deal with it as best we can. You're still shaking.

MARIAN

It's mostly the cold now

VERDENMACHER

You're not properly dressed for a kidnapping

PROJECTION: ARMIN in shorts and t-shirt, shivering in the rain.

MARIAN

I was at a party
I stepped outside I
needed a cigarette

VERDENMACHER

Take my sweater

MARIAN

They said they'd bring me some other clothes

VERDENMACHER

They will then, eventually.
They haven't been cruel. They treat us well. We had roast pork last night.
They just won't let us contact anybody outside. Or tell us where we are. Or let us go.

MARIAN

Just like this Farm thing.

VERDENMACHER

Yes. It is similarly set up in some ways. Yes.

MARIAN

And we're here indefinitely

VERDENMACHER

As far as any of us can make out yes we are

Pause.

MARIAN

What's all this?

VERDENMACHER

Oh it's my
oh nothing just something to pass the time
Astronomy was my first love

MARIAN

Star charts?

VERDENMACHER

The skies are remarkably clear here most nights
I've always wanted to try naked eye astronomy. The way the Greeks did it. So that's one good
thing about
I'm not any good it's incredibly difficult

MARIAN

These must take you all night. When do you sleep

VERDENMACHER

During the day I suppose if I'm tired which often I'm not

MARIAN

That's nice
But what about getting out

VERDENMACHER

Out?
Oh, of here

MARIAN

Of course, of here
You must spend time talking about, working on that
I mean, what are your plans? The three of you? Bring me up to speed

VERDENMACHER

You're tired and in shock

MARIAN

I'm thinking very clearly actually

VERDENMACHER

You ought to rest

MARIAN

Tell me everything. How many guards. Exits. What are your guesses about why we're here. Will we be ransomed. What have they said to you. What are our options.

VERDENMACHER

I can show you to Brody's room and you can get some sleep
I'm sure they'll want to keep you ladies together

Pause.

MARIAN

I assure you I am as capable of helping us get out of this mess as you are.

VERDENMACHER

I am sure you are.
But we've been here for weeks.
You're not going to be able to do a thing about it tonight. You might as well rest.

MARIAN

I can't be here this can't be happening I have a very important
Being stuck here indefinitely is not an option
What will I do here I don't like astronomy

VERDENMACHER

The food is really very good

MARIAN

I think I might throw up

VERDENMACHER

Take my sweater. Don't be so stubborn

MARIAN

I'm no damsel in distress thank you

VERDENMACHER

Listen, Marian

MARIAN

Dr. Rose

VERDENMACHER

Well, one doctor to another, doctor

MARIAN

Dr. Rose.

VERDENMACHER

Very well. Dr. Rose. There's nothing you can do tonight about our little predicament nothing any of us can do so it's best to remain as relaxed as you can

MARIAN

I was days away from publishing

Days this was years in the making, years of staring at charts and graphs until my eyes bled, years of that gray cement block laboratory with the broken window that no amount of maintenance requests could convince them to fix, years of working with my hateful formaldehyde-smelling graduate assistant in close close quarters, and it was nearly over, and I had struck gold

Results everybody said I couldn't get

Days. Days. Days away.

VERDENMACHER

What were you looking for? What did you find?

MARIAN

I can't tell you

What if this Albert fellow's right

End scene.

2.2 SCENE 2

A hall in the house. BRODY, alone.

BRODY

What do you know about quantum physics?

It's all right to say you don't know anything. Nobody knows anything. I don't know anything and it's supposed to be my field, what I do. It's about tiny things. Figuring out what they do and trying to predict what they'll do next. And we try to make all that into a story. You know there was a study done not too long ago, where they attached tiny lights to a few select joints on the bodies of black-clothed humans. Took a video of that and showed it to other people with no explanation, just asked them to describe what it was. It all showed up as just a random collection

of bright dots moving around on the screen, but every participant identified the dots as human beings.

We rearrange stars into constellations. Scorpio. Ursas Major and Minor. The Dippers.

Pointillist painters. Like Seurat. Meaningless collections of different-colored dots. Our eyes have no trouble repainting them into a representation of a park, a seascape, a room of nude women.

That's quantum physics. Extracting a story out of the movements of these tiniest particles. We can't accept their apparent randomness. I'm a storyteller. That's what physics is. Stories that don't have endings yet.

My favorite is the story about entangled particles.

There's a process by which particles can become entangled. It's technical. That's not part of the story.

So, do that technical thing. Entangle two particles. Separate them. Put one in a laboratory at MIT and the other in a laboratory in Hong Kong. And do some measurements on them. Play around with them. Your measurements will have a collection of results, like the dots in a Seurat painting. First particle red, second particle red. First particle blue, second particle green. Second particle yellow, first particle red. First particle green, second particle blue. And if you play around long enough you will notice that, though the result of a measurement on one particle is random and unpredictable, it somehow has an *effect* on the random, unpredictable result of the same measurement done on the other particle.

And if this sounds weird and confusing that's because it is.

The point is just that, somehow, no matter how far apart they are, entangled particles have an effect on one another. It's hard to describe what happens without getting technical. But it's almost like they *communicate*. That's the constellation we make out of the stars. The particles are communicating.

And the weirdest part: They do it instantaneously. Einstein showed that nothing can move faster than light, and even light has a speed limit. Move your entangled particles twenty light years apart. A light signal, the fastest possible signal, faster than a shout or a radio signal or a telephone call, would take twenty years to travel from one particle to the next. But the particles still communicate with one another instantaneously.

Move them very very far apart, as far as you like, impossibly far, to opposite ends of the universe. Communication: still instantaneous.

This is the most fascinating mystery in quantum physics. And it brings up questions of telekinesis and imaginary particles and time travel. And we can't answer those questions. Nobody's written the end to the story yet.

End of scene.

2.3 SCENE 3

Same place as Scene 1. Morning. VERDENMACHER asleep in an armchair. MARIAN, in comfortable clothes, looking over his charts. ALBERT enters.

ALBERT

Good morning.

(She's startled. Then motions to VERDENMACHER.)

Don't bother about him. He's dead to the world. When he sleeps he sleeps deep and wears earplugs

MARIAN

Does he really stay up all night working on these things

ALBERT

Unless it's overcast

Even then he waits sometimes to see if it'll clear up

MARIAN

That's

ALBERT

Crazy.

MARIAN

Eccentric.

ALBERT

Crazy is the word you're looking for, the man's insane

He's making these star charts to try and figure out from the motions of the heavens where we are exactly, use the navigation system of the ancients

Then he'll tunnel out of here and guide himself free by the stars – so he thinks

Did you know that whales navigate by the stars?

MARIAN

No

ALBERT

Some woman in Australia or somewhere just discovered that

PROJECTION: ARMIN hemmed in on all sides by a crowd.

MARIAN

Not much private space here is there
This room, the dining room which they don't let you in except for meals

ALBERT

The bathroom

MARIAN

The bathroom

ALBERT

Your bedroom

MARIAN

Not with Brody and I sharing a room and she's in there now, clipping her toenails
I can't stand that snick-snick-snick
My mother used to do it on the couch, watching infomercials

ALBERT

My mother's dead.

MARIAN

Oh
I'm

Silence.

ALBERT

There's lots of room in this house though they've just shut most of it off, posted guards in front of the doors. Only makes sense. They're trying to force us together so we can't help talking

MARIAN

About?

ALBERT

Our projects. Our theories. I thought I told you yesterday?

MARIAN

Oh. No. Well, he did a bit.

ALBERT

It makes perfect sense doesn't it? All the evidence aligns
we're all physicists

ALBERT (cont.)

we're not told why we're here
they're offering to bring us materials and things
we're miked, all the rooms, I found one last week

MARIAN

Don't you think that

ALBERT

What?

MARIAN

I'm sorry I know I haven't been here as long as
I mean only a day really but don't you think, all the physicists interned at Farm Hall, from what
Dr. Verdenmacher said, they'd all been working on nuclear fission
But we're all quite different
Brody's work is in string theory
You're a theoretician more of a philosopher really
My work is well it's neither of those things
Verdenmacher told me himself all he does now is teach

ALBERT

Trivial. The link is there we just can't see it.
Perception can't be trusted
That's the first thing I ever learned
I find it a lovely place for sleeping though. This house. The crickets. When I was growing up
there were always crickets. Of course I didn't know they were crickets until later
Did you sleep well?

MARIAN

Not a wink.

PROJECTION: ARMIN sleeping
peacefully.

ALBERT

I slept beautifully, always do. Here. At home in the city it's rarer all those cars and people. I hate
living in the city but of course the university's there so. Do you like it where you live? Back
home, I mean, when you're not

MARIAN

I'm sorry I

ALBERT

no it's

MARIAN

I just don't know what one talks about in a scenario like this.

ALBERT

Well anything you want to

MARIAN

I feel strange about it.

ALBERT

Talking?

MARIAN

Talking standing here anything

ALBERT

It's surreal

MARIAN

Yeah

I should be drinking my second cup of coffee now, booting up my computer
Looking over my grad student's calculations

ALBERT

It's a Sunday

MARIAN

Weekends are just another day for getting things done

ALBERT

I find it's useful to have time just to think, not to have to be doing something, but just think and consider things. I'm a thinker. Not everybody is. A lot of people don't understand it. Why I need just to be quiet and think sometimes.

MARIAN

Oh, well I think sometimes everyone needs that

ALBERT

They think I'm strange I hear the whispers
I already look strange enough even for a physicist

MARIAN

What are you, don't be

ALBERT

No I do I do I've seen pictures

That was a joke
I don't suppose there's any chance you'd want to

MARIAN

Want to what?

ALBERT

Well you know, fuck
As long as we're here

MARIAN

Oh, actually, no, thanks.

PROJECTION: ARMIN and a woman,
kissing.

ALBERT

Just thought I'd ask as long as we're here. After all for me it's been a long time, don't know about you, or are you seeing someone or

MARIAN

You're making me extremely uncomfortable.

