

2008 TCG National Conference

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“Theatre in the Environment”

Dr. Alexander MacDonald

Hosted by Paula Vogel

Chip Walton:

Good afternoon everybody. My name is Chip Walton. I'm the Artistic Director of Curious Theatre Company, here in Denver. It's been a real pleasure to have you all in our community. And I hope you've had a good time, we've certainly had a good time having you here. I am here to welcome you to "Theatre in the Environment," which is TCG's final plenary session of this year's conference and I'm honored to take just a few moments to introduce the host for this afternoon's session, Paula Vogel. Playwright Paula Vogel is the recipient of countless awards and fellowships. Her play *How I Learned to Drive* won the Pulitzer Prize in 1998 and has since been produced all over the world. We have produced Paula at Curious three times in our ten-year history. She was the playwright-in-residence at Signature Theatre for the 2004-2005 season and Paula has been the director of the MFA playwriting program at Brown University for twenty-three years. She will leave that post in July to become the Eugene O'Neill Chair and Director of Playwriting at Yale University and her new play, *A Civil War Christmas*, is in development by Long Wharf Theatre and The Old Globe and will be produced at the Long Wharf in November. On a personal note, I just want to say that I'm sure I'm not the only person in this room whose artistry and career has been profoundly shaped by Paula's wisdom and support. I'm equally certain that my organization, Curious Theatre Company, is one of many organizations represented in this room that exists and thrives today because of her belief in our vision, her support for our work and her advocacy for our success. In my estimation, Paula has been perhaps the most influential and nurturing artist, teacher and mentor for an entire generation of theatre artists, including myself. It's an honor to introduce Paula Vogel.

[Applause]

Paula Vogel:

Thank you. It's a great thrill to be introduced and to be on the stage with Chip again. I've had an extraordinary time – every time I step off the plane in Denver, and I'm not talking about the altitude sickness, I'm talking about the high of working with the artists at Curious Theatre. So, it's a great pleasure to be hosting this session. I just wanted to talk just a few seconds, though, in terms of thoughts as we enter this and thoughts I know that you must share as well. I don't know what age I was when I first read the short story "All Summer In A Day" by Ray Bradbury. If I might recap the plot very quickly, it's a play that takes place in the future on Venus where there is perpetual rain, except for one day every seven years when the sun comes out to shine for an hour. And in the short story there is a young girl who is seven years old and who left Earth to emigrate to Venus at an older age than her classmates. Her classmates are five years old and they were born on Venus. But this one little girl, Margot, has memories of sun on Earth. And so she's made - there's a lot of mockery at Margot's expense by her

classmates, who at age five have never seen the sun. But this particular day, they're all excited: their teacher is going to let them out at midday and the perpetual rain will stop and the sun will come out for an hour. And with the unthinking cruelty of children, her classmates lock her in the closet and go out on the playground and they forget about her until the rain starts to fall again.

I think about this short story often. I think about it particularly at the end of every ten months when I stumble forth from the black box theatres, underground where I've spent my year, and I emerge, blinking, into a summer sun. One of the things that is very exciting about the next two hours that we will be spending together is that we're going to be examining in different ways, I think, three basic skills that we need at this moment in time in terms of facing the climate change which is upon us and all of us are here from different parts of the country and we're experiencing this climate change. Those who were flying from the east, unable to do so; those from the Midwest who are experiencing the rains; parts of the country in Georgia in drought: all of us know what is upon us, but what do we do in terms of facing changing the climate change?

It seems to me that we need three things. One thing that we need, which we have, is the imagination to visualize the future, the ability to use creative gifts so that we can feel what the world will be like for our children's children. We secondly need the ability to observe the changes that we're facing every day; the gift to examine rather than evade, what is happening right under our noses, what we are doing on a daily basis, with the unthinking cruelty of children to our planet. And lastly we need the gift and the belief that I think in this conference we are, right now, examining, but the belief that we can work collectively to slow the dire changes before us and to make different choices globally in our energy consumption. Now, today we're going to hear in many ways from, I hate to say, the both sides of the brain. We need both sides of our brains to talk to each other. So, first we're going to have this thrilling opportunity to hear an internationally renowned scientist who has been using his gifts as an artist to impart the urgency to visualize and to examine and analyze. I'll come back out and tell you about the second part, where we have the extraordinary honor to hear new plays from emerging playwrights who have been working with scientists to visualize and to examine. So it's a great pleasure for me to introduce to you Dr. Alexander MacDonald, a.k.a. Sandy, he told me, who is often described as a visionary scientist. He's been with the National Oceanic and Atmospheric Administration (NOAA) in Boulder since 1973 and he has made countless contributions to our understanding of the science of weather and climate. He currently leads the Earth System Research Laboratory at NOAA, he serves as Deputy Assistant Administrator for Research and he has worked with Vice President Al Gore – Gore on The GLOBE Project.

[Laughter]

See, we're already to the aka Al Gore aka Globe, which is what we're thinking right now at this moment in time. He's worked on The GLOBE Project and this earned him the distinguished Presidential Rank Award in 1998. He confesses to being an avid arts fan and a piano player with a fondness for the American musical and he's also an inventor.

I want to talk to you about two things, though, that may not show up in some of the biographies. When I talk about Dr. Sandy using his skills and gifts to examine but to visualize and to help us visualize, he has a passion as an educator that's remarkable. He invented and visualized something that's called Science On A Sphere, which used advanced media projection technology where viewers can watch satellite data and other visual effects on a globe and as viewers, we can watch hurricanes birth and we can watch the subsequent race across the ocean. Dr. MacDonald has said, that he wanted to do this, he wanted to get students interested. This is the way he thinks science should be taught, to get students interested in learning about the Earth's environment. And that drive, that passion, to have that urgent communication with students lay behind the conception of Science On A Sphere. Educators and scientists can use this technology to get a true picture of how Earth's atmosphere and oceans are changing. So it is with a great privilege and pleasure to introduce to you Dr. Alexander MacDonald. Thank you, Sandy.

Dr. MacDonald:

It's hard to come out after a buildup like that but I did get a few new lines: I worked for AI Globe on the Gore Project.

[Laughter]

I learned a little bit. And actually, my job today is to try and depress you.

[Laughter]

You know that if people come out of the movie and they're crying, three hankies and all that, that it's gonna be tremendous box office. So if I'm successful here today, you're all gonna be wringing your hands and sorry tonight. However, it's kind of not in my nature – I've always been an optimist and I think the keys to the future are really with us, and I mean the collective "us." If you look at American history, and I'm gonna come back to this, and if you look at World history, it's really the performers and the muses that are our leaders, our opinion leaders, and so I'll come back to that because I think the purpose for coming here today is to talk to the people who really do talk to the people.

