GIVE US BACK OUR SUN / PETER GALISON & WILLIAM KENTRIDGE

PETER GALISON: We thought we might begin with the title of the piece and talk about what we mean by refusal. What's being refused here?

WILLIAM KENTRIDGE: One of the beginnings was the contrast to *Seize the Day*. *Refuse the Hour*, like *Seize the Day*, has the implicit confidence and certainty of a revolutionary dictum; but *Refuse the Hour* and *The Refusal of Time* is also a refusal of that certainty. At one stage, the project was going to be called "Three Times Table," about three different times: Newtonian time, Einsteinian time and then time disappearing into a black hole. But as we went on, it became more and more about trying to resist the imposed order that time supposes, and referred to other refusals.

PG: For physicists, time was always more than just another technical concept. For physicists, the question of time was always more than just another technical issue. Physicists debated whether parity was a valid part of fundamental physics —could any process of nature also occur in its mirror image? But parity never ignited passions. Time is something much more immediate to people—to the person on the street, but also to Newton, Einstein, and their successors.

WK: I thought you were discussing whether parody as an art form has a scientific basis.

PG: (laughing) That may be the case as well… The huge emotional and political upset that changed our ideas about the notion of causality indicates that time was never just a technical, engineering, or physics issue. It has always been related to mortality, or individual control.

FATE

WK: I understood the project when I realized that it was really about fate. Everybody knows that we are going to die; but the resistance to that pressure coming towards us is at the heart of the project. At the individual level, it was about resisting; not resisting mortality in the hope of trying to escape it, but trying to escape the pressure that it puts on us. In colonial terms, the refusal was a refusal of the European sense of order imposed by time zones; not only literally, but this refusal also referred metaphorically to other forms of control as well.

BLOWING UP THE MERIDIAN

PG: Exactly. The moment in 1894 when the anarchist Martial Bourdin decided to attack the observatory at Greenwich was a decision that, everybody understood, represented an attack on the supposed neutrality of time, the "zero time" of longitude, and the center of the colonial order. Conrad responded to the plot viscerally in his *Secret Agent*. Back then, the British cable system distributed time and information across the world; it was a planetary machine, with tens of thousands of miles of underwater and overland cables stemming from that one observatory on a hill, in order to map and control the empire. The material reality of that web that was drawn out and literally covered the world from a central point—here was an image that entranced both of us.

WK: There's a sense of time as something that's on a much larger scale, that is a much larger force than it is possible to comprehend. But it becomes humanized in the form of the Greenwich Meridian. So resistance to the certainty and arrogance of British control of the world then becomes something that you can tackle. You can't tackle the earth turning and the days passing and revolving around the sun. But resistance to British colonial arrogance becomes possible, because you're blowing up a meridian rather than blowing up the sun! Yet it also refers to other things, huge political questions, which are at the same time large-scale manifestations of privately felt anxiety or rage.

FOREGOING THE MIDDAY ZENITH

PG: One slogan that we came back to over and over again was "Don't take away our Sun!": this idea that, within your time zone, it would no longer be a local jeweler who would determine what time midday was for you by calibrating his best clock to the moment when the sun is at its highest point in the sky. Instead, clocks were fixed by signals travelling through telegraph lines along railway tracks, or submarine cables emerging from the sea. These electrical pulses fixed time to a central clock, ordering the world into 24 zones, each covering 15 degrees of longitude. It was a practical matter—useful for railway scheduling, mapping, weather prediction, and stock trading. But it was also a symbolic blow dealt to autonomy. On a large scale, an American Rear Admiral and director of an observatory bristled: why should his country accept British time—why not the other way around?

WK: It's a combination of things. On the one hand, there's this completely cosmic scale. When the sun in the heavens is directly overhead, that is the time that we call noon. We take our time from the stars and bring it down to the scale where it is incorporated within individual bodies, where your heart, lungs and pulse turn the body into a kind of a human clock, a breathing clock. The refusal of time

is an attempt to resist—although we know it is impossible—the spinning of the earth on its axis, the earth orbiting around the sun. But it also reduces time to a level where it's as though time were being invited to a dance, and time itself is refusing to take part: it is time that refuses.