ALBERT

Yes sorry. Stupid.
I say stupid things. Forgive me. But don't make the mistake of thinking I'm crazy. I'm one of the few sane people in the world.

Enter BRODY.

BRODY

Where's breakfast? I'm starving.

ALBERT

Pig to the trough, Brody?

BRODY

I'm hoping for eggs Benedict again

ALBERT

It's not eight yet.

BRODY

Oh I thought
Ah

BRODY (cont.)

(To MARIAN.)
Sometimes I forget how to read clocks
Anyhow I thought because you left

MARIAN

Oh no I just. Restless. Hard to adjust.

ALBERT

It is it was at first. You know, thinking about the outside.

MARIAN

My work. I'm going crazy, away from the lab, infuriating

ALBERT

For me it's thinking about my family

BRODY

There's a lot of time to think here

ALBERT

My mother, ordinarily I call her every day. She must be going crazy.

MARIAN

You said your mother was dead.

BRODY laughs.

ALBERT

No I didn't.

MARIAN

Five minutes ago when we were talking you said

ALBERT

I'd never have, she's

BRODY

He says that sometimes

ALBERT

Shut up Brody

MARIAN

Why would you lie about something like that?

It's easier than the truth

BRODY

THE TRUTH THE TRUTH
You don't know truth you little bitch

ALBERT

I don't tolerate that word

MARIAN

YOU DON'T KNOW
NONE OF YOU KNOW YOU MINDLESS HULKS
YOU THINK YOU SEE EVERYTHING KNOW EVERYTHING BUT ALL YOU'RE SEEING
IS A LIE

ALBERT

BRODY is laughing. VERDENMACHER
has woken up. He speaks to ALBERT.

You make me physically ill.
(ALBERT exits.)
Brody, angel, you really shouldn't.

VERDENMACHER

There's oh so many things I shouldn't do, aren't there, Verdy

BRODY

What's the truth?

MARIAN

About?

BRODY

His mother. You said

MARIAN

Oh
She hates him

BRODY

Did you know him before this then?

MARIAN

No.

BRODY

Then how do you know that?
MARIAN

BRODY shrugs. A bell rings.

Hark our devoted servants summon us to break bread
VERDENMACHER

It's like science camp
BRODY

You went to science camp?
MARIAN

Of course
BRODY

Of course
(BRODY exits.)
What makes her think that she
MARIAN

She's terrifyingly perceptive.
VERDENMACHER

I'm sorry if all the
Well you know
MARIAN

Oh no no no
VERDENMACHER

You were asleep
MARIAN

Yes well my own fault for camping out in our little common space.
Besides, I know all too well Albert can't help getting...agitated.
VERDENMACHER

He said you're crazy.
MARIAN

Right now, only with hunger.
God, I hate mornings.
Your eyes change colors.
VERDENMACHER

Yes
MARIAN

They were blue last night. Now they're green
VERDENMACHER

Yes
No one ever notices that
MARIAN

But it's so striking
VERDENMACHER

You are only the second person ever to notice in so short a time after meeting me
MARIAN

What is it? The daylight?
VERDENMACHER

The light, color I wear, mood I'm in
Many things I don't know, variables
It's totally unpredictable
You'll never know until you look at them
MARIAN

But they're green now...Dr. Rose.
VERDENMACHER

Yes
They're green
MARIAN

Coming to breakfast?
PROJECTION: ARMIN's eye. It is blue.
VERDENMACHER

Don't know if I can eat anything
But we can talk about the plan
MARIAN

Plan
VERDENMACHER

To get out of here. As you said last night

MARIAN

There's no plan

VERDENMACHER

Of course there's a plan. Albert

MARIAN

You'll only lead yourself astray if you listen to Albert

VERDENMACHER

There has to be a plan
People don't just sit and rot

MARIAN

I'm famished.
Just wait until you see the spread they've got for us.
Fresh breads, jams, meat cold and hot, eggs, milk, bananas.
Pears and oranges.
Mouth watering yet?

VERDENMACHER

I eat oatmeal for breakfast

MARIAN

You'll change your mind

VERDENMACHER

He exits.

MARIAN

There's a plan
It's impossible that there isn't a plan

End of scene.

2.4 SCENE 4

BRODY in a hall, alone. At some point, ALBERT enters. But he is not really there. It's more like he's in BRODY's mind.

BRODY

This is my story about Albert Albert.

He was a strange little boy with a debilitating lisp and a nose he picked so much it bled. Crusted blood under his fingernails always. It turned his mother's stomach to look at it. He had been an accident. The first child was his sister Susan and she was a porcelain doll girl whom her parents petted and adored. They had only ever wanted a single child. But one ill-starred sperm slipped past latex walls and heroically dodged spermicidal fire, found its way to Mrs. Albert's uterus to trigger the gestation of Albert Albert. And when the morning sickness came – Susie had never caused a moment of morning sickness – she raised her head from the dripping toilet bowl and croaked to the empty bathroom, “I should have had my tubes tied.”

Susie learned to talk at nine months. She never cried. She started helping with the dishes at the age of three and once in school was always the teacher's darling. She never fought with the other kids. She never so much as broke a stick of sidewalk chalk.

Albert peed on Mrs. Albert's face every time she changed his diaper. He got carsick just looking at an automobile. He couldn't tie his shoes until he was eight. He talked too quiet and cried too loud. He had asthma. Other children were afraid of him, which made them violent; he was always in fights, always losing them. His father ignored him and his mother hated him so deeply that she was afraid.

He worshipped Susie. Followed her everywhere. Mrs. Albert was relieved. Meant she didn't have to watch him. Susie was clean and neat and responsible. Susie was an angel. Susie seemed to be the only person who didn't mind her crusty, squinting, lisping, flatulent little brother; the only one who could tolerate the grasp of his sweaty hand.

Where are you, Albert?

ALBERT

In the woods.

BRODY

Woods, what woods?

ALBERT

Woods by the park.

BRODY

Who's there with you?

Susie.

ALBERT

Just her?

BRODY

Nobody else can get here. There's a fence. And they don't know about the hole. Susie found the hole.

ALBERT

How old are you?

BRODY

Four. Five. Seven. Ten.

ALBERT

How old?

BRODY

I don't know. We come here most days. Most every day for years. No one knows about it. Secret place.

ALBERT

What are you doing there today?

BRODY

Same as always. Projects. Figuring out things.

ALBERT

BRODY has become SUSIE. They are children together in their secret place.

SUSIE

Have a radio.

ALBERT

Neato! Where'd you find it?

SUSIE

Jake gave it to me. Think he likes me.

ALBERT

He does not.

SUSIE

Well he does so, he gave it to me with three red roses and a *caramel*. And a note that had our initials in a big heart. JS. It's a really expensive radio. From Radio Shack.

ALBERT

It's really dirty though. There's a big crack in it.

SUSIE

The dirt is the style. Like distressed jeans, duh. And that's not a crack, that's the new receptor. For the radio waves. Like instead of an antenna, because see how it doesn't have an antenna? They found out that radio waves are flat so they have to make the receptor flatter so that it can absorb the waves better. That's why it's called a pancake radio.

ALBERT

Cooooooooool...

SUSIE

It works way better than the old ones. It's basically more high techno. Let's take it apart.

They start to tear into it.

ALBERT

I told my science teacher about how gravity really works. Like how this rock doesn't actually fall down to the ground but the ground comes up to it.

SUSIE

Mmm.

ALBERT

Like you told me.

SUSIE

Oh, right.

ALBERT

But she said it was wrong. Says of course what she teaches us is right cause why would they teach us something that was wrong.

SUSIE

Well – what does she know.

ALBERT

But she said that –

SUSIE

I said she's a stupid cow!

SUSIE (cont.)

(Beat.)

You want to be a scientist, don't you? A good scientist.

ALBERT

Famous one.

SUSIE

Well you got to be good to be famous. Good means you don't take anything anybody else tells you for granite. Good means if some stupid cow tells you something that makes no sense, you ask questions and you peel your eyes and you figure out why it doesn't make sense. And what makes more sense.

ALBERT

'Kay.

SUSIE

Listen. Everybody's got different eyes to see with and different heads to think with. We see different things. We think and understand different things. We can't all be right about those things. One thing has to be true. Many minds, one truth. One truth, right, Albie?

ALBERT

One truth.

SUSIE

Right. Now what do you think this is for?

ALBERT

It has all these little holes in it. In the sides.

SUSIE

Yeah, it looks like a strainer.

ALBERT

Or it looks like it's been shot a lot of times. Or with a machine gun.

SUSIE

Like what Mom uses for draining spaghetti.

ALBERT

It's like a barrier. A soldier protecting the rest of the radio's insides. So something's attacking. Along with the radio waves some kind of other wave is traveling and it's the radio's enemy. And if a little bit gets in –

SUSIE

No.

ALBERT

– that’s static.

SUSIE

No. It’s a strainer. All the noise has to go through it and get weeded out from the, from something that’s like water, maybe static, maybe you’re right about the static thing, but it is definitely a strainer.

ALBERT

Maybe it’s both.

SUSIE

It’s not both. Are you retarded? How can something be a guard and a strainer at the same time? One is to keep something out and the other is to let something out. One truth.

ALBERT

Looks like a guard to me. All shot up guard.

SUSIE

One truth, you see something and I see something different and only one of us can be right...

Something is wrong. She is trailing off. Her eyes flutter a little.

ALBERT

Sometimes I can be the right one though. Susie?

(She is not speaking. Her face sculpts itself into grimaces.)

Susie, Susie, don’t don’t don’t...

(She is having a seizure. It is terrifying.)

I’m going to get her. Susie please. I have to get her. You haven’t...I thought you were...I’m getting Mom...

(He tries to go. She shrieks at him wordlessly.)

Please. You said they weren’t happening anymore...you...

It suffuses her, consumes her, leaves her, her body, spilled out on the ground. Long silence from both.

SUSIE

Let’s rest a while.

ALBERT

Susie, please. Please.

SUSIE

She wouldn't believe you. You know that.