I call this talk "A Choice for Civilization." There's a wonderful book by Jared Diamond, a really profound scholar in my opinion. And what he said in that book called *Collapse*, is that civilizations and societies choose their future. And we all know that we chose our own future. If you could have a time machine and go back to when you were sixteen or twenty, you might do a few things different, maybe you'd say, "Boy, did I make a right choice." Most people have a few of those. I think that come the year 2100, people are gonna look back on our time and say, they made a choice for us and it was an incredibly important choice. And that's really what I'm gonna talk about today is, about what that choice is.

I like to start off with a visual. And this visual is pretty spectacular in my opinion. We're looking at the Earth from the North Pole, but we aren't looking at it with our usual visual eyes, we're looking at it as the NASA CMWF satellite sees the earth. And what we see is a ring of ice around the North Pole and surrounding that ring of ice is a – let's see if I can get my laser pointer here. I always demand a laser pointer that's strong enough to vaporize anyone who is not with me in the audience, so –

[Laughter]

This one is, a little – everybody's forewarned! [Laughter] So what we have is a ring of ice and then we have a ring of life. And the life is easy to see in the forests. And these great forests have huge amounts of carbon and I'm gonna come back to that, because that carbon is important to us. But here's an interesting thing – you notice this green in the ocean – that's actually the ocean life. And you notice that there's this ring of deserts and a ring of blue in the ocean and they're right in the same ring. That's actually the ring of deserts. These blue areas are the ocean deserts. So what we see with the Earth is that based on the mix of warm and cold air, it basically has areas that are very abundant in life, including all of our fisheries and our agriculture, and it has these huge areas that are really hostile to life and you can't grow food. And just to give you sort of a preview of where I'm going, I think that's the key issue. People talk a lot about, "well, it's gonna get a little warmer and so on, I always like it a little warmer—"

[Laughter]

But, if it was a little warmer and you didn't have any food – that's a different story. So, that's something for us all to think about. So this is one of the marvelous tools that our scientists, including the scientists that I work with, am privileged to work with at Earth System Research lab, is the ability to survey over the entire earth, the life of the earth. This is a diagram of something that's happening in the west and what we're looking at are two things: one of them is temperature from 1950 to 1977 – a little hard to see this one [referring to diagram], it turned blue on me, which I'm gonna blame on Bill Gates, but what we see here is that the temperature rises - and these are in degrees centigrade - these bigger circles are temperature rises over most of the west that are averaging now about 2.7 degrees Fahrenheit over the last thirty years. And here is the change in the frost dates. So this is the change in the growing season, and if you look at this chart and think about it a little, there's a couple of blue dots but this is definitely a trend. Not just western United States, but the entire States; all the oceans and all the continents are partaking in a significant temperature rise. And I'm gonna make this a little local since we're in the west and show you a couple results of that.

If you go up to Grand Lake, which my wife and daughter went up last weekend, what you find is this beautiful Lodgepole pine forest that's all dying. Why is it dying? It's dying because it's warmer. Actually, in the Colorado high country we're pushing three degrees Fahrenheit warmer. And the Lodgepole pine, essentially, are being attacked by the pine beetle. The pine beetle hates cold, so a good thirty-five to forty below for a week and the pine beetles start at ground zero. Unfortunately, we haven't had that. Not

only that, this long warm season is allowing them two-fold seasons. This forest, the Lodgepole forest, to me is one of God's great creations. It starts in Colorado, it goes all the way to northern British Columbia. And these things are cyclical. There have been pine beetle in the past but there's a fairly big worry: a recent paper in the magazine *Nature* talked about whether this was really the end of this forest. I gave a talk to some people who are part of the National Forest Service. And you know they weren't very – you know, it wasn't a crowd with a lot of humor. I don't know what it is. I said, well, you know, don't replant Lodgepole pine; go down to northern Mexico and find some scrubby little Ponderosa, plant that. And they're thinking about this – millions and millions of trees that are so beautifully adaptive for the last million years. So that's maybe why they didn't think it was funny. And it's not funny. The change that's taking place is faster than nature can adjust. If we replant Lodgepole, how well are they going to do if it's three degrees warmer than this? So these are the kinds of questions that we're addressing.

As I said, I'm privileged to work with a group at Earth Systems Research Lab in Boulder. In fact, I'm one of the lesser lights. [Referring to slide] This is Susan Solomon here and Susan's office is about five doors down from mine. And every once in a while, I bring her coffee and try to make her happy – pillow for her feet and so on. Susan was the leader of the Intergovernmental Panel on Climate Change Working Group I. I think Working Group I totally changed the world on February second of 2007. They essentially announced that the argument is over, climate change is taking place and the results could be very profound.

[Referring to new slide] This is Susan with some of the scientists from Earth System Research Lab being congratulated by the Secretary of Commerce. So, we're very proud of them and knowing Susan like I do, I don't think there's anybody else in the world that could've gotten this through. In the end, this document is approved by 135 governments, word by word. So everybody says, well what does the Bush administration think? The Bush administration approved every word in this document.

So, what did they say? They said two things I think that are really important. First of all, the warming of the earth is unequivocal. Susan said they got up and they said unequivocal – that's an English word and they translated it into Chinese and the Chinese liked it, and they translated it into various languages. But they got to French and they translated into French and one of the French West Africans jumped up and said, "It's a terrible word!" I'm not sure if he said that in French or English, but anyway, he said it was a terrible word. And the representative from France, stood up, puffed himself up and said, "It's the exact right word." So we ended up with the word "unequivocal" for climate change. It also said, greater than 90% chance that it's due to humans. My own take: a lot higher than that – there's no question.

So, that's what they said about the past. What did they say about the future? We have some pretty extraordinary people who've worked on these for decades. I am in charge of all of NOAA's labs and one of our most important works has come out of the Geophysical Fluid Dynamics Lab in Princeton, New Jersey. And they and eighteen

other modeling centers around the world are looking at what's gonna happen in this century. [Referring to diagram] And this is a depiction in color of the temperature changes in this century. A couple things to notice. One of them is, that's a degrees centigrade, so if you want to make that into Fahrenheit, you double that. So it says, well, looks like places up in the Arctic are gonna be twenty or twenty-five degrees warmer and the continents are gonna warm a lot more than the oceans. So a key point is not so much what's gonna happen to the whole earth, which you hear all the time. Everybody says: "Well it's gonna warm three degrees." Well, that's three degrees centigrade – three degrees centigrade makes it six degrees Fahrenheit and then you add another fifty percent for continents. So what we see here is, the U.S. is gonna warm nine or ten degrees in the middle-range scenario. And that brings up the really important question, what is the sort of maximum and minimum that's possible? The minimum that's possible is something that some of the skeptics like to point to: they say, well, it could be as little as three degrees. However, they probably don't talk about our best estimate – and this is a recent paper in science that essentially says, yes, and it could be eighteen degrees Fahrenheit, ten percent chance, over the U.S. Is that important? I should think it's important if we want our children and grandchildren to live in a world where they can produce the food and other sustenance that people need. In other words, sustainability is the issue here.

