The Dome of Florence: A Paradigm for Economic Development

by Bruce Director

President Trump flanked his Democratic Party impeachers and indeed surprised everyone, by travelling to Davos, Switzerland to deliver an address to the World Economic Forum. In his speech (see page 17 of this issue), Mr. Trump said, "This is not a time for pessimism, this is a time for optimism," and spoke about the construction of the cupola of the Cathedral of Florence, for which the technology did not even exist when the Cathedral was first designed, 140 years before the dome was complete. The citizens of Florence did not accept limits to their high aspirations; the engineering problem was solved, and the dome was built.

This is the edited transcript of Bruce Director's remarks concerning the Dome and its conceptual father, Brunelleschi, from the weekly Fireside Chat of January 23, 2020. Subheads and embedded links have been added. The full program is available on www.larouchepac.com or via the YouTube link provided here. Readers can view a further development of the idea, which was presented by Bruce Director on January 25, as the second speaker during the "Saturday Dialogue with LaRouche" in New York.

White House/Shealah Craighead

President Donald J. Trump at the 50th Annual World Economic Forum in Davos, Switzerland, on January 21, 2020.

I had many discussions with Lyndon LaRouche about the issue of the Dome of Florence and the story of how it came into being, as a paradigm for economic development. In fact, it sort of encapsulates all the principles of physical economy in what it signifies and in its existence, and how it came into existence. Lyn, of course, wrote about this many times, and pointed to it. In fact, in the weeks before he went to prison in 1989, he made a trip to Florence, where he visited the Dome. He spoke again about it right before he went to prison. This is a very relevant point which I'll come back to.

Brunelleschi's Dome atop the Florence Cathedral (Catedrale di Santa Maria del Fiori) in Florence, Italy.

But the key to sort of encapsulate what it is that the principle of the Dome represents, is what President Trump referred to in the over-

all character of his speech, and particularly in the closing section which is the principle of optimism.

That optimism, in a certain sense, is the key to physical economy and to economic development. It's the key to all human development. Trump referred to that in very emphatic terms, and quite pointedly at a conference that was organized around pessimism. Not just around the hoax of climate change, but on the pessimistic view of the state of mankind, a pessimistic view of the state of the world, which is, in fact, an inhuman attitude. When Trump spoke about optimism, saying, "This is no time for pessimists, but a time for optimists," he was addressing the very essence of human development.

Because optimism is not a superficial state of mind; it's not the idea of the glass half-full or the glass half-empty. It's an emotional quality. It's the ability to look at the difficulties that you're facing, and be able to summon the emotions that summon the higher powers of the mind, and in that state, when those higher powers of the mind are active, to be able to see the solutions to problems and to see the future in a way that you could not see before. This is a uniquely human quality, and it's the summoning and evoking of that human quality on which all human progress depends. That's the essence of economic development; and it's the essence of what makes us human.

Boccaccio and others preparing to flee the plague, in this illumination of a French edition of his Decameron *(c. 1485).*

As most people who have paid attention to LaRouche's work know, this is something that he was completely dedicated to, lived, preached, and practiced. It was exhibited by the President of the United States in his speech at Davos. But it's also been evoked by previous American Presidents, from Kennedy, to Franklin Roosevelt, Lincoln, and Washington. Our history is filled with many examples of this, and beautiful poetic expressions of it in these kinds of Presidential presentations, of which Trump's speech at Davos—especially the ending part—I think deserves to be ranked with.

Let me put some clothes on this idea by giving you a brief report on what it is about the Dome that is so amazing. As Trump indicated, the Dome was conceived before the ability, the technology, to build it was even available or known. In 1296, the City Council of Florence authorized the construction of a cathedral church. The church was designed to be the biggest in Europe at the time. It was completed in 1436; that's more than 140 years later. What happened in between?

Well, the church was pretty much built, or a lot of it was built, but then something happened that put everything on hold. That something was called the Black Plague. In a very short period of time—in three, four, five years—Europe was engulfed in a pandemic of bubonic plague and pneumonic plague. This reduced the population of Europe overall by one-third, and in some cities, by as much as 50%.