ALBERT

Only because you –

SUSIE

I'm tired.

Silence. She lies there.

ALBERT

I want to go somewhere. Far. High. So high up, walls don't mean anything anymore. You can see everything. Right into gardens. Amusement parks. Skating rinks. Prison yards. Right into peoples' minds.

The scene is over. BRODY reclaims herself.

BRODY

Something won't be clear to you here. Albert had told Mrs. Albert about Susie's seizures. Many times. The first time, Mrs. Albert's heart gulped like a bullfrog. So darkly did she feel, she wouldn't admit what her fear was even to herself. Do you want to know? She thought her angel would die – that was not what was frightening to her – what was frightening was that if Susie died, she would be left alone with Albert.

But Susie said, Mother, Albie's telling stories.

Nevertheless she was taken to Doctor Brown and there were tests done and questions asked and little lights shined into shrinking pupils. And Doctor Brown said, Mrs. Albert, she's strong as a horse. Seizures are funny things, but if she says that little rascal there is just spinning yarns, I'm inclined to believe her.

ALBERT

He just believed her.

BRODY

That was the end of it. Mrs. Albert added "liar" to the mental list of vices she ascribed to Albert, and her ears were never pricked for him again.

ALBERT

They all believed her. She didn't want them to know. She didn't want them to think she was weak. So I had to watch alone and that was the only thing I could do. I loved her and every time it happened I was sure this time I was watching her die.

BRODY

But Albert, the last time you saw her. After you were both grown up.

ALBERT

And she moved away to be an actress but became a professional model instead.

BRODY

And she didn't return your phone calls or come to visit you.

ALBERT

That didn't happen.

BRODY

And after years and years of denial you flew to the city where she lived to find her.

ALBERT

A long anticipated reunion.

BRODY

An ambush.

ALBERT

We had coffee together.

BRODY

You followed her into a Starbucks.

ALBERT

She was so happy to see me.

BRODY

When she saw you she almost tried to run.

ALBERT

And she looked sicker than ever.

BRODY

You asked her about her seizures, was she still having them. She gave you a withering look and said, "Albert, get it through your head. I never had seizures."

ALBERT

She didn't want to be weak.

BRODY

"I was playing with you. It was a game. Get over it. Grow up."

ALBERT

No. I know what I know.

BRODY

She lied to you. A smart and bratty little girl with an overactive imagination.

ALBERT

I saw what I saw.

BRODY

Yes you did.

ALBERT

What do I have, other than that.

BRODY

Yes, Albert, yes. Precisely.

Silence. End of scene.

2.5 SCENE 5

BRODY and MARIAN in their room. BRODY cuts her toenails. MARIAN at the window near her bed. PROJECTION: ARMIN behind bars, clutching them in fists.

BRODY

Can't be very interesting viewing

MARIAN

Excuse me?

BRODY

Isn't yours boarded up too

MARIAN

There's a crack
I can see their flashlights down on the lawn when they walk by
If I squint

BRODY

Planning a jailbreak?

MARIAN

It can't hurt to know the patterns the guards move in

BRODY

The tall fat one starts out the night. He'll be on til half past midnight and he has the fastest stride so he'll come round the house once every four minutes. The little dawdly one takes over until dawn, he's slow, makes a circuit in six and a half but he's much more thorough as you can tell by his flashlight sweeps. Lately I think he's had a cold or perhaps chronic hiccups because the light pops up and down sometimes in an erratic way, didn't used to.

I have more accurate measurements of their circuit times, those are just very approximate averages

Sometimes I used my pulse like Galileo

MARIAN

Excuse me?

BRODY

My pulse. That's what Galileo used as a timing device

For his experiments with pendulum swing

Much easier just to use the second hand on my watch of course but it's fun to go back to the basics sometimes – like Verdy and his star charts

Share your results to me and I'll add them to my averages if you like

(MARIAN moves away from the window.)

Are you going to tunnel out with a spoon?

MARIAN

I don't understand any of you

It seems like nobody really wants to get out of here except for me

BRODY

I like it here. You're all such interesting people.

MARIAN

Will you stop that

BRODY

What?

MARIAN

Cutting your

I don't see how it is possible you even have any toenails left to cut

BRODY

Why do you dislike me so much?

MARIAN

I'm sorry I just I hate that noise it drives me crazy

BRODY

No. Really. What is it?

MARIAN

What
Why I
I don't dislike you.

BRODY laughs.

BRODY

See you cringed. If I were your lover you would love my laugh and you would find my nail clipping endearing but you dislike me, nearly hate me, and so these things I do make you cringe. Why?

MARIAN

You're the one supposed to be able to read people so well so why don't you tell me?

BRODY

Oh that's cheating
(Pause.)
Let's start with the easy. I threaten you.

MARIAN

Threaten.

BRODY

Sure. Ten years younger than you. And prizes. Recognition. Respect. I outstrip you in all of these things.

MARIAN

Modest.

BRODY

Well I didn't ask for any of these things but it is simply true

MARIAN

I don't care for fame

BRODY

You do though you do
You're so worried about publishing this great secret you've been working on

MARIAN

It's an important discovery

BRODY

Yes, and you'd like to be in the books as the discoverer

MARIAN

I

BRODY

You wouldn't mind.

If it was only about the discovery what would it matter if someone else published it first?

MARIAN

What moral mountain do you think you've scaled that you can

You may not think it's important for us that I do this but

BRODY

Us who us, humankind?

MARIAN

No, *us*

You can walk around pretending that it doesn't matter and that we don't have any kind of obligation to, to

But I refuse to forget what we had to go through to get here

BRODY

The obstacles science has overcome

MARIAN

Now you're just being

Look. You want to know why I

I hate women like you

Women. Girls. You're barely a woman.

You act as if it doesn't exist. You accept scholarships. Research positions. Grants. As if everything's leveled out already. As if the battle's won. As if seventy cents to a dollar is just Canada's problem.

You don't admit to yourself why you wear a short skirt to an interview. Why you cock your head like this and flip your hair and laugh a high-pitched little laugh when some department head with a beer belly and tufts of nose hair named Chuck Johnson or Jim Brown calls you in to his office for review. Why you pick your low-cut blouse and curl your hair and dab scent on your wrists to go to a conference where you'll be surrounded by bony, prematurely balding Carls and Franks and Murrays who are wearing the same tattered, stained shirts as the last time you saw them. Who each have one pet practice of personal hygiene he neglects: face-washing, nail-clipping, showering, deodorizing, tooth-brushing.

We all have had to fight our way in tits first. But I look it in the face. I call it what it is. It's

MARIAN (cont.)

degrading and demoralizing but if I had refused to do it I'd still be calibrating picomotors for Dr. Cohen at Penn State.

Whereas now I am on the brink of publishing something that will really put me on the map

As a female physicist

Without victories like these the sins of skirt-wearing and flirting and breast-baring will be visited on future generations of women scientists, without end

Step one: get there. Step two: do something with it. Ends justify.

But pretending to be unaware

It belittles me, the things I've achieved, robs me of them

Women like you do this to me

BRODY

I don't even own any skirts

MARIAN

You know what I

BRODY

I'm a frump

Ever since fifth grade everyone's been telling me I'm a lesbian

If you told me any man ever looked at my breasts I'd call you liar

MARIAN

You're naïve, or pretending to be, which is worse

BRODY

Sometimes I feel sexless. No. Robbed of my sex.

MARIAN

It's a matter of trade – supply, demand

Where I want to get in life. I need the collateral to get there. Women, we're not allowed to use brains as collateral yet, we've got to use whatever we can

BRODY

Maybe it's that you don't allow yourself

MARIAN

Feigning ignorance doesn't absolve you of anything

BRODY

Physics tortures me

Lives in me, feeds on my brain like a hopeless love

I live in a world everyone's trying to tell me I don't belong in and I wish I could believe them. I would believe them. Except integrating functions is as natural as breathing. And I speak to quarks better than I speak to my friends.

MARIAN

I never had a female physics professor. I never had a female TA.

BRODY

I don't have time to fight for other women

MARIAN

Seventeen physics majors in my graduating class and I was one of two women

BRODY

I'm too busy fighting for myself

MARIAN

Until these men, these lanky men, these ink-smelling, leathery, unsympathetic Hydras are no longer the keepers of the gate of science, there is no way for us to fight but the way Hercules fought: dirty

BRODY

I had a lover once
Every time he brought me close to climax it reminded me of solving equations
There he'd be between my thighs and I'd get up and find a pencil at my desk
In the month we were together I never once came but I did stunning things with matrices

MARIAN

They keep us corralled penned up policed under surveillance locked in our box of femininity and you, women like you, refuse to accept what it takes to escape.

BRODY

If I could escape from anything it'd be my own head

MARIAN

I have got to get out of here.

BRODY

And
I don't think Hercules ever fought dirty
He was just the best

MARIAN

I will go crazy
If I haven't already

End of scene.

2.6 SCENE 6

BRODY in a hallway, alone. At some point, MARIAN enters. As with ALBERT, before, she is not really there.

BRODY

She is angry. She hates me. She is furious. It is hard to tell whether her accomplishments are a function of talent or fury. She seems single in purpose, in vision. She wants it that way. Wants to seem that way, maybe wants to be that way, but isn't that way. I know that. I wonder what else.

What is not full in her that she must fill it with a fury? Like manure fills the space left when you plant a sapling. Like two atoms fill their valence shells by bonding covalently.

No. I don't know the truth about people. I am a good guesser.

There are people who let what they do determine who they are. And there are people who do things based on who they are – but what makes them who they are is not always clear.

A dog bite. An abusive father. A spurned love. Hidden variables. Bits of their lives you might never ever find out about and yet those bits determine the way they behave.

Some people think quantum mechanics implies that the same is true of quantum particles.

And yet we can describe what those particles do. And we can tell stories about why they do those things. Physics is storytelling and I am good at physics. Consequently, I am good at storytelling. Maybe I'm wrong when I tell you things about these people – but they sound like they could be true; so until we get some new information to contradict my stories, they're as good as any other.