[Referring to next slide] I'm not gonna spend too much time on this but this goes to an idea. What we have here is a graph from 1900 to the year 2100. And what we see are these things called A2, A1 and so on and they differ; so they start off the same and they differ. Those differences are our choice. Those are – those scenarios – are how much carbon we put in the air. If we put in, if we double the carbon dioxide, we end up here going up and going strong. And so the main point is, I started off by saying we have a choice as a civilization – as a civilization, I don't mean the U.S., I mean the entire world – and that choice as a civilization is really gonna be determined by how much carbon we put in the air.

I'll say a little bit more about that. So the temperature's probably gonna rise ten degrees Fahrenheit over the U.S., this century, unless we do something pretty serious. That's about a degree Fahrenheit per decade. That's about what we've been doing. We're up at 2.7 degrees here in Colorado. What about precipitation? Again, this map shows that the subtropical deserts – now I want you to think about the original picture that I showed you: you have the ring of life and then you have the ring of deserts. So what this picture shows is our best models – these are the consensus of all the models – our best models show that these deserts expand northward. So if you're living near Hudson's Bay, don't need to worry about the desert. If you're living in Colorado or Atlanta, Georgia or places that are, you go about five or eight hundred miles south and you're in desert like we do here when you go into northern Mexico, then you do need to worry about the deserts, cuz they're gonna move north. So our models are not as skillful in this but the combination of a lot hotter and a lot less rain in summer is one to contemplate when you think about how well the crops and your grass grows.

So warm is good. Why are we worried about it? [Quoting New Yorker cartoon]: “Long term I’m worried about global warming, short term about freezing my ass off.”

[Laughter] I had to put this in here because my whole childhood, my mother got the *New Yorker*, I was in a little town in Montana, and she says, there’s two good things in the *New Yorker* magazine: one of them is the quality of the writing and the other is the cartoons and probably, at the time, I liked the cartoons the best, so I wanted to get this one in here.

[Referring to new slide] This is agricultural production. And if you look at what’s feeding 6.7 billion people today, what’s feeding 6.7 billion people today are these green areas and these yellow areas. So, we see that there’s a huge amount of food being grown in eastern United States, in Europe, in China and India, and a significant amount of, if you look carefully at the thing, a significant amount, but less intense for South America and Africa. In other words, if you’ve gone there, you realize that the surplus that’s feeding a lot of our 6.7 billion is coming out of the mid-latitudes. The mid-latitudes have the soils and the extraordinary endowment of rain and the right climate. So we’re not being fed from everywhere. What we’re curious about is what’s gonna happen as these climates change and if you think about that a little bit, what we see is that -- in fact, I think I’m gonna go back and just show you this cuz I think it’s pretty striking. You notice how terribly dry Europe gets and southern United States, even all the way up over most of the United States, so some of our most productive areas are those areas where most of the food is being grown. So a change in climate, in my opinion there’s a lot of things to think about; sea level rise, that’s very important and many other things, the change of the vegetation, the change of the ecosystems, if you take the high latitudes, one of the points I wanted to make about that first slide, is that it takes probably a thousand years for these ecosystems to adjust. So you’ve got the seals and the polar bears and the fish of the high Arctic, it’s going to be hard for them to adjust to a rapid change. But it’s going to be hard for the humans to adjust to a life without much food too. So that’s the purpose of this one.

[New slide] Now this is my other slide I’m blaming on Bill Gates; that is, it’s supposed to be a movie but I can’t show you the movie because we tried everything beforehand, including switching computers, but that just means I’ll get to describe it to you. So, this movie goes from 1765 to 2100 and what it shows is a huge change in the oceans. Now if you think about it a little bit, we used to say, “Boy isn’t it wonderful, we put out all this CO₂ and half of it goes down in the ocean – we don’t have to worry about it!” Well as it turns out, it goes into the ocean and makes the ocean more acidic. And we really didn’t – this is amazing to me, it just shows you how dumb the scientists are – we really didn’t figure this out until about ten years ago, and the best papers have come out in the last five years. So if we saw this movie, what we’d see is through this period, we’re already twenty percent more acidic in the oceans and we’re headed toward over 100 percent more acidic, so if you think of the pH scale it’s a long scale and it’s got a long ways to go, but what’ll happen to ocean life? What most people agree is that it’ll be a big change in ocean life. There’ll still be ocean life but jellyfish are not a very big plate for the seafood restaurants, so unless we want to eat jellyfish we should think about the acidity of the ocean. Why is the ocean acidic? As that carbon goes into the water, it

creates something called carbolic acid. And so the carbon that's there – and people have called this the other half of the global change problem – so people have great ideas about how we're gonna put up, you know, a big screen - NASA's gonna put up this big screen and screen away part of the sun. But that wouldn't change the amount of CO₂ going into the ocean and making acid. So I don't think there's any easy way out of this. I personally believe that we're not gonna get rescued by geo-engineering; I think we're gonna have to deal with the problem.

How much time do we have? What does it take to do something? [new slide] Here's a graph that I'm gonna show you next that we had a carbon dioxide conference. The Mauna Loa Observatory that is famous has been taking observations since 1957, and we had a big meeting, a scientific meeting to talk about it at the 50th anniversary. And a graph that was presented is this graph and without going into it too much, what they did – they did a couple of tricks. They started at our pre-industrial value. We know that about a few hundred years ago we had about 278 parts per billion of carbon dioxide; that's how much carbon was in the air. And so they started with that as a baseline and they put it on a logarithmic scale so it would be a straight line and what they discovered is that everything that's happened over the last fifty years has stayed right on that line. So that's the kind of math that I like: you just draw a straight line and see where it hits a doubling. And the answer is: it hits a doubling in 2050. 2050 – that's a key thing because when we say, "How much time do we have?" what we're talking about is we're on this freight train and it's headed toward a cliff and I think that cliff is pretty well represented. If we get to there, I would say the pictures that I've shown and the things that I've talked about are gonna be hard to deal with. In other words, I don't see if we get to 278 x 2, 556 parts per billion; if we let it go till then, we're in big trouble.

As I said, I'm an optimist. I've had the privilege to testify in front of John Kerry, just a few weeks ago, and the Congress, in its inimitable way, is working on this issue. And it takes time and if you go back in recent history, the Clean Air Act took three years to come up with a good bill and they came up with a pretty darn good bill. That's why the cities are a lot cleaner than I remember in my younger days. So there is hope. And I think we see the American political system moving along and both of the Presidential candidates have said this is a priority with them, which I think is pretty exciting. I'm hoping that we really will deal with it.