This, of course, put the construction of the church on hold; and it sat there uncovered for many years. Not only was there a shortage of workers and skilled craftsmen, but there was a subjective pessimism in Europe; a subjective pessimism that said this crisis that is befalling us now is something we can't overcome; that it is the result of something inherently bad in us.

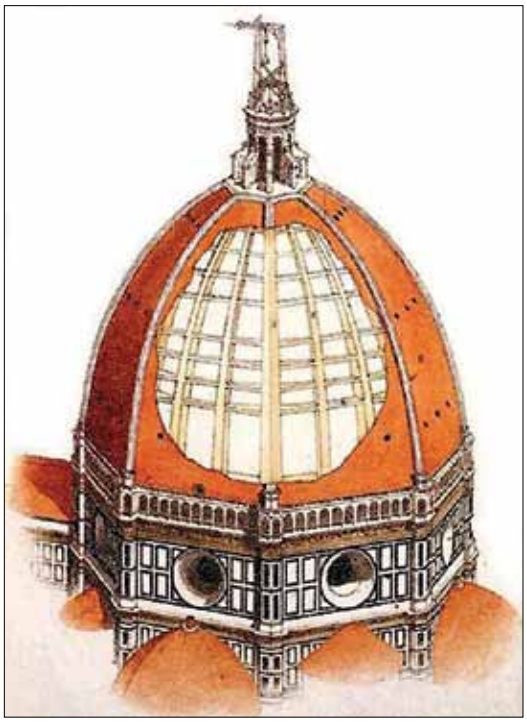
There were all kinds of reactions to this. You can read the Italian poet Giovanni Boccaccio's account, *The Decameron*, of the psychological effect of this kind of devastating collapse that occurred in Europe at the time. Some people went into complete hedonistic flights of fantasy, and others went into self-deprecating fits of pessimism and degradation.

But despite all this, there were those in Florence in particular, who looked back to previous times and summoned up optimism. They realized that what had brought about this crisis was not something bad in man *per se*, but a lack of their ability to summon what was good. And that's the creative powers of the mind.

As this idea began to gain strength among certain political forces, the decision was made to complete the construction of the Dome on top of the church. The

problem was, that this structure was so large, that you could not use any of the construction methods that had previously been used to build such domes. Up to that time, the domes required the construction of a large wooden scaffold, which would support the structure of the dome as it was being built. The scaffolding served not only as a support for the structure as it was being built, but it was a platform the workers stood on in order to be able to do their work.

Such scaffolding was not feasible for a dome of this size because there was not enough wood in all of Italy that could have been used to construct such a huge scaffold. So, this was a problem that couldn't be solved, or that no one knew how to solve. Yet, a decision was made to do it.



Masaccio

Detail from Raising of the Son of Theophilus and St. Peter Enthroned, *thought to be a portrait of Filippo Brunelleschi.*

Left: A cutaway drawing of the Dome.

The man who came up with the idea for how to solve it was Filippo Brunelleschi, who was an artist and an architect and a great thinker. He conceived, in his own mind, how to do this. He mastered certain new principles of physics, which we will elaborate after discussing the obstacles he faced.

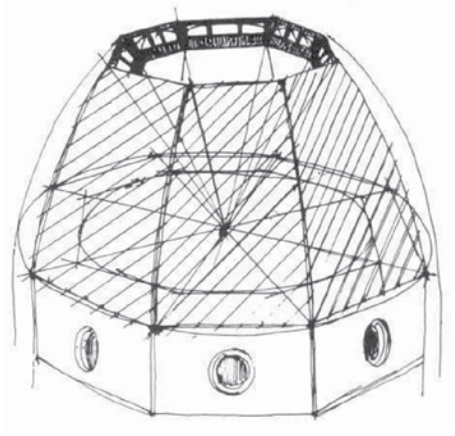
There was a political problem. He knew how to solve the physical problem, conceptually, but he couldn't tell anybody. Because if he were to tell people what he planned to do, his political enemies would then cut him out and try and do it themselves. They would screw it up, it would fail, and the whole project would be left in ruins. He was so controversial because of his optimism, that even though he presented a plan, or at least the elements of a plan, they wouldn't give him the contract. They made him share the contract with Lorenzo Ghiberti, who was in the other political faction.