My story for Marian Rose has to do with a man.

I don't know how they met. But I am sure it was accidentally. I think they would both tell a different story about how it happened.

PROJECTION: ARMIN. All of ARMIN's lines are delivered by the ARMIN projected on the screen.

ARMIN

It was the coldest day of that winter and I slipped on the ice-covered steps coming out of the natural history museum. Someone grabbed my arm and tried to hold me up but there was no grip for her toes either, so we both fell, in a tangled heap of two. That was Marian.

MARIAN

I remember clearly. I dropped a lens in the lab. Sliced my finger on the broken glass. Went into the bathroom to wash the cut and a man entered just after I did, his hand also dripping blood. There was one small sink and we shared it. Our blood mingled in the sink bowl.

ARMIN

It was the summer that I took up amateur birdcalling. At night I would go into my backyard and do my best owl hoot up to the stars. It wasn't long before a neighborhood owl answered me. I was thrilled. Every night the owl and I would call and respond, mating calls, hoots of longing – hoots of hopeless love. One night, as I stood tenderly who-ing, a giant branch from the old tree in my backyard fell and crushed a portion of the wooden fence separating my yard from my neighbor's. There she stood, in her bathrobe, cut off mid-hoot. We had been communing every night of the summer in the tongue of owls.

MARIAN

I was an undergraduate. Last party of the semester. Nearly blackout drunk, flirting with this econ major. He gave me his sweater. Kissed me. Then I threw up on the sweater. He took it from me and stormed off. Behind me, someone said, "Only a fool flees the spit of an angel." He wiped me clean with his sports coat. That was Armin.

ARMIN

She was feeding pigeons in the park and I was painting them, the same pigeons. A flock of monstrous white geese advanced on her out of nowhere, hissing. I threw my shoe at them and they scattered.

MARIAN

There was a train strike in France. Stuck in Nice for hours. Rain started to pour. By some miracle there was an abandoned umbrella on the sidewalk but as I reached for it, someone else did too. We fought over it. Then we shared it.

ARMIN

My brother was in a play and I went to see it and I was the only one in the audience, so they almost canceled the show. But then she showed up and convinced them an audience of two's enough.

MARIAN

April. My pet rabbit escaped. He was out hunting, shot it.

ARMIN

October. I couldn't find my way out of a cornstalk maze and neither could she. We kept intersecting at the dead ends.

MARIAN

A pigeon pooped on his head.

ARMIN
She was singing a song I remembered from my childhood.

MARIAN
My zipper broke.

ARMIN
My iced tea spilled.

MARIAN
In the library.

ARMIN
In the hotel lobby.

MARIAN
On a Greyhound bus.

ARMIN
In Mongolia.

MARIAN
In an old age home.

ARMIN
With no one around.

MARIAN
In the midst of a crowd.

ARMIN
We talked for hours.

MARIAN
We didn't say anything.

ARMIN
I was scared.

MARIAN
I knew just what I was doing.

ARMIN
But everything suddenly made sense.

MARIAN

But I couldn't understand anything anymore. And that was Armin.

BRODY

They came together very suddenly. A collision of lives.

MARIAN

The first time we kissed was in the rain

ARMIN

Was on a train

MARIAN

Was near a tire swing in a park

ARMIN

After dark

MARIAN

The sun was rising

ARMIN

We'd been riding horses

MARIAN

We were hoarse from singing along at the concert

ARMIN

And I looked into her eyes which had always been green before

MARIAN

And he said, Marian, Marian, your cat eyes have turned into bluebirds

ARMIN

That was the first time I noticed

MARIAN

The first man to notice that trick of my eyes

ARMIN

That her eyes were like mine.

MARIAN

Because his eyes did the same thing.

ARMIN

And then I kissed her.

MARIAN

And then I kissed him.

BRODY

And the story after that can be as mundane as you like. Love stories are all the same, after all. Speaking as a chronic outsider. The main thing is that they made the decision to tangle their lives together. And there was affection, and hand-holding, and long talks at night and long mornings in bed, and time passed. They fought, as cats will in a cage.

MARIAN

You wanted the right side of the bed.

ARMIN

You couldn't stand when I beat you at chess.

MARIAN

You were late to everything.

ARMIN

You'd never say what you were actually thinking.

MARIAN

You hated seafood, red food, mustard, brown soda, and cottage cheese. And raw carrots made you hiccup.

ARMIN

You always got the hiccups in museums.

MARIAN

You didn't understand physics, and you never tried to.

ARMIN

You didn't understand that I was happy drifting from job to job – hotel clerk, freelance photographer, waiter, insurance salesman, dog walker.

MARIAN

You never had as much money as you acted like you did.

ARMIN

You refused to say I love you.

MARIAN

You were so sure you loved me.

BRODY

What they fought about, the things they liked about one another, the way they spent their days, I don't know the actual whats or things or ways. There are any number of answers that fit. The way it ended – that's what I see reflected in Marian now. I don't know how long they were together, months or years, because so little of that remained after. The way it ended is what stayed with her for me to find.

ARMIN and MARIAN, early morning.
ARMIN still speaks from the projector,
MARIAN live, but they behave as if they
are in the same room, moment, reality.

Morning, babe.

ARMIN

What are you doing?

MARIAN

I'm having some tea.

ARMIN

You don't drink tea.

MARIAN

Well, you're out of coffee.

ARMIN

It's 6:30.

MARIAN

Yes, did you see the sunrise? The clouds are all in piles today, twisting up the light. Spooky but fantastic.

ARMIN

You're never out of bed before nine.

MARIAN

I wanted to spend a little time with you.

ARMIN

Sweet of you. You'll have to share me with my breakfast preparations.

MARIAN

ARMIN

No no no, I made it for you, babe. There's oatmeal on the stove and I cut your grapefruit for you, so there, that should give you fifteen extra minutes, right?

MARIAN

Oh. Right. Thanks.

ARMIN

How are you?

MARIAN

I, what do you mean how am I? We talk every day, you spent the night last night.

ARMIN

Okay, okay.

MARIAN

No. I'm sorry. Hey. What did you want to know?

ARMIN

Just how you are. How...I don't know, how work is.

MARIAN

The same. Frustrating. No progress. No money. Sucking up to old men all day.

ARMIN

Okay.

MARIAN

Was that all?

ARMIN

No. Yes. What are you doing? Sit down, stop fussing around. I made that so you could have fifteen extra minutes to sit and eat and talk to me.

MARIAN

Sorry. I just get impatient.

ARMIN

I know.

MARIAN

So what's...?

ARMIN

I just want to talk. About whatever. We talk every day but it's never time to just sit and talk, it's calling me to ask when I'm coming over or it's having sex or it's you being too worn out from staring at numbers on a computer screen all day and falling asleep mid-sentence.

MARIAN

I know. I'm sorry. Things are very...We're on the verge of – *something*, and it takes a lot of energy, concentration –

ARMIN

I want you to move in with me.

MARIAN

I like living here.

ARMIN

Then I'll move in with you. I want some of that energy and concentration to be focused on me. Not all but some. I don't think that's ridiculous.

MARIAN

But what good will –

ARMIN

I'll be here. We won't have to spend all this time figuring things out. Schedules. Plans. What time does the subway run. You won't have to make such an effort to make time for me. I'll be part of your life.

MARIAN

I do work here.

ARMIN

Your lab is for work. Your office is for work.

MARIAN

No, Armin, no.

ARMIN

Then you don't want me to be a part of your life.

MARIAN

That's not fair.

ARMIN

Marian, you're always on the verge of something. Work and work and work. It's not going to get any better if we don't change it.

MARIAN

I think it's fine the way it is.

ARMIN

You think it's fine.

MARIAN

Yes. I do. I like it. I have to go. Why are we doing this right now?

ARMIN

You said you weren't going to take that grant.

MARIAN

I have to go, really.

ARMIN

You can be five minutes late. You *said* you weren't going to take the grant, said you were going to cut back.

MARIAN

You looked at my mail.

ARMIN

You look at mine. But I don't have anything to hide from you.

MARIAN

Babe –

ARMIN

You only call me that when you're doing penance.

MARIAN

Armin, it's a huge opportunity. We've been struggling. We need this – the money, the deadline.

ARMIN

It's a huge commitment. That's what it is. And I deserve a commitment too.

MARIAN

I can't live with you. I can't.

ARMIN

Because you already live with your work.

MARIAN

Physics needs all of me.

And I do too.

ARMIN

And I want to give all of me to both. To you and to my research.

MARIAN

That's not possible.

ARMIN

But I don't want to choose physics over you.

MARIAN

Then choose me over physics.

ARMIN

I can't.

MARIAN

Then you choose neither.

ARMIN

No.

MARIAN

Well, what then, Marian? You've ruled out all of the possibilities. Me, physics, both, neither. There's nothing else.

ARMIN

There should be. There must be.

MARIAN

Not in this world.

ARMIN

I have a responsibility to science. To women. You know how much I love physics, Armin.

MARIAN

And me. Do you love me?
(Pause.)
Why won't you ever say it?

ARMIN

Because I have never said it to anyone.

MARIAN

ARMIN

So start with me.

MARIAN

But I don't know. I don't know how I feel about you.

ARMIN

Well, I know. I love you.

MARIAN

People say that so easily, "love." "To be in love." As if it is *just* a state, an easy definition, you are or you aren't.

ARMIN

I love you.

MARIAN

I *have* loved men, I think. In retrospect.

ARMIN

You love them in retrospect.

MARIAN

No, I mean when I look back I know that I loved them. And there are others I didn't love. Those, too, I can identify from looking back. At the time, there was no difference. When I was with each of them I thought I loved them all.

ARMIN

It's different with me.

MARIAN

It's exactly the same with you. Sometimes I am so sure that I love you, it scares me. It is frightening to be so sure. Because I could so easily be wrong. Because what I'm feeling right now probably isn't love at all, it's the possibility of love – the potential for it – and that feeling hasn't got a name.