I see it as a fairly simple to state but difficult to do: create a carbon-free global economy. [Referring to slide] And you'll notice I have a nuclear plant here – that's carbon free – a coal plant where they sequester, we've got the solar thermal, which is actually quite economic already – those of you who drive past **Marstove** see that plant out there that's been there for twenty years. Photovoltaic has got probably another ten years and unfortunate[ly], to get some wonderful briefings from the National Renewable Energy lab here in the Denver area, it's out by Golden, and they're very excited about the photovoltaics. And I think the key to the photovoltaics is that it's gotta be something that you can put on your rooftop or put in small areas. And there is a, a real key is when people can do something themselves, they don't have to wait for the power company to go buy a big network of wind turbans, but they can do something themselves. So, if you

look at photovoltaics, they've come down a factor of two about every four or five years, they're twenty-eight cents per kilowatt hours. I mean, I'd love to see that down to fourteen and become really competitive. And that's a complicated thing, all the economists go through all this stuff –

Q – Could you tell us what photovoltaics are?

Yah, I'm sorry. In fact, I went over this, trying to think, ok where should I cover – the photovoltaic is something made out of silicon and when the light shines on this, it generates an electric current. So it's a little power generator and of course, those of you who looked at your hand calculators over the last fifteen years, you sometimes see those little dark cells – they're actually generating electricity from light. So the whole idea of the photovoltaics is that you can have these on your roof and it would generate power – and this is sort of an idealized scenario, down in your crawlspace you'd have all these batteries and the photo – when the sun shines it charges up all these batteries and these batteries are super-efficient so it doesn't take up your whole crawlspace, it leaves some room for your junk. Not only that, that there's enough of it that the sun shines and it fills up those batteries and at night you plug in your electric car so when you drive in the morning, it's basically using energy that was created by yesterday's sunshine. So, there's some very exciting technology that's possible. As an optimist, I believe we could do this. As a realist, I realize that people who say it takes literally generations to turn an energy economy around, I realize that this isn't going to be easy.

But there've been things in the past in human history and I'm gonna talk about one that is really important to me, and that is the human history of the United States in the 19th century, in the 1800's. There's a lot of good history, but a couple examples that I've read recently that I really think hit it, particularly the James McPherson history of the Civil War where he talks about the lead-up to the Civil War. And the example from history that I wanna make is this: if you basically did a poll of the U.S., a Gallup poll in the 1840's, there's no way that you would believe that the United States was going to deal with the issue of slavery. It was so deep in U.S. society and it was so ingrained, there's no way we could deal with it. If you took that poll again in 1860, there was a large part of the country that had converted, and they had converted because of the leadership of the opinion-makers. So that's really why I said I was here today and that is, I think the opinion-makers are not those that write learned tomes and those that do scientific papers. I think the leaders are you all and the people that you work with, because the public culture and the messages that people get -- whether it's a television show or a play or in the case that I think, are scientists trying to be able to convey it – I think that those are the ways that we're gonna show people the importance of this issue.

So what can we do?

[New slide] This is Science On A Sphere and it's something that I came to about twelve years ago. I was just driving home and I thought, you know, if we're gonna show people what's happening to the earth, we can't make it abstract. You can't have graphs...

You've actually got to have some little Earth that just floats in front of you, and that you can see what's happening now. Since I couldn't make a moving picture of the other one, I didn't even try on this one. This one actually moves and you can do things like look at a hundred, 600 million years of continental drift. What's really interesting is, you look at these models, and you can look at life over the earth, and you can look at how the ocean distributes it, and you can look at how that changes and show people how this greenhouse gases are actually changing our whole atmosphere, and changing the life on it, and changing the food producing potential and so on. In other words, we live on one little dot – a beautiful dot that floats there – and it has this extraordinary properties. This is a springtime picture; we know that because the sun is shining up north. We see the shallow seas by the Grand Bahamas with the light blue there. We see the Amazon rainforest. I was fortunate, some years ago, to go there with my son and my brother. And this is our endowment, this beautiful planet, and the idea of Science On A Sphere, which is now in twenty-seven museums and is gonna be seen, we think, by 12 million people next year, and the idea is to show people what our globe looks like, right in front of you, small enough to relate to and watch the changes of the life and the other aspects of our planet. And I think that's a key.

But this other key is the leadership of people like yourselves, who write plays and who think about how to convey to the world – we're gonna see a wonderful example of it in just a few minutes – these great issues that we're facing. So I've talked about how important it was that national opinion and world opinion, no matter how ingrained you think they are, if they're presented right they can change. And so I'm gonna go back to that example. It seems like almost everything, Lincoln said the words better than we can, and so I'm gonna do two quotes from Abraham Lincoln. One of them was, he was talking to the Congress, December 3rd of 1861, he said: "The struggle of today is not altogether for today; it is for a vast future also."

Think about that – here we are in this future, not so far from Lincoln's time, where the two Presidential candidates include a Black American. I think that the prescience of the people back then in dealing with this kind of a problem is exactly what we face; we have to make this choice for civilization, and it's not just for us, it's for the future.

Here's the second quote from Lincoln. This is a speech that he made about the Emancipation Proclamation:

"Fellow citizens, we cannot escape history. We will be remembered in spite of ourselves, no personal significance or insignificance can spare one or another of us—"

Can't spare me, can't spare you.

"The fiery trial through which we pass will light us down, in honor or dishonor, to the latest generation."

Lincoln's words to the Congress on the eve of the Emancipation Proclamation.

I think that's where we are. We have a choice to make for civilization. The tools are in our hands – they're not in politicians' hands, they're not in other people's hands. A change like this has to be a change in the minds of the great majority of people and our job is to use our talents – our God-given talents – to try to help that change to take place.

Thank you very much.

Paula Vogel:

Thank you very much, Dr. MacDonald. We'll have an opportunity to talk with Dr. MacDonald in a few minutes. It's now my great pleasure to introduce you to this next segment. And I want to tell you about Curious New Voices. A couple of years ago, when I was in town for *The War Anthology*, I got the opportunity to spend some time with the Curious New Voices, which was absolutely spectacular, and I am continuing to work now with a young playwright from Denver as a result of this program. Curious New Voices is Curious Theatre Company's youth playwriting program and it's now in its fifth year, and the program has grown to include a series of plays on climate change in collaboration with EcoArts. And I understand that Marda Kirn basically commissioned the plays that we're about to see. Curious New Voices has done summer playwriting intensives, school-based playwriting programs, ten-minute companion pieces to a chosen mainstage production and once a month, a drop-in writer's jam. It's a very exciting group. We're pleased now to present two plays from the New Voices project: *The Ten Billionth Baby* by Bailey Williams and *Solace in the Heat* by Luke Slattery.

THE 10 BILLIONTH BABY

By Bailey Williams

9/30/07 Draft

A woman, MAGPIE, early 30s, is onstage alone. She holds a box in her hands, filled with clippings and old pictures. She is worn.

MAGPIE

My baby got a big to-do when he was born.

You'd never think.

Small town in the Midwest.

He wasn't part of septuplets or nothin.

Just a little baby boy.

(Searches box.) I've got an article here.