PG: The intensity of that refusal is repeated elsewhere, in other episodes that have interested us throughout the project. When Einstein says, "There isn't a time, there are times"—suddenly, in 1905, people started becoming agitated about the idea that every moving observer has their own time. People had only just more or less adapted to the idea of a worldwide set of "mother clocks," and now they were hearing that there was no absolute time. The order of things was dealt another blow: your twin sibling could fly off then return later, decades younger than you.

WHERE IS THE UNIVERSAL TICK-TOCK?

WK: When Einstein said there is not one single time, there are multiple times, this was difficult to understand scientifically, mathematically or logically. How can it be that one twin ages at a different rate? But internally, this was so much closer to our sense of time being not Newton's single fixed-speed clock, but being bound up with psychological states, with excitement, fear, time expanding, time compressing, and with a memory of time being both extremely slow (like the passing of a year) and yet how quickly ten years pass. Destabilization, which was rigorously demonstrated through science, corresponds to the much less rigorous, but much more internally felt, instability of time.

PG: Einstein once said, "There is no universally audible tick tock." Once it had been settled that time would be distributed and made universal and absolute, there was something reassuring about Newtonian absolute time ticking away in the universe, in a way that each person could somehow learn to hear. Yet this clashed with our shifting intuitions about what time really was, and how we fit into this order.

STRING THEORY

WK: Shall we shift to the literal and beyond the literal? What came through the conversations was that the more science is discussed or explained, the richer its metaphoric associations become. That doesn't mean that the performance on stage, or the representation in films or drawings, has to be accurate—we are not trying to turn the work into a science lesson, where somebody comes to see it and understands, or can do a mathematical diagram of time. But every time something is explained more clearly or more specifically, the range of metaphors and associations and ideas multiplies. We hear about things not just disappearing into black holes, but also

leaving attributes of information in vibrating 'strings' around them. This suggests a whole series of possibilities relating to the literal and the metaphoric; and beyond this, the literal and the metaphoric and what they suggest in terms of their manifestation in drawings, film, editing, sound or sound games—how they also provoke their transformation onto the gallery wall or onto the stage.

PG: Yes. When we are really dealing with the physics of time—and this is true both historically and in the present—the stakes of what people believe about time are extremely high. Physicists, and indeed the public at large, were tremendously upset by this new Einsteinian idea of time; they were furious that their intuitions had been shattered by Einstein's ideas. But one of the things that Einstein insisted upon is that our intuitions are historically determined, they are constantly changing. What was intuitive at the time of Copernicus differs from our thoughts at the time of Galileo, Newton's time, or in the present time. Exploring the depths of these intuitions, and the shock of having them challenged, is something that we are trying to broach here, not through a pedantic exposition of the changing formalisms of time, but by thinking about how time registers in people, why it feels like the stakes are so high. Is all information lost when an object falls into a black hole? Or is some trace of that preserved? In recent years, this debate has preoccupied some of the leading physicists in the world, because it seemed to matter more than simply as a correction to an equation or a formal alteration of a term used to express entropy. In *Refusal*, we tried to enact these themes in myriad ways, from zoetropes and melodramas, to machines and music.

DUCK SOUP / PUOS KCUD

WK: You talk about twins aging, with one twin aging more slowly than the other —that disjunction, which relates also to the question of things being simultaneous. How do we know they are simultaneous? What happens when they start getting out of kilter? Throughout the project, I was thinking about *Duck Soup*'s association with Groucho Marx in the mirror. Is the mirror image synchronized with itself? Should this be staged with two actors performing against each other? Should it be presented as a film screen split in two, with two versions of the same person in time and out of time? Should we play on the idea of metronomes dividing the space, starting exactly in time and then becoming increasingly out of time? Can we use sound as a metaphoric representation of time? With sound, it's very easy to talk about things being simultaneous or non-simultaneous; it is very obvious when a beat falls exactly at the same time, or when a beat is syncopated or out of sync.