ARMIN

If you want to leave me, leave me. Don't do it this way, make excuses.

MARIAN

I don't want to leave you.

ARMIN

You might as well because I can't do this any longer, pour feeling into a black hole. It empties me out. I feel tired.

MARIAN

You're so sure you love me.

ARMIN

The shoe fits.

MARIAN

Weak phrases, aphorisms. Mixed metaphor. You see, you don't know either. Won't know until you're forced to know.

ARMIN

Look into yourself hard enough. The answer's there somewhere.

MARIAN

It might not be. That's the funny thing about it all is that maybe there's just no matter of fact about whether I love you or not, until that moment comes when I'm forced to find out. Maybe the ideas "she loves, she doesn't love, she both loves and doesn't love, she neither loves nor doesn't love" don't apply yet; maybe none of them are true.

ARMIN

Either you love me or you don't.

MARIAN

But what if the word "or" means something you don't expect it to mean?

ARMIN

Marian. You want impossible things. Love without admission of love. All work and all play, all at once.

MARIAN

I have to go. I'm sorry. I do. We'll talk tonight. Think about it until then.

ARMIN

I don't want to talk anymore. Not until you're done lusting after contradiction.

MARIAN

I can't deal with this right now. Please understand.

ARMIN

Not deciding is a decision. Walking out that door is a decision.

MARIAN

We'll talk tonight.

She "exits" the apartment. ARMIN fades.

BRODY

The last time they saw each other went something like that. She came home that evening and he'd taken all of his things. She was sure he would break first but when for days she heard nothing she began to feel like a dog abandoned, and she resented that feeling so much that the letter she had intended to be an apology ended this way:

MARIAN

I will not say "I love you" because that would vindicate you and I will not say "I don't love you" because that would give you something to pity yourself for. All I can give you is that I am honest in feeling none of the above.

BRODY

She never knew if he read it. There was no reply. And her phone calls went unanswered.

MARIAN

Never had a relationship end in uncertainty. Feels unfinished. He still lurks in my life. Hides somewhere in me.

BRODY

Hides, but not too deep.

Silence. End of scene.

2.7 SCENE 7

Night. BRODY wanders into the main room. VERDENMACHER is there.

BRODY

Verdy

VERDENMACHER

What are you doing up, angel?

BRODY

I can't sleep, exactly

VERDENMACHER

Nor can I, exactly

BRODY

You never do sleep

VERDENMACHER

But it's damned cloudy out. Nothing to look at, nothing to do. I'd rather be sleeping.

BRODY

Sleep then

VERDENMACHER

It's just that it's deafening inside my head

Your excuse?

BRODY

The distracting hostility of my roommate

Verdy, do you think it's strange none of us are trying to get out of here

Other than Marian

VERDENMACHER

Does it feel strange

BRODY

No

I don't know

VERDENMACHER

Well

BRODY

Albert doesn't want to leave because outside isn't kind to him

In here he can pretend everyone misses him

VERDENMACHER

Why don't you want to leave

BRODY

Maybe I think it's nice here

Maybe I think I need a rest

VERDENMACHER

From being the baby genius

BRODY

I like thinking in an office, a bedroom – not on a stage

VERDENMACHER

Why don't I want to leave

BRODY

That's a bit of a mystery
You're a bit of a mystery to me and I don't say that often

VERDENMACHER

Perhaps it's very simple. I'm lazy.

BRODY

Lazy

She gestures to the star charts. Laughs. They both laugh.

VERDENMACHER

Or perhaps I'm scared

BRODY

Of?

Pause.

VERDENMACHER

Nothing.

Pause. BRODY fiddles with the charts.

BRODY

You're turning the sky into a map.

VERDENMACHER

Yes.

BRODY

To me it's a picture. My grandma and I would look at the stars. She hated constellations because she thought they were so arbitrary like a child's scribbles but I saw the pictures right away.

VERDENMACHER

I'm like your grandmother. I've never been good at seeing the pictures. I've always thought they were fascinating, though, constellations. Different cultures identify the same groups of stars as pictures independently of one another

BRODY

Because they belong together, those stars, the picture-stars, they're linked

BRODY (cont.)

You can just tell

VERDENMACHER

Well
There are some things that are just
Connected
In a way all people can feel

BRODY

I remember the moment I was most scared
It was tenth grade. I fell asleep in chemistry class and dreamed that my grandmother had died.
In my dream the chain-link fence behind our house were the metal braces on a giant's teeth, and
the giant devoured her
All that was left were her legs – the toes were still twitching on the green lawn
And the awful thing was when I woke up I thought it was true

VERDENMACHER

That there was a giant?

BRODY

No I guess what happened was I forgot the dream
I forgot the dream itself and just remembered that my grandma was dead
For the rest of the day I was miserable, a wreck
When I was walking home I thought with every step the word *dead, dead, dead*
I was so scared then

VERDENMACHER

Sad

BRODY

Just scared
Knowing I was going to live the rest of my life alone
My grandma, we had something I won't have with anyone else

VERDENMACHER

But she was alive

BRODY

Of course
And then, it's funny, when she actually died, I wasn't scared at all
I don't think I felt anything
I didn't even cry

VERDENMACHER

When did she die

BRODY

Not too long ago
How many children do you have?

VERDENMACHER

Five
You're an only, aren't you?

BRODY

It's obvious

VERDENMACHER

My oldest is very very bright and very very neurotic. When she is worried she picks at the skin around her fingernails. When she was still in high school and our Golden Retriever went missing her fingers were bloody messes for a week. Now they must be, well Olly is always telling her to stop – he's my oldest son – can't help acting the big brother, even to her "Stop it, stop it," and his huge dimples turn sad. She doesn't like when others note her weaknesses, fights him. The others roll around on the carpet with a dog, a cat, whatever is around. Maggie, my wife, hollers from the kitchen. It's Christmas. Everything is red, and my family – loud and messy and comfortable.

BRODY

It sounds overwhelming

VERDENMACHER

Not in the least. Makes the heart pump faster. This energy, this energy between people connected by love. You're all straining trying to keep it together. That's the hardest

BRODY

Without you there

VERDENMACHER

There's a piece missing. Things start to crumble.

BRODY

That's what I don't understand
Why you aren't yearning to be home with them

VERDENMACHER

Brody, angel, angel, of course I am
I told you. I'm scared.
(Pause.)

VERDENMACHER (cont.)

These people holding us here are armed for a reason.
Being held here is one thing.
Being shot, killed
What happens to my family then
What happens to my daughter's hands
There's no sense in dying if I can avoid it
It's weak but I'm hoping eventually they'll just let us go

BRODY

I didn't think you'd be afraid of anything

VERDENMACHER

Connection is an act of creation. That glow you feel when a first conversation with a stranger goes well, it's energy released, like in a chemical reaction. And a bond forms. Without your effort, without your willingness to engage, that energy would have remained tied up in potential forever. Your connection with another person is the one true unique thing. When that's destroyed, that, that's the only thing you can lose that's worth having

BRODY

Would you rather have nothing to lose?

VERDENMACHER

Don't settle for those easy aphorisms. "He who has not loved and lost." Et cetera. Your insight is deeper than that. Don't compromise it.
Insight, angel, insight, what I wouldn't give.

BRODY

Connection
What *I* wouldn't give

VERDENMACHER

(Touching her face.)
I think you're more capable of it than you know.

Pause. She doesn't move. He doesn't move.
Pause. She touches his face. Pause.

BRODY

Verdy

She runs out. End of scene.

2.8 SCENE 8

BRODY in a hall, alone.

BRODY

Maybe I'm changing. That was something. I didn't think I could ever. I forget I'm still young because sometimes I feel so old. But I'm still young, still changing. Maybe I'm changing. Maybe I can change. What do you think?

You wouldn't know. You don't know me. I can talk and talk to you, but you'll never know me at all.

End of scene.

2.9 SCENE 9

MARIAN, VERDENMACHER, and ALBERT, in the main room. ALBERT is not engaged with the other two, and his movements are for the moment inexplicable: scouring the room meticulously, inch by inch, perhaps as if he's lost something. He goes in and out, is not in when MARIAN mentions him.

MARIAN

Not to interrupt. Just in search of a bit of Daylight

PROJECTION: ARMIN stargazing in a great empty field.

VERDENMACHER

Privacy you mean
Roommate trouble?

MARIAN

Cabin fever. How are the, um, the

VERDENMACHER

Slow. Cloudy every night, lately.

MARIAN

How is it that this window's not all boarded up, when all the others

VERDENMACHER

Oh, it was, but I asked if they could take part of it off, enough for me to see the sky
They're surprisingly obliging
They increased the guard but they did it

MARIAN

And soon you'll be ready to

VERDENMACHER

To what?

MARIAN

Your plan
Look will you stop playing innocent about it
Albert told me

VERDENMACHER

Oh dear. Told you what?

MARIAN

The escape. The star charts.

VERDENMACHER

Ah. Did he also tell you

MARIAN

That you're insane? Well yes or that he thinks so but I don't believe that, Dr. Verdenmacher, maybe the idea's just a little far fetched but wanting to escape is as sane as sane can be, and if you only knew the mental acrobatics I go through trying to come up with an escape plan that'll work, talk about far fetched

VERDENMACHER

As I told you before
I'm not planning an escape

MARIAN

If you wouldn't be so solitary about it, we could all put our heads together and bit by bit the plans will improve

VERDENMACHER

I have no plans.
Do you know Albert has told me that Brody is insane? "She's a raving lunatic who thinks she's psychic."

MARIAN

Yes and she

VERDENMACHER

And you too. You'd hardly been here a day before he came up to me with "This Dr. Rose broad is a wack job." Said you were convinced we were all trying to steal your research or something.