I save things.

My husband calls me Magpie.

I've got drawers full of clippings and photographs.

I'd recycle. But you know how it is.

Memories are precious.
(*Pulls out slip of paper.*) Here. This article.
They called him the “10 Billionth Baby.”
(*Shows picture.*) Here’s a picture of him.
6 pounds, 11 ounces.
See all that tufty red hair?
He gets that from me.

He brought a lot of attention to the town of Chester.
I’m nothin more than a house wife.
He has a sister, older by a few years.
I took care of her most days.
I gardened like I was supposed to. I didn’t drive too often. I was energy-conscious, like any good housewife.
I took my pills.
I took one pill a day. Never missed a day.
I know because I mark my pills down every day in my calendar.
I was scared to miss.

When he was born, my husband drove me to the hospital.
My baby came fast.
I was worried we’d have him in the car.
We made it though. Just about ready to pop, but we made it.
I had my baby at 4:35 in the afternoon, with a couple of seconds.
I’ve got the birth certificate somewhere.
I stayed at the hospital for two days before they came.
I was holding my baby.
“The records have been processed. Your son is the 10 billionth baby.”
That’s when I got scared.

I saw on the internet that they were lookin for the baby that would push us to 10 billion.
I didn’t think it would be my baby.
I didn’t have a reason to.
But suddenly the government was lookin towards Chester and we weren’t ready to have them look too closely.
Things have gotten strict.
Don’t think I’ve been ignoring the regulations cause I haven’t.
My carbon footprint is small, real small.
I registered all of our emissions online like I was supposed to and we been very conscientious.
It’s just in Chester, it’s a bit more simple.
In the city, conditions are bad.
Real bad.
They got mask days, I hear.
Days where the air gets so bad you got to wear a little blue mask just to be safe.
I’ve seen pictures. I don’t want to wear a little blue mask just for breathin.

That's why Chester's good.
We're responsible.
We've got our share of problems.
But we can do all the breathin we want.

First glance, all of us in Chester are model citizens.
We got our solar panels up, people bike places.
It's hot, but we bear it.
We check the news for regulations and we comply.
I have my garden.
I can feed my family, which is more than most can say.
But we got secrets in Chester too.

Chester don't follow one rule.
Just one.
It's a rule we disagree with.
We know we got to make sacrifices, but this sacrifice is cruel.
Makes me shake every time I think about it.

My first, my Betsy.
(Shows picture.) This is her.
She was born 8 months after I got married.
My mamma wasn't too pleased about that bit of math.
But havin Betsy was the best thing I ever did.
She was the sweetest little girl.
I had outfits and outfits and I read to her and her favorite toys were the building ones
and I told her every thing that I remember about the world so that she won't think it's a
fairy tale when she grows up.
She'll know her mamma was there to see.

When Betsy turned two, I started missing babies.
All I wanted was to hold babies and play with babies, but Betsy wasn't a baby anymore.
She became a small person.
I still loved her of course.
But two years with a baby isn't enough.

So I started praying.
I've never given God a second glance in my life but I started anyway.
I figured I'd make up for lost time.

I'm not brave like other women.
I have a hard time not obeying the rules.
It makes me feel safe. I understand rules.
So I couldn't stop takin my pill, every day at the same time, because I don't want to ask
for trouble.
Best to keep your head down.

But I look at the back of the box and I see 99%.
And I start to think, and I start to convince myself that if God wanted me to have a baby again and if God knew I wanted babies in my life for all the right reasons and that I would care for my baby and I would garden extra and I would never take my car out again just for a baby that I...
That maybe I'd get that 1% chance.
Maybe I'd never have to break rules like all the brave women.
Maybe my baby would come to me by himself.

I tried so hard trying to think a baby into existence.
I tried for 2 more years.
And I hated God for not listening to me.
If there was a God to hate.
And I hated the government and I hated my husband and I hated my pills.
But one day, while I was gardening, my alarm went off.
Time to take my pill.
I took out my pink package and I popped out every single pill.
One by one.
And I buried them like seeds.
I hated the rules too.

6 months later, I was pregnant.
I didn't tell anybody.
I was so happy to know my baby was coming.
I wore baggy sweatshirts and I told my husband I was tired.
But he found out soon enough.
I didn't have to worry about breaking the rules with him.
He didn't care. He was happy too.
Chester was happy for me.
They'd broke the rules too, many times before.

My baby was a spring baby.
Spring for hope.
My garden stopped growing.
I was worried.
But I hoped.
And my baby came. He was so beautiful.
6 pounds, 11 ounces.
Tufty hair that he gets from me.
No complications.
The Chester doctors don't ask questions.

But then they came in.
"The records have been processed. Your son is the 10 billionth baby."

They took pictures and they asked questions and sooner or later, they found out.

My son was the 10 billionth baby.
But he was also the second.
10 billionth is better than second.
Second means you've broken the rule.
Second means they can take your baby away from you.
The No Child Left rule.

They started investigating Chester.
They counted children on calculators.
We had 76 seconds and thirds and even fourths.
77, including my new baby boy.
And they began taking them away.
It was against the rules.

No one knows where they take the seconds and thirds and even fourths.
An orphanage? Another country?
No one in Chester knows.
We were all born first.

My baby boy had come fast into this world.
We almost didn't make it to the hospital.
I was afraid I'd have him in the car.
Now I wished he'd been born earlier.
I wished so much that he'd been born at 4:34.
Or sometimes, even not at all.

I dug up my pills.
My garden started growing again.
My soil is trying to give life again.
Life to 10 billion people.
I tried to give life to two.
But I cannot sustain.
I cannot sustain.
The earth cannot sustain.
Despite everything.

The night before they were supposed to take my baby away.
My 10 billionth baby.
I sat with him.
He didn't have a name yet.
Just 10 billionth baby.
I rocked him back and forth. I kissed him. I changed his outfits and let him fall asleep in my arms. I told him everything I remember about the world, so he wouldn't think it was just a fairy tale.
And then I put him to bed.
Face down.

And I prayed to God.

(End of play.)

[Applause.]

Solace in the Heat

By Luke Slattery

Scene 1

THE DREAMER

I've always wanted to go to India. When I was a kid, I used to dream I had wings. I used to believe that things of the mind, things like memories and hopes could have their place in reality. I used to fly, everyday, to some foreign land. I like to think it was India. I would sleep through whole nights, walking down indiscernibly beautiful streets. And I would smell things. In my dreams I would smell things. Scents so strange, that they could only be akin to the streets through which I walked. And as the moon would fall over the fingertips of streetlamps, so would the sun rise in my world, and I would fly back. When I awoke, I would tell no one of the place I'd been. The days would drag on, with excruciating lethargy until it was night. I lived for the night. Because when the sun went down, I could travel back to India.