Through conversations, through listening and responding, we developed ideas for potential transformations into a material object, an installation, a performance, or a film. It's not as if there was first a scientific conversation and then an artistic one.

MAN IS A BREATHING CLOCK

PG: That's crucial. I remember one element that we pursued and that has manifested itself in the work in various ways. There's something that struck me as tremendously funny about the idea that there were these quarter-inch pipes underneath Paris that were pumping time and pushing air that would reset the clocks. We started thinking about this, and associating what it would mean to take this abstract notion of time and pump it through a pipe.

WK: At one stage there was the idea—because it's Documenta—that we would literally have pipes all over the building; that instead of pumping honey like Joseph Beuys did through Documenta, we would pump air. But this also made us think about the fact that a lot of the music would be based on wind instruments: tubas, trombones, panting people, megaphones. A sense of the body as a clock, the body as a musical instrument, the body as an engine; then there's a way of seeing the body as an engine and making mechanical bodies. We have a huge set of bellows, which starts standing in for the human lung—you see these mechanical bellows, but hear the panting of a human voice. This shifting backwards and forwards between the theoretical, the historical, the mechanical, and the human, forms the basic premise that each idea plays on.

PG: Breathing, time, communication and signaling were all things that we kept coming back to. When we thought about Galileo using his own heart as a clock in a church, as he watched a lamp sway back and forth, or Einstein talking about clocks and railroads and how to synchronize time at distant locations, we became intrigued by electrical and optical telegraphs that would send signals back and forth between themselves. I also remember thinking about Hector Berlioz, who dreamed of using telegraph lines as a way of conducting an orchestra by remote control. Pumps of air, signals created through electricity and optics, these became themes that we returned to again and again.

FROM HILLTOP TO HILLTOP

WK: The notions of remote control and telegraphs immediately made me think of signals being sent from hilltop to hilltop, relaying the message of the Fall of Troy: the idea of sending signals, transposing them and relaying them across the earth. So what started as a conversation at a personal level, also became a form of signaling. This developed into visual signals, semaphores and mechanical telegraph machines, which became machines that we could place on stage; then a duet between a person on stage and a mechanical object being physically manipulated.

PG: For performance, we have the element of drums banging away at a distance, controlled by remote control via a system of cables. There is a period that has fascinated both of us in our work prior to our collaboration. It is the late nineteenth and early twentieth century period, when the project of modern technology and science had begun, yet everything was visible, or almost visible. It was a time when you could almost see the mechanisms of things working—before they disappeared into a microchip, beyond our grasp.

ODE TO THE SWITCHBOARD

WK: It relates to an interest in nineteenth century mechanical technology, a mechanical switchboard, a pipe in which you can feel and hear the pulse of air being transferred. Nineteenth century technology rendered visible what are now invisible phenomena in the twenty-first century, such as the messages that are sent invisibly, by two hidden chips, when two cell phones make contact. The mechanical metronome of the eighteenth century can stand in for an atomic clock; they're doing the same thing: counting. One is visible to us and understandable mechanically. Our conversation set a series of images, machines, stories, and strategies of thought in motion. It was about every idea being manifested in some way: whether this took the form of a written text, a spoken text, a piece of music, an instrument, or a choice of mechanical objects. With this vocabulary of images and machines at our disposal, it then became a matter of constructing what was to become *The Refusal of Time*.

PG: In many parts of the piece, what exists now is the end of a long conversation, the result of a lot of thinking about time, and recording. We thought about using Morse code as a way of communicating information and signaling. We thought about the punched paper that runs the player piano, about using that as a way of signaling, encoding, recording, and transmitting something to a future time. (Traces of this remain in one of the film clips.) Another idea was to break up the story of the attack on the Greenwich meridian into five parallel stories, making their simultaneity visible, with each of these stories unfolding in different places—in the colonial war room, the clock room, the observatory, and the anarchist fort—with each story progressing towards the final explosion, then showing things flying apart after the explosion.