MARIAN

Oh
But

VERDENMACHER

He makes up his mind about something and that's it no arguing with him
He knows the "one truth" and you can't persuade him otherwise

MARIAN

So you're not working on an escape plan

VERDENMACHER

My dear, as I think I told you before, I've always wanted to try naked eye astronomy
Gain a real first-hand appreciation for what life in the sciences was like before our precision
instruments, massive telescopes, satellites
I've just never had enough free time to give it a real go before now
That's all there is to it

MARIAN

I don't understand any of you
Albert's only concerned with proving he's right about why we're here
Brody seems almost to, to *like* it here
You and your apathy

VERDENMACHER

Your eyes are blue now, what emotion is that?

PROJECTION: ARMIN's eye, green.

MARIAN

We're being held here against our wills but I'm the only one interested in getting out

VERDENMACHER

Certainly I'd like to get out. But you have seen how this building is guarded
To willingly endanger my own life, that would be

MARIAN

But your work, your work, how can you bear to be away from

VERDENMACHER

What work?
I'm little more than a teacher now
Physics is a young man's game

MARIAN

That doesn't have to be true

VERDENMACHER

I once teetered on the brink of possessing *some clout* in the world of theoretical physics, but I turned out to be sniffing up all the wrong skirts
By then I was thirty-two – an old fogey

MARIAN

I'm thirty-five.

VERDENMACHER

And you think you're still in the game.

MARIAN

I know I am.

VERDENMACHER

A real genius for math, for physics, takes a kind of mental elasticity you don't have when you get older

MARIAN

Or maybe you just stop trying

VERDENMACHER

Brody could intuit in one day of mental acrobatics what it would take you or me years of number-crunching to even guess at.

MARIAN

I think Brody's insane
And what is she doing always off talking to that guard

VERDENMACHER

You and Albert
They're all insane. The young ones. Maybe that's what they have, and what we've lost.

MARIAN

If you knew what it is I was about to publish, if you knew what torture it is to be here
Maybe when you were young when you still loved it

VERDENMACHER

Loved physics?

I started doing it because I was obliged to by my schoolteachers and kept doing it because I was better at it than anybody else. For a little while.

Enjoy occasionally *often* even yes but love no

MARIAN

You have a family yes? Children?

You were at your first child's birth

VERDENMACHER

Letting Maggie squeeze my hand white

MARIAN

You weren't one of those skittish fathers

VERDENMACHER

No I was readier than Maggie at the time

MARIAN

And that moment you first held

VERDENMACHER

Her

MARIAN

Was

VERDENMACHER

One of those moments you always come back to

Like a landmark in your memory

MARIAN

Imagine, Dr. Verdenmacher, walking down that hospital hall towards your wife's room

Your first daughter about to be born

You can hear your wife calling to you telling you to hurry and come quick

And then someone yanks you into the nearest broom closet and locks it

And you stand bewildered amongst the Swiffers and the Comet and the smell of sterile dust and your baby's just out there *about to be born*

And no matter how hard you slam your shoulder against the door it won't budge

There are three other people locked in the closet with you and you *know* if they'd just *help* you you'd have enough force together to break down the door

But none of them will help you not a single one and that's how I feel

PROJECTION: ARMIN begging, passersby unmoved, unresponsive.

Your baby's being born
VERDENMACHER

My first child
MARIAN

You're not a mother are you Dr. Rose
VERDENMACHER

Does it make a difference?
MARIAN

VERDENMACHER
My daughter's birth was a terrifying moment
To see for the first time the face of a creature Maggie and I were now responsible for raising
molding shaping protecting, this *human being* who without us would not have been, and who
without us would *cease to be*. I was a part of my daughter at that moment and twenty years later
I am still a part of her and I am in what she's becoming.

MARIAN
I have discovered I have created

VERDENMACHER
This whatever you have discovered or proven
The inception is enough. Your job is over. To watch the birth is just privilege, just vanity.
I understand your frustration but do not compare this to the birth of my child

MARIAN
It is a triumph

VERDENMACHER
And a child's birth is more than a triumph
It is a responsibility

MARIAN
This is a responsibility. It matters *it matters* that I did this as a *woman* it matters

VERDENMACHER
Ah so then it isn't physics you love

MARIAN
How can you say that?

VERDENMACHER
Not the advancement of learning or the beauty of an idea but the advancement of a cause

MARIAN

It doesn't make me any less of a scientist than you

VERDENMACHER

But I've told you I don't consider myself a scientist

MARIAN

Don't condescend to me

VERDENMACHER

I wouldn't dare
I just think that perhaps you don't know exactly what it is you love

MARIAN

Just because you haven't met other women like me

VERDENMACHER

My dear, I've met far too many women like you.

Into a throbbing void in the argument
ALBERT bursts.

ALBERT

Got it got it almost got it you ready?

VERDENMACHER

Ready for what?
(But he's gone.)
For Christ's sake, Albert.

MARIAN

What did you just say to me?

VERDENMACHER

Look Dr. Rose
I like you I don't want to fight with you and I'm not trying to make you angry

MARIAN

Your behavior given those three statements is astonishingly inappropriate

VERDENMACHER

I spend so much time getting attacked by women that's all

MARIAN

Defense, retaliation at most

VERDENMACHER

Do you know how many emails I get daily about grants whose criteria indicate that “proposals highlighting involvement of women or minorities will be given strong preference?”

Do you know what effort has gone into recruiting female faculty to my department over the past five years? Cultivating young female talent?

MARIAN

None of those things would be necessary if

VERDENMACHER

Of course the doors should be open but we shouldn't have to *entice* you

MARIAN

But the doors aren't open yet

VERDENMACHER

As if you were puppies begging bones

MARIAN

You don't want to insult me?

VERDENMACHER

You are stunning.

Your energy that is.

But it's so stunningly misdirected.

MARIAN

I should aim it at love? Children?

VERDENMACHER

Science if you like

Anything real

MARIAN

There was a man once

I tried to do those things people do, cut back on work, make quality time

VERDENMACHER

Men are hardly all to blame for the demands of love

MARIAN

I did good work still but I was turning down opportunities left and right, convinced myself they were small

And still he wanted more

And then I was passed up for a major recognition in the department

MARIAN (cont.)

When I asked the chair why he said, “We invest in great minds, not the mothers of potential future great minds”

VERDENMACHER

Oh surely

MARIAN

Verbatim.

VERDENMACHER

Well.

And then.

MARIAN

I never said no to an opportunity again.

VERDENMACHER

And the man? What is the remainder of your history?

MARIAN

A blank.

VERDENMACHER

Did you ever tell him about

MARIAN

There were many things I never said to Armin.

VERDENMACHER

And you don't think that maybe

ALBERT (O.S., overlapping)

Got it!

Lights out everywhere and sudden cutoff of VERDENMACHER's, MARIAN's, ALBERT's voices, replaced by two voices we may recall from the preshow, tinny and harried in the blackness. What they say is not terribly important. There should be overlapping and confusion.

VOICE 1 (V.O.)

What the

Power outage
VOICE 2 (V.O.)

No the computers, everything's still going
VOICE 1 (V.O.)

Well check the
VOICE 2 (V.O.)

it's just the monitors are out and
VOICE 1 (V.O.)

Get it back online
VOICE 2 (V.O.)

I know I'm
VOICE 1 (V.O.)

right now
VOICE 2 (V.O.)

there's a backup if I just, not sure where the switch
VOICE 1 (V.O.)

Lights up. The VOICES are gone.

This and subsequent transitions between darkness/VOICES and light/action should be as sudden, jarring, and remarkable as they can be. While the VOICES speak, change as much as possible on stage (costumes, lights, set, everything) in as little time as possible. The audience should be left wondering "How did they do that?" – if they are given any time to wonder at all.

Bright daylight. ALBERT giving a lecture.
The other three listen.

ALBERT

The measurement problem. It's a problem. In everyday life, we measure things – in baking, for instance; we measure one cup of flour. There we have an instrument of measurement, that's the cup we put the flour in; and the instrument just tells us how much flour we have. Very straightforward. Or we can measure, for instance, temperature. Our thermometer is our instrument; it takes a reading. Maybe we hang it on the wall and take a look at it a couple of times a day. Say John wants to know how warm it is outside because he's thinking about going

ALBERT (cont.)

swimming. He looks at the thermometer and it says 89 degrees – wonderful swimming weather; he goes to put on his swim trunks with the happy dolphin print, the ones the other boys all make fun of him for wearing, which he can't help, because Mother says she just hasn't got the extra cash to buy him a new pair this summer, dear, just like last summer and the summer before that. The point is, friends, we would all think it would be foolish to say now that the temperature *could have been* anything other than 89 degrees. John looked at the thermometer, it said 89 degrees, and so as long as we trust the thermometer we know that it was 89 degrees outside *before* John looked at the thermometer. In fact, we know that if John had never looked at the thermometer *at all*, it would *still* be 89 degrees outside. This is common sense.

Quantum measurements just aren't like that. And nobody really knows why. Nobody knows why measuring something like the spin of a tiny thing like an electron should be different than measuring the spin of a big thing like the earth. All we know is that *something weird* happens when you measure a quantum particle. Because before you take a measurement, there *is not* a predetermined *value* for that measurement. It's tricky to explain because it goes against common sense. But it would be like if the temperature outside, before John looked at the thermometer, had a 50% chance of being 89 degrees and a 50% chance of being 30 degrees. And when he looked at the thermometer it suddenly made up its mind and decided to be 89 degrees. But it could *just as easily* have been 30. And there was no way of knowing what it would "decide" to be when you look at the thermometer, other than *actually looking*.

In quantum physics, this is what is called *superposition*. We would say that this weird temperature that hasn't made up its mind yet is in a *superposition* of being 30 degrees and being 89 degrees. Which means it is not 30 degrees and it isn't 89 degrees and it isn't both and it isn't neither.

We don't get anything like this in the macroscopic world – the world of big things. But in the world of tiny things it is very real and it is very hard to figure out what it means. Because we can say that a particle is in a *superposition* of having spin up and spin down. And that means that it isn't spin up and it isn't spin down and it isn't both and it isn't neither. And yet when we *measure* it, our instrument, our measuring device, will give us a *definite value* for the particle's spin.

This is *weird*. What should we make of this? Nobody really knows. There are various –

VERDENMACHER

This is preposterous.