But that place... It was a place of wishes and dreams. And only the right ones ever come true. Maturity told me that then; my age reminds me of it now. Because now, I am old. And a night shift in a cab has replaced the nights I used to spend in that place. I am a New York cabby, and I drive through Queens, through Manhattan, the Bronx, you name it. And sometimes, when it rains, and it hardly ever does anymore, I can melt the neon and asphalt of my world into those beautiful streets of India. But only at night. I drive in the night because it is too fucking hot during the day.

(In a cab)

THE DREAMER

Where to?

THE HOPELESS

I don't know man. I don't know. Just... Away. Get me out of this fucking city.

THE DREAMER

If you don't mind me askin', what's the rush?

THE HOPELESS

Is it any of your frickin' business why we rush? No. It's not. Just... Just take me to the airport.

THE DREAMER

Alright, man, cool off or I won't take you anywhere.

(Pause.)

THE HOPELESS

Take me to the airport.

THE DREAMER

Alright. (Starts driving. Long pause) You going home?

THE HOPELESS

I don't know.

THE DREAMER

What you mean you don't know?

THE HOPELESS

I mean, I don't know.

(Pause)

THE DREAMER

Well do you have any family? Like in New York, or something?

THE HOPELESS

I don't have anyone. I'm in a cab, at four in the morning... I got nothing. Fifteen years in this town, and nothin' to show. But that's how it goes.

THE DREAMER

You're a lonely guy.

THE HOPELESS

Hey. You're the one that drives this cab. (Short pause) You wanna go a little slower?

(Pause)

THE DREAMER

And where are you goin'?

(Pause)

THE HOPELESS

Higher ground. I'm going to higher ground. They say we only got a few more years in New York. But that's just for the waters rising. They can't account for disasters. They try to predict it, but they don't really know how long we got. Disasters never stick to a deadline. So I'm getting' out now. (Pause) You know what they're callin' it? The day we have to leave? They're calling it the "Day of the Arc". As if God is somehow responsible for this world we live in... (Pause) Shoot man... you know what I did today? I thought before I'd leave... Before I'd leave I'd go see the World Trade Center memorial, you know... But I couldn't... It was too fucking slippery. A lot of shit is getting slippery these days, man. And I mean all over the world. Like India. I always wanted to go to India. (Pause). They say it's not worth going now. Too much of it is drowning. But that's how it goes. I mean, where can you walk, without getting your shoes wet? I don't know. Maybe it'll be drier up high.

THE DREAMER

Drier up high? Man, everyone has to walk through water sometime in their life. You gonna walk through water in the mountains, too. It gets to hot and wet and you walk off?

THE HOPELESS

It doesn't matter, man, all this crap will be under water...

THE DREAMER

You don't know that...

THE HOPELESS

Yes I do. You wanna know something? I've lived in this town for so long and I've had to move five times in the past three years. Five frickin' times. And you wanna know why? The foundations got too weak. Water can turn the hardest stones to sand, and the places I used to live became crumbling sand castles. I've forgotten what a home is like, because the fucking doormats get too wet before I ever get a chance to step on them.

THE DREAMER

Why are you flying now?

It was this summer, man. It was too hot. This summer's heat broke records. You make history when you do that. But it won't matter. Cause next year, the same ones will be broken. And same with the year after that and the year after that. And when record braking becomes habitual it doesn't matter what it's for. It's routine. And it's tough to break a routine. It'll end when the birds fall from the skies, and the trees catch fire. And with any hope, I'll be gone.

THE DREAMER

What do you mean, gone?

THE HOPELESS

I mean in the ground. Death will be my only solace in this heat. Until then elevation will have to do.

(Pause)

THE DREAMER

What about the children? I'm stickin' around for them? I don't think so. See I'm doing my part by carpooling for a living and I could probably do a lot more. And what do you do? You fly away. With your back and your beliefs towards the problem. I'm staying man. I will go down with this city. My last breath of air will be shared with this drowning world. If that breath will really be taken.

THE HOPELESS

Yeah right. I just say, fuck it. That's my attitude. One, I don't got no children. Two, I'll be gone. Nothing's gonna get in the way of my satisfaction. And once I have it, I'm set. I don't need to recycle a fucking can or buy some tricked out light bulb. I'll do what I like, and when I die, I'll be happy. I'll be happy because I will know that I lived my life how I wanted to live it.

THE DREAMER

Get out.

THE HOPELESS

What?

THE DREAMER

Get out of my cab. I'm not takin' you to the airport. Wake up, and you can hail me anywhere in the world. But until then, my friend, you will be no fair of mine.

THE HOPELESS

Are you kidding me? What the fuck?

THE DREAMER

Get out of my cab.

Scene 2

THE DREAMER

In some ways that man was right. Records broke. And broke and broke and broke until bits of them were scattered throughout every piece of this world. Then the cab company recalled all of its vehicles and replaced them with hybrids. Not out of some idealism, but out of economic necessity. And now we only operate at night. Tires couldn't take the heat during the day. It's strange to think about... The days and nights seem to have exchanged professions. And everything, I mean everything happens when the moon rises... And when I step into my cab at

night, it is still blazing from the day. I strap belts of flame across my chest. I find a grotesque, pink film covering the wheel. The seared shells of the palms of the cabby unlucky enough to drive the twilight shift.

And when I have to drive that shift, I see dogs lying in pools of their own drool, children trying to play in the boiling water of fire hydrants. And in the cloudless heat, I watch as gas prices burn holes in the wallets of men. And I think with less people driving, business will be great. I can save enough money to do something. Because in this life, wealth seems to accommodate change. But business is not great. People don't go outside. I think it's because you appreciate things less in the dark.

THE DREAMER

Where to, my friend?

THE HOPEFUL

To the airport, please.

THE DREAMER

Sure thing. (Short pause) Where you headed?

THE HOPEFUL

I'm headed to India.

THE DREAMER

Reall? You know, they say it's not worth going.

THE HOPEFUL

Oh yes it is.

THE DREAMER

Business?

THE HOPEFUL

You could say that.

THE DREAMER

Well, what do you do?

THE HOPEFUL

I'm a filmmaker.

THE DREAMER

That's great. So you're doing a film in India. (Pause.) Man, that's just great. What's it about?

THE HOPEFUL

It's about hope.

THE DREAMER

Really. Hope for what?

THE HOPEFUL

Mainly hope for this planet. If I can capture some of the mystery of these places, like India for example, while they're still around maybe I can inspire a few people, you know? And then hopefully they'll do the something.

THE DREAMER

And how old are you?

THE HOPEFUL

I'm 22.

THE DREAMER

That's great. That's just great. You with a studio or anything? Or is this some independent deal?

THE HOPEFUL

Oh, it's very independent. I'm not gonna have a big audience, or anything. But I figure that's where it starts, in small, young circles. Start below, it will ripple up to the top, you know?

THE DREAMER

Yeah...

(Long pause.)