THE ROOM OF FAILURES

WK: Inevitably, there are ideas that have disappeared somewhere along the line. Some of these are presented in our "Room of Failures": the non-existent part of the exhibition that could have been filled with everything that did not make

it into *The Refusal of Time* in the end. Things that are in a limbo, not necessarily "The Acceptance of Time," but not part of *The Refusal of Time* either—a theoretical and artistic limbo. At one stage, I thought that if we had two tubas, this could represent pneumatic air. That was a failure, because even with the best engineers, we were unable to get a good embouchure out of rubber and pneumatic air—we could not obtain anything of interest from these tubas. The two tubas that we bought for the project testify to what we were unable to do. Nevertheless, the big breathing apparatus and the live tuba playing in the performance piece take this element further.

PG: I remember one object that we considered for the museum of failures. It struck us as immensely funny that the very carefully selected Paris-standard kilogram K, was actually losing weight! This was discovered rather recently, in the midst of our project. This pure one-kilogram weight had been chosen to control all the weights in the world. It was buried in a special chamber in Sèvres, with "controls" all around it: identical copies that would serve to show should anything untoward happen to K. I calculated how long it would take for K to disappear entirely. It would take about half the age of the earth, 2.4 billion years, if I remember rightly—and we thought about we would have a beautiful bell jar with nothing in it, that *that* would be the pure kilogram in the distant future. We began to think about other potential candidates for pure standards—such as the idea of placing a standard cat under a bell jar. This got us thinking about a kind of museum of Plato's heaven, where ideal forms would be housed: an ideal cat, an ideal bicycle…

THE PLATONIC CAT

WK: As you say that, it reminds me that this room of failures is still worth doing. It's something that could still be made: an exhibition of bell jars of Platonic objects, the Platonic coffee pot, the Platonic cat, the Platonic typewriter —as a joke, but also as a way of refuting the idea of there being a perfect example. It is a relief to discover that the Platonic kilogram is unstable rather than perfect. The main question of the project, in the experiments arising from our conversations and in our whole strategy, is, basically, do we evoke a sense of a resistance to time, resisting all the things that people see at the moment they see them? In the end, it becomes very much a question of fate and our futile attempts to resist it. It becomes a work about regret. When people enter the black hole in the last scene, a question is posed: is this the dance of death into a black hole? Is it a slow death march? Even now, a month before the project is due for completion, these questions will be tested in the space as we install the different elements and finally bring it all together. No doubt the final meaning will only become clear once it's completed—when it is too late to change it.

PG: Everything about these turn-of-the-century technologies is a kind of memento mori: the black-and-white melodrama, the cutouts, the big mechanical machine, the pneumatic pipes. We discovered things by testing them many times. It's also very appropriate that a work about time is a time-based piece, that this is something that will take place in roughly 30 minutes. I hope that there's a combination of the chaos of time, things happening simultaneously, that are hard to single out, hard to coordinate, and yet leading somewhere—leading up to the final march of the silhouettes towards the black hole. Is there some final trace left to us when an object falls into a black hole? What remains when things come to an end?

WK: It started as an open-ended conversation. I was interested in the pre-history of relativity, and we met because you've done work on Einstein's clocks and Poincaré's maps—and it has always been linked to a topic, but it was open-ended. I am not yet certain what the work will ultimately express, but that is not the same as saying that it has nothing to say.

PG: It is crucial to understand that it has never been our goal to do something that is simply a scientifically accurate art piece, or an illustrated piece of science. From our first conversations two years ago, we were immediately plunged into an evocative, emblematic way of looking at this material nature of our confrontation with time. Time is in some ways the most important thing to us: life's struggle against death, and the anxiety that surrounds our hope for our memory to allow us to live on after our death. Yet these vast metaphysical questions somehow relate strongly to pumping air through pipes and signaling with clocks—or to the rhythms of the body and music. This impossible combination seems evocative to both of us: something altogether built into the world as we experience it, and something completely ethereal about our nature as human beings. That conversation has kept driving us forward.■