ALBERT

Sorry?

VERDENMACHER

You keep saying "nobody knows"

Nobody knows! Do you actually tell your students that? The measurement problem is the oldest problem in the discipline and it's been satisfactorily solved since Bohr

ALBERT

Oh but you can't say that

VERDENMACHER

Certainly I can

Superposition – what you're talking about is the particle's wave function and we all know that taking a measurement collapses the wave function

ALBERT

Buzz words, buzz words, "collapse," "wave function"

VERDENMACHER

All right

Measuring a particle changes the equation that describes it

It isn't described by a probability wave anymore

It's forced to pick an option – to be just spin up or just spin down

ALBERT

That's exactly what I'm saying. That's what *happens* but *why* does it happen?

VERDENMACHER

I smell philosophy

ALBERT

Physics *is* philosophy

BRODY

My grandmother used to think that there were all of these worlds out there, alternate worlds, although we only experience being in one of them

Everything that's possible actually happens, only in different worlds and there's an infinite number of them

Which sounded just like all the sci fi books she used to read to me

But then physics was an explosion in my brain and it started to seem less like fantasy

ALBERT

That there are alternate worlds?

BRODY

If you're talking about these particles that are in superpositions, and then you make a measurement and all of a sudden it seems like they've picked just one state, and the other possible state is gone

Couldn't it maybe be that the world's just split in two, into World A and World B

And you're in World A, where the particle made one choice

But there's a World B version of you who sees a particle that made the other choice

VERDENMACHER

What a ludicrous and totally useless idea

BRODY

Ludicrous yes it's probably not *right*

Because everything would have a 100% chance of happening which would make all the probabilities in quantum mechanics meaningless

VERDENMACHER

Not to mention shamelessly violating every conservation law in the universe

BRODY

But useless, not useless, it's another story to think about

Isn't that why we do physics after all

VERDENMACHER

I do physics because it works

MARIAN

As you were saying, Albert –

As before: lights out, sudden switch to the VOICES.

VOICE 1 (V.O.)

Fuck

VOICE 2 (V.O.)

I thought you said you

VOICE 1 (V.O.)

what *was* that some kind of lecture

VOICE 2 (V.O.)

back online back online damn it

VOICE 1 (V.O.)

Hold on I don't understand how the backup

VOICE 2 (V.O.)

If they know we can't see them this could be very

VOICE 1 (V.O.)

They aren't supposed to know we've got this

Yes but they've guessed at it
VOICE 2 (V.O.)

setup hold on
VOICE 1 (V.O.)

you know that
VOICE 2 (V.O.)

just let me rewire almost got
VOICE 1 (V.O.)

Lights up, VOICES out. Music, the four physicists dancing together in pairs, trading partners frequently, not concerning themselves particularly with conversational coherency.

VERDENMACHER
I had to do something, always had a mind that needs something to chew on
Problems in other disciplines were solved too easily

ALBERT
I was a tinkerer

VERDENMACHER
History: Who was the third wife of Henry VIII?
Mathematics: Prove that there exist an infinity of irrational numbers

ALBERT
Old radios car engines windup toys treehouses with basket dumbwaiters

VERDENMACHER
Literature: Name the prevalent themes in *A Tale of Two Cities*

MARIAN
Jimmy Caldwell

VERDENMACHER
These questions had answers

ALBERT
Potions for my cat to drink busted personal computers my mother's jewelry sticks and stones telephones

MARIAN

Red red hair
But no freckles

ALBERT

Junk left out for the garbagemen: lamps and hubcaps and a swivel chair become a spaceship for me and Susie

VERDENMACHER

But
How did the universe begin?
Is time travel possible?

MARIAN

Pretended in the playground he could travel through time

VERDENMACHER

How much can we know about a quantum particle? What is dark matter?

BRODY

My grandmother was always asking me questions

VERDENMACHER

No easy answers to those ones

BRODY

What if I see totally different colors than the colors you see and so to you, the grass is the color I would call pink, and to me it's the color you'd call red, but both of us call it green?

MARIAN

The tire swing was his time machine

ALBERT

I learned how things worked by taking them apart and putting them together and making them new

VERDENMACHER

In physics there was always something to think about

BRODY

She would wake me up at one, two, three in the morning to ask what would happen if I went back in time and tried to kill her before my mother was born

ALBERT

Most people have never seen the inside of a television
Could not even give a reasonable explanation of how one works

MARIAN

One day, second grade, got the courage to ask him if I could time travel with him

BRODY

Ask me if I ever thought about how big infinite space is or how long is forever, used to scare the hell out of me

VERDENMACHER

That is how life stays interesting

ALBERT

I learned that the way most people understand the world to work is wrong

MARIAN

He said no

ALBERT

That the only thing I could trust was my own perception

BRODY

I mean, have *you* ever thought about how long forever is?
At two in the morning?

MARIAN

He said time travel is physics

BRODY

To give us both some peace of mind I started telling stories that would answer her questions in a way I assumed was fantastical

MARIAN

And he said his dad told him girls can't do physics

VERDENMACHER

Life stays interesting

BRODY

But as it turns out those are the types of stories all physicists are telling in one form or another all the time

VERDENMACHER

as long as you have something new to explore

MARIAN

Battle

Question
Tinker with
Think about
And now?
Can't be spontaneous the whole system even the Armin observational
it's just
like a chain reaction
you think one of them
I don't see how it's
but then why aren't they
exactly
That should

BRODY

ALBERT

VERDENMACHER

As before: lights out, sudden switch to the VOICES.

VOICE 2 (V.O.)

VOICE 1 (V.O.)

VOICE 2 (V.O.)

VOICE 1 (V.O.)

VOICE 2 (V.O.)

VOICE 1 (V.O.)

VOICE 2 (V.O.)

VOICE 1 (V.O.)

Lights up, VOICES out.
VERDENMACHER, ALBERT, and
BRODY address the audience. MARIAN
watches. VERDENMACHER is mid-
speech.

VERDENMACHER

I conceived of the complementarity principle: that an object, such as a particle, can possess multiple seemingly contradictory attributes. My writings are notoriously vague, self-contradicting, and controversial. I am Bohr. I am the father of quantum physics.

ALBERT

I am Feynman. I am Richard Phillips Feynman. Born May eleventh, nineteen hundred and eighteen in Far Rockaway, Queens, New York. I am a joint Nobel Prize recipient, 1965. I did not speak until I was three years old. I repaired many radios as a boy. I was known as a prankster, a jokester, a nomad, a dabbler. I played drums, picked locks, and studied Mayan hieroglyphics. My first wife died of tuberculosis. Niels Bohr, the father of quantum physics, sought me out because I was not afraid to argue with him. I am remembered as one of the greatest teachers of physics. The first principle of science is that you must not fool yourself – and you are the easiest person to fool. I am Feynman. I am a joint Nobel Prize recipient.

BRODY

I am Cassandra. I am wild, mad Cassandra. Born to a royal family not long before the Trojan War. When I spurned Apollo and his love, I was cursed by the gods with the gift of prophecy. It was a curse because the gods decreed that no one would ever believe my prophecies.

MARIAN

This is madness.

BRODY

I saw all, but no one would see with me. I understood all, but was powerless to convince anyone of what I knew.

MARIAN

Maybe we are all mad.
Maybe

As before: lights out, sudden switch to the VOICES. Ad lib here. Noises. Frustration.

As long as it needs to be, but as brief as is possible. Then lights up, VOICES out.

ALBERT is restrained, blindfolded.

BRODY wears MARIAN's dress from her first appearance. No MARIAN or VERDENMACHER.

ALBERT

I'm not mad I'm not mad I'm not not mad mad mad

Let me free it's dark it's dark why this abuse this scorn

You are all afraid because you know I am right, who is

(BRODY rustles by, brushing ALBERT's face with the dress.)

Dr. Rose Dr. Rose please, you're a reasonable woman, a scientist, tell them

BRODY

(Imitating MARIAN.)
Maybe we are all mad

ALBERT

You are
All mad but me
I'm the sanest person you'll ever meet

BRODY

Why do you say that?

ALBERT

Because we all see the same thing but I'm the only one who understands it
Because we're all taking in the same information but it's lost on everyone else
Because you refuse to see what's happening to us, and why

BRODY

Dr. Albert, why do you insist on flagrantly insulting my sex

ALBERT

No not women, not "you" as in "women," that isn't at all

BRODY

You disappoint me
Everything disappoints me
The world I live in is not the one I would choose to live in

ALBERT

You misunderstand as always as all of you do you are of the wrong mind completely
(Hearing her walk away)
Come back Dr. Rose don't, don't leave me alone in the dark with eyes and hands, everything I
trust, denied me

Lights out, VOICES up, even more briefly.
Then lights up on a split scene. In the main
room, ALBERT, still restrained, and
BRODY (no longer in the dress, if possible).
Elsewhere in the house,
VERDENMACHER and MARIAN.

VERDENMACHER

Despairing?

How much time has passed? MARIAN

I never counted the days. VERDENMACHER

Lost time. Lost days. MARIAN

(Imitating VERDENMACHER.)
Still here you nitwit BRODY

Verdenmacher? ALBERT

Because you are letting it wander VERDENMACHER

Neil ALBERT

What? Time? MARIAN

Make use of it VERDENMACHER

Neil! ALBERT

and it won't be lost VERDENMACHER

Well? How can I help you, Albert? BRODY

Why have I been put into this hideous darkness ALBERT

But days, weeks away from my work
Months perhaps MARIAN

I'm sure you were overdue for a holiday VERDENMACHER

BRODY

Your erratic behavior was a concern

VERDENMACHER

To take some time off, let your brain chew on other things

MARIAN

Like your naked eye connect the astronomical dots art project? No thanks

BRODY

You were delusional

ALBERT

I was too close to the answer

BRODY

You refuse to admit of any interpretation other than your own

ALBERT

And you, what's your interpretation
What are we doing here

VERDENMACHER

It's an exercise
I learn from it

MARIAN

What do you learn?