You're doing the right thing, kid. I wish I'd done something like this when I was younger. Going to India... Man!... You're... you're doing a great thing. I wish I'd done what you're doing.

THE HOPEFUL

Why are you wishing? You got time. Just do it, man. Just... Just take a break from driving, and buy yourself a plane ticket. Go to India. See Bangladesh, see the Taj Mahal. It might be a little slippery, but I'll give you a mop. I bet you'll make a great janitor of the earth. Soon, man, everyone's going to be mopping and saving the future like it's there job. It'll be great. Do what you want, man, but just plan ahead. Not just for you, but for everyone.

(They arrive.)

How much is it?

(Pause.)

THE DREAMER

Don't worry about it. It's nothing. Thank you.

(The young man hands him a tip and exits the car)

Thank you.

After I gave that young man a ride, I stopped driving... And I dream again. That's I'll I do with my nights free. The dream is different than it was in my youth; I no longer walk down dark streets. Instead, I see... Instead I see a drowned man suspended over the marble floors of a completely submerged Taj Mahal. In the sunset, only the great spires of that place reach towards the failing sun. But each night, as I come back to this dream, the water seems to recede. And week by week, bits of the Taj Mahal come back into the light. And to my surprise, the drowned man rises from his watery grave and treads water, praising Allah as he does so. And in only a matter of time, he kneels on the marble floors again, praying. Only mere puddles surround him, and even those suck back into themselves. And very soon, thousands of environmental refugees come back into the country and become citizens again. They find that which was lost to them. They love that which was dearest to them. And in the tears and arms of family and friends they all flock, throngs and throngs of people, towards the man praying upon the marble floors of the Taj Mahal. And as they walk through the gorgeous grounds of that wondrous building that holds a higher place than man can ever give it, they find themselves picking through millions of unmatched shoes. Shoes abandoned by the faithful and tourists alike, outside of the Taj Mahal. The shoes were swept away by the rising tide, but then returned once again after the waters fell. And now they lie jumbled together, without distinction and without match. All soon to be worn again together by everyone in this life and the next. This life and the next.

And you know what? When the dream ended, I bought myself a plane ticket.

(Short pause.) I'm going to India.

(End of play.)

[Applause.]

Panel Discussion

Paula Vogel:

So what I'm hoping is that we can just have a conversation, a discussion, ask questions of our scientists-director-playwrights team here at the table – responses, thoughts. There are two people – TCG staff – in the house with microphones. So we're gonna turn the floor over to you but I just have to say, these are three presentations that were amazing and I am both shaken – and I'm sorry Dr. McDonald, I'm not depressed, I'm actually exhilarated. So folks, thoughts? Questions?

Q: I have a question for the two young playwrights. What's the process like? The experience of being in this program and how do you guys get to this final place where you have a ten-minute piece?

A:

Luke Slattery: Well, uhm, it all starts - it started when we got the, when EcoArts commissioned the pieces, and a few scientists came and spoke to us and we took that. And then, we had a pretty short time frame, we had what – basically, what I do is I just, in once sitting I get it all down on paper, everything that I want to say and maybe some of it will be really atrocious, maybe some of it won't be and whatever I don't like, through the next subsequent drafts, I'll go back and I'll take out what I didn't like and I'll rearrange things. And this piece actually, I went through ten drafts, which is, I've never done that many for a play before. After about six, I got, I found out I was gonna be presenting here at the conference. And to be honest, before – between the sixth and the seventh I didn't really like it that much. And I, uhm, Chip, Dee and Pesha – Pesha was my great director, thank you Pesha - they read it and they gave me a lot to consider and re-think about. And so the seventh draft was basically a completely different play. So actually, maybe there's just uhm, there's about, I guess, four drafts for this one. [Laughter] And so then, so after that, I just got to this point, I worked with Pesha for a little bit, changed a few lines around here and there and then I just gave it to my awesome actors – thanks guys – and they, I gotta thank them, they turned it into what it is.

Bailey Williams: Yah, we had about a month, I'd say, and I waited til, like, a day before we had to turn it in. [Laughter] I was like, wow, what do I know about the environment? About a week's worth of AP environmental science. And about the first thing they cover in environmental science is population, so that's where I got the inspiration. And population actually turns out to be probably *the* most important thing in environmental science to consider when talking about climate change. And, uhm, yah, I got it all out. Sort of just came to me. And then I rewrote and worked with Mare and she's done wonderfully.

[Applause]

Q: I want to congratulate you. I run a playwriting program in Vermont and we see a lot of young playwrights doing work and your work is wonderful and it's especially difficult to do message theatre that is entertaining while still putting the message out. And I think, ultimately, it's got to be good theatre first. I want

to bring a note of hope into this after Dr. Sandy's wonderful address. There's a woman named Katherine Bloom who started the Lysistrata Project – anyone heard of that? She's tackling global warming now, with theatre, and she's written a play called *The Boycott*, about the First Lady of the United States staging a sex strike until the administration attacks global warming. And, uh, she's been performing it around the country and if you want to know more about it, it's at www.theboycottplay.com.

Q: I'd like to know from the young playwrights, how consistent would you say your peers' views are with your own, that you presented in your play and when you saw Dr. Sandy's presentation, was that consistent with your own thinking?

A:

Bailey: I'm not a huge science person. I do what I can and I try to learn what I can, but I probably couldn't give you any scientific explanations like he can. But, yah, from what I've seen all around me, it seems pretty much consistent in my own views. I don't feel like there's much to clash with, honestly, I feel like it's pretty much straightforward fact. All that really kind of seems to differ with is, like, what to do from here, what route should we take. I agree, absolutely, that the arts are definitely a key place to promote change, but, you know – I don't really know, I'm sort of rambling right now. What was the question?

[Laughter]

Luke: I too am not much of a science person, so, uhm, but the one thing that was consistent with Dr. Sandy's and how I look at it was the importance of optimism. I think for people that don't – aren't science-related people like myself - that's one of the few and best ways to go about, kind of, tackling the incredibly overwhelming task we have ahead of us, is just with - and it's ok if it's blind, but it needs to be optimistic. So that's how it was consistent with mine. The way I relate, most of my peers are on board and stuff. There's a few and I just don't understand them, because it's just undeniable. I mean, people are winning Nobel prizes proving the facts that *are* facts, but they just don't agree with it. And, uhm, I guess it's not my place to condemn them for that, but I guess I just need to help them change their opinion and the best way to do that is through art and stuff.

Dee Covington: And I want to say that youth have been really responsive to these plays when we've taken them into the schools. They really resonate with their peers on the issue and it does change people's thinking on a peer-to-peer level, which is another really important thing – you had said it's gonna take generations for us to really make a difference and I feel like this generation, writing, is exactly the right step in the right direction in terms of making generational leaps, so, kids really get it.

PAULA VOGEL: Dr. Sandy, do you want to respond to the plays yourself.

DR. ALEXANDER “SANDY” MACDONALD: I think it was very enjoyable and what I find interesting is science writing is pretty obscure and what I thought is that both of these plays allow you, gradually, into the thinking of the playwright. So it was fun to see that directness. The other comment that I’d like to make is, I’m really enjoying being called Dr. Sandy. It makes me feel like Dr. Phil on Oprah!

[Laughter]

I really feel elevated today!

Paula Vogel: Thank you, Dr. Sandy!

Q: Dr. Sandy, the presentation was, grim, actually. I guess the reality of the science is somewhat grim. And actually, to a pretty great extent, the worlds that both playwrights created, were also grim. At the same time, all of you are expressing a great deal of optimism and you just talked about that a little bit. I wonder if you could talk about it a little bit more. Your slide, Dr. Sandy, especially, about the various approaches to mitigating carbon in the world -- I’d love to hear you talk a little bit more about why those things make you optimistic. I mean, there was coal, there was nuclear, there was wind, there was solar. And then, certainly, anything the playwrights would have to say, in addition to what you’ve already said, about why you would be optimistic about coming of age in a world that is going to challenge us all.

A:

Dr. Sandy: I agree, if you just looked at the facts, you really would probably give up hope. I think, actually, though, I didn’t have time to really go into it except for the one example of the change in U.S. opinion in the 1840’s and 1850’s and that came from books like *Uncle Tom’s Cabin*. But more than that it was at the grassroots level in the North, of people seeing the ethical and moral issue and saying, well, you know, I realize that economically it’s unfair and all that, but the ethical and moral issue and I think people, ultimately, do respond. And that’s what this is – this is an ethical issue. So my optimism is not that we have wonderful coal sequestration or photovoltaics. My optimism is that people ultimately respond to an ethical argument and this is an ethical argument about the future of our children and our grandchildren.

Bailey: I have optimism because I have a tremendous faith in the youth of this country. I know it sounds silly, but the youth voter turnout has never been higher and that gives me a lot of hope –

[Applause]

I really feel like we’ve got so many brilliant minds out there and we can absolutely do something about it, no matter how grim the statistics are. I don’t think that really matters. I just don’t think it ends here, I really don’t.

Luke: I think because of how daunting the nature of the task we have is, you have no choice but to have hope, because if you don't, you're just gonna give up because it's such a big thing we have to deal with. So, if only for that, that's why I'm optimistic and hopeful, because I feel like, if I'm not, I'm just gonna give up because it seems so impossible, at times.

Q: Some of us are not familiar with EcoArts. Could someone please inform of us what this is and how other theatres could become involved with it?

A:

Dee Covington: Absolutely. EcoArts is started by a woman who is located in Boulder and she's also here in the audience – Marda, she's just down front in center so I would encourage you to find her. Why don't you stand, Marda.

[Applause]

So Marda has taken it upon herself to link nationally renowned scientists with artists, and so we were paired with two atmospheric scientists and they gave us, we had an opportunity to sit with them in circle, and then also read our plays and talk and that kind of thing. But you [Marda] do this with artists all over the world. So what you'll do, when you run into her -- and she will just make you start to cry, cuz she's so passionate about it, she'll be weeping within thirty seconds and she'll tell you why this is so important--But what she'll do is, she'll grab you as an artist and she'll say, what do you do? And then she'll find you a scientist across the world and say, well, this scientist links with your artform, and then you'll start to work with the scientist and you will begin to create together, with the whole premise being, which is sort of the holistic concept of this panel is that, compelling data with moving art makes change. As opposed to just one in isolation or the other in isolation. It's a holistic, heart-based project that Marda is incredibly skillful at and we are just really blessed to be a part of it and anyone who's interested in any way--

Paula Vogel: www.ecoartsonline.org is the website - it's a wonderful website. By the way, just something that I wanted to take a moment to respond, in terms of this, that I felt each play was really effective – I found myself squirming in my seat because I have a mindset that I think each play kind of exposed, one of which is “well, I won't be alive to see it.” And I have heard those words out of my mouth, so, Luke, I kind of went, “Ohhh...” And the other one is, “well, you know, it's just me, so if I'm the one that breaks the rule, it's only me, it's one person,” instead of the cumulative effect which, I think, Bailey, your play does too, which I thought was really effective.

Dee Covington: And I think that speaks so much, Paula, to hope, because I think anytime we pull shadow into the light, we free energy and freed energy is hope. In the face of grimness, or in the, sometimes, the revealing of grimness, really what we're doing is electrifying a current for change. So I just want to, I feel like it's the same thing, when we sit there and say, “Ooh, that's a little bit of my shadow material, that's a

little bit of the secret inside of me, once that comes forward, like you said, it's undeniable and we're, we're on the right path.

MARDA KIRN (EcoArts): I just want to say, it's such an honor to be witness to Dr. Sandy, Sandy MacDonald, and the playwrights and Dee, who's such an extraordinary magic-worker. And I just want to say to everybody, one thing: that if you decide to go forth and multiply and make fabulous climate change plays, which is one of my deep secret wishes from – to come out of this panel, is that, just quickly, EcoArts is based on a study that I read which asks the question, why is it that many people know that we're facing multiple environmental crisis but very few people are actually doing anything about it. And the study found that, or believed that, observed that action, effective action is often a combination of cognition and affect working together, meaning your heart and your mind, your intellect and your emotions and that most studies of environment are cognitive. They say, we've got a problem, let's come up with a solution. There are hundreds of solutions. Mostly they sit on shelves because there's not enough affect to put them into action. Their recommendation was, in the study was, to make at least of climate change in academia, be not just cognitive but also affective. And I noticed that outside of academia, that *if*, and I always say that *if* - in deference and real respect to my environmental colleagues, many of whom are doing great work - if an environmental group goes charging ahead with great affect, great passion, but not good science, it's argument is over as well, because anybody who wants to poke holes in the argument, has a case, and it's over. So the idea of EcoArts is to put together the cognitive power of impeccable science with the affective power of great art, pull those together, make an extraordinary play or a dance or visual art exhibit or whatever it is that you do, and in that half an hour – or to an hour – that the marketing people say you've got between when you've effected somebody deeply and people go back to their regular, normal, busy, numbed-out everyday lives, that's when you offer them very practical, non-partisan or bi-partisan steps, choices, that they can make to try and change their lives. So I just wanted to say that. So I just urge you that if, in fact, you do write fabulous, wonderful plays, that you do really, really research it and if you can, really try to find scientists who can help you so that you then, really know what it is upon which you speak and we can help you if you want. Thanks.

Paula Vogel: I want to thank you. I'm looking alas at my watch and so, I fear that we have to wrap this up. I want to thank everybody who's participated in this – the actors, Dee, Pasha, Luke, Bailey, our own Dr. Sandy, now. Perhaps one of the reasons I feel hopeful is that we have on stage renewable energy from emerging artists and from a passionate scientist. Thank you so much.