VERDENMACHER

Patience
Attention to detail
Humility. Doing it is hard. I'm awful at it. Yet thousands of years ago, people started from scratch and catalogued the universe, what they could see of it, and used it to find their way around our world

BRODY

You love your family Albert don't you

ALBERT

Don't change the subject

VERDENMACHER

To discover new physical laws

BRODY

We've talked about your mother, your sister

MARIAN

I never bought into that whole polymath thing
The scenery distracts from the road

BRODY

I have a wife I have children

ALBERT

Yes yes I know

VERDENMACHER

There are other things then
Brody, me, even Albert, we can be interesting people on occasion
There are conversations to be had that don't center on work
Stop revving your engine

BRODY

If I were to die

ALBERT

Who's talking about dying?

BRODY

I know that if I were to die
The misery they would go through

MARIAN

Well that's not me
Relating to
Just
relating

BRODY

I want to get out of here alive
Not fast not right just alive

ALBERT

Nobody's dying

BRODY

We're held here indefinitely and without explanation and against our will by men with guns
Wake up Albert

VERDENMACHER

Because you don't believe it's worth it

BRODY

I don't know who's listening. I don't know what they want with us. And I don't want to prick any lethal beasts into motion. I'm keeping a low profile.

(She is walking away.)

Whatever guesses I may have about why we're here I'm keeping to myself.

ALBERT

Neil don't

MARIAN

Dr. Verdenmacher, if I spent my life worrying about other people

ALBERT

Don't don't go

VERDENMACHER

Worrying not *worrying*

ALBERT

Not in this darkness

Neil

BRODY has exited.

VERDENMACHER

What you deny yourself Marian and I will not call you doctor
By these walls and gates, screens
What you deny yourself is massive

MARIAN

I have everything I want

VERDENMACHER

Then why aren't you happy

MARIAN

I am happy never been happier

VERDENMACHER

Why did you step outside for a cigarette at that party

MARIAN

I like to smoke

VERDENMACHER

Why do you think about the man you drove away

MARIAN

He left me

VERDENMACHER

Did you love him

MARIAN

I don't know.
I don't know.

VERDENMACHER

Don't you want to love anyone

MARIAN

I have my physics

VERDENMACHER

You mean your discovery.
But if you don't have it. If you make it out of here. And someone else published first.
Then what do you have.

(Pause. BRODY enters, unseen by MARIAN and VERDENMACHER. She stops, watches.)

Connection is an act of creation. That glow you feel when a first conversation with a stranger goes well, it's energy released, like in a chemical reaction. And a bond forms. Without your effort, without your willingness to engage, that energy would have remained tied up in potential forever. Your connection with another person is the one true unique thing. Other people can and will discover whatever wonder of physics you've discovered, Marian. But the strings running between us, the hooks you've landed in my gut, the knots I've tied round your ribs, those are replicated nowhere else in the world, nor ever can be.

(VERDENMACHER takes MARIAN's hand. They hold hands in silence. BRODY stares. She exits.)

It's a world we create by choosing to observe it.

Pause. BRODY sings softly offstage.
ALBERT hears her.

BRODY (O.S.)

How should I your true love know
From another one

ALBERT

Brody

By his cockle hat and staff
And his sandal shoon

Brody!
(Silence.)
Brody?

Have they left you here

I came too close

Maybe you just annoyed them

Annoyed

Well you fucked with their system
Made all the observational equipment go haywire

Right the observational equipment they were observing us like I said

No one was denying they were probably observing us
Even Verdy

Why wouldn't he untie me

You endangered all of us Albert
They were treating us with decency because we were cooperating, and then

Then Marian, why wouldn't she? She doesn't think we should cooperate

But you weren't trying to help her escape
You were just trying to prove your point which only makes her angrier

BRODY (O.S.)

ALBERT

BRODY

ALBERT

BRODY

ALBERT

BRODY

ALBERT

BRODY

ALBERT

BRODY

ALBERT

BRODY

BRODY (cont.)

She's furious you didn't tell us all beforehand what you were doing, convinced we could have made a break while they were blind

ALBERT

There are armed guards all over the lawn we'd never get two feet past the front door

BRODY

Didn't say I agreed with her

ALBERT

Then why don't you untie me

BRODY

I like captive audiences

ALBERT

Go talk to your guard friend

BRODY

He's been otherwise engaged. Thanks to the havoc you caused.

ALBERT

They should have it fixed by now. Maybe another glitch or two. My tampering wasn't permanent.

BRODY

I've got a story to tell you so sit tight

ALBERT

I don't like stories

BRODY

But this one's about someone you know

ALBERT

I'm not interested

BRODY

It's Neil Verdenmacher's turn

ALBERT

Untie me and maybe I'll be interested

BRODY

Because I think I've worked out a kink or two of his but I need to hear how it sounds out loud

ALBERT

I DON'T WANT TO HEAR ANY STORIES
UNTIE ME UNTIE ME YOU LITTLE

BRODY

Shut up or I'll gag you

ALBERT

You wouldn't

BRODY

There's a roll of duct tape Verdy's been pasting up his star charts with and I don't think I need a left sock at the moment are we clear

(Pause.)

Neil Verdenmacher. Family man. Children with red headbands. Children with toy trucks. Wife wrapping white points of light round the Christmas tree. Aunts and uncles. Parents and in-laws. Phones the wife when he's going to be home late. Buys milk from the corner store. Children who like cinnamon cookies and a wife who bakes them. Sends birthday cards to nieces and nephews and second cousins. Burns bacon when he tries to cook. Loves the plaid slippers his wife gave him four years ago. Nothing he likes better than a night at home, playing board games, playing rummy, watching a movie on the couch with his arm around the wife while children cut paper snowflakes on the carpet.

(During the following MARIAN and VERDENMACHER, who have been holding hands, draw close to one another. Gradual, slow; it takes the whole of BRODY's speech.)

Neil Verdenmacher. Philanderer. Women with high heels. Women with red bra straps. Women loosening the white-striped tie from round his neck. Secretaries and students. Conferences and symposia. Takes his office phone off the hook when he needs his privacy. Buys condoms from the drugstore on College Ave. Women who like to be painted with chocolate, topped off with whipped cream. Sends dirty emails when he gets the chance. Burns the notes they leave in his pocket. Loves when they give him little gifts like cufflinks or blowjobs. Nothing he likes better than a night with a beautiful woman, foreplay, roleplay, motel room television flickering in the background with her legs up over his head and the newspaper under the bed rustling as it moves.

Of two natures so contradictory in seeming, one must be a lie.

But neither is. He possesses both, both exist in him simultaneously, complementing and completing one another, coexisting without erasing. He lives both lives with full honesty and full commitment and he loves his wife and he loves the women who aren't his wife and he loves his children and he loves the women who have never met his children and he sees nothing strange in this.

MARIAN and VERDENMACHER kiss.

Lights out, VOICES.

VOICE 2 (V.O.)

What now I thought you

VOICE 1 (V.O.)

Just a tick, to get the Armin observational back and then we'll be fully, we'll be

Lights up, VOICES out. PROJECTION flickers up: ARMIN with a woman, her face obscured. They kiss. MARIAN and VERDENMACHER kiss. MARIAN pulls away.

VERDENMACHER

You see
Now we are creators

MARIAN

Now I know

VERDENMACHER

Know

ARMIN

(Speaking from the screen.)
Now I know
Marian, you were right
I thought I knew before

MARIAN

I didn't know before

ARMIN

But now, now I know

MARIAN

It's fallen collapsed and now I know

VERDENMACHER

Know
Know what

End of scene.

2.10 SCENE 10

BRODY in a hallway, alone.

BRODY

Here is what I think. And you don't have to tell me if I'm right. But here's what I think.

You remember the story I told you. The story without an ending. It's about communication. It's about weird connections. And they happen on a quantum particle level. But quantum particles are a part of the real world.

Here we are. And we've got these connections. Albert and his sister. Verdy and his family and his...lovers. Marian and Armin. And we're being observed, monitored.

I should recognize an experiment when I see one, don't you think?

They noticed something. Correlations between our behavior and the behavior of those we are connected to. Strange, impossible correlations. Statistically impossible unless we are communicating, somehow, faster than light.

Like quantum particles.

So they keep us here. They monitor us. They monitor those we are entangled with.

Communication. Faster. More reliable. So fast it moves faster than light. So reliable it never fails. If it's possible, it's worth going to extremes for.

I know. There's me. No. You're right. I have no one. I'm entangled with no one. My grandmother was my only real connection in my life, and she's long dead.

I did think I was getting somewhere with you. Weeks ago. When you talked to me. You asked me if I needed anything. And I thought. Well, it's all right. That's how things go for me.

And Verdy. But that is also how things go for me.

I am a blank. I am an anomaly. But no theory is a perfect fit at first.

You don't have to tell me if I'm right.

Maybe you don't even know. You're just a guard here, after all.

Lucky for me I'm not interested in answers or endings. I'm just interested in questions. I'm just interested in stories.

Enter MARIAN. The colors describe her eyes. There is not always a corresponding projected eye of ARMIN's, but when there is, the color is unfailingly opposite.

MARIAN

They're blue. Found what no one else has found. Blue. Making history. Green. History for women. Blue. Green. Landmark event. Change everything. Green. Green. Green. Clear the way. My name in all the papers. No. Blue. That's not the important part. Green. Important part is. For women. And science. Scientists. Blue. The march of information. The expansion of knowledge. Nobel prizes. Blue. I've discovered. Blue. I've discovered. Green. Blue. Green. I can't remember what I've discovered. Blue. Blue. That's not true. Green. But I can't remember anymore why it's important. Green. Why anything's important beyond the thing, the thing that I now know.

Silence. MARIAN blinks her eyes, slowly, open and shut, open and shut. When she opens them, ARMIN's eye is projected, now green, now blue. When she closes them, the eye blinks out. Regularly, like a heartbeat, like a wave lapping the shore, until the lights fade and the play is over.

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