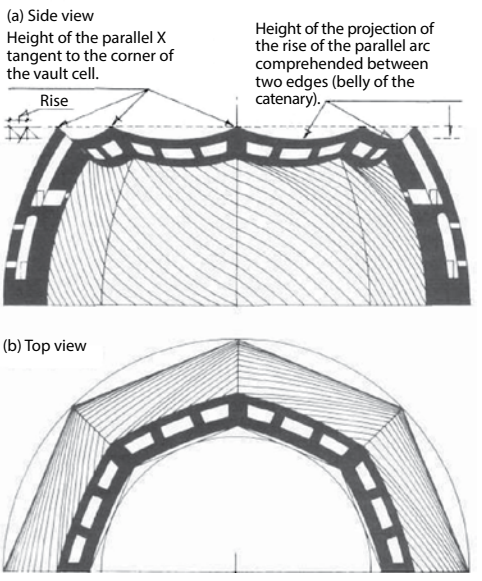
Now Brunelleschi was eventually able to show that he had to have full control of the project, and he could do it on his own. But what he employed here was a principle which to this day is not very well understood. But he employed a principle which Lyn talked about at length called the catenary principle. The catenary principle was elaborated by Leibniz in precise detail 200 years later. But Brunelleschi had a concept of how it worked; and this is the principle of the hanging chain.

To summarize, Brunelleschi used the principle of the hanging chain (catenary) this way. He designed the dome to have two shells—one inside and one outside. The base of the dome was an octagonal structure—eight sides. There would be eight ribs, one at each corner of the octagon. He would construct these ribs, and as he constructed the ribs, he would hang chains between the ribs. And on those chains, he would make a herringbone pattern of brickwork, using mortar and brick from the surrounding area.

This was a structure that supported itself. It was a self-supporting structure—it supported itself as it was

Brunelleschi's use of a herring-bone pattern of the brickwork, in the space between the inner and outer domes, allowed them to self-reinforce as they were being laid.





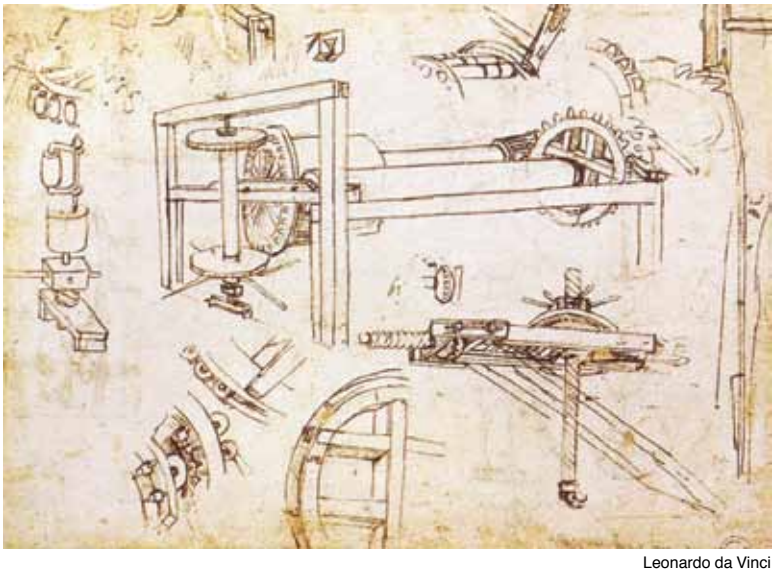
These drawings are adapted from L. Bartoli's Requiem per una Cupula*, showing some details of Brunelleschi's catenary structure.*

being built, so it became its own scaffold. The workers would construct the lower parts, and then they would stand on those completed lower parts in order to construct the next layer, and so on for the next layer, and the next.

This created a very profound psychological, subjective requirement. Brunelleschi was asking his workforce to work with, and execute, a construction technique that had never been used before; and for which they had no point of reference. The way they cut the bricks, the way they cemented them together, the way they organized it; all of it had never been done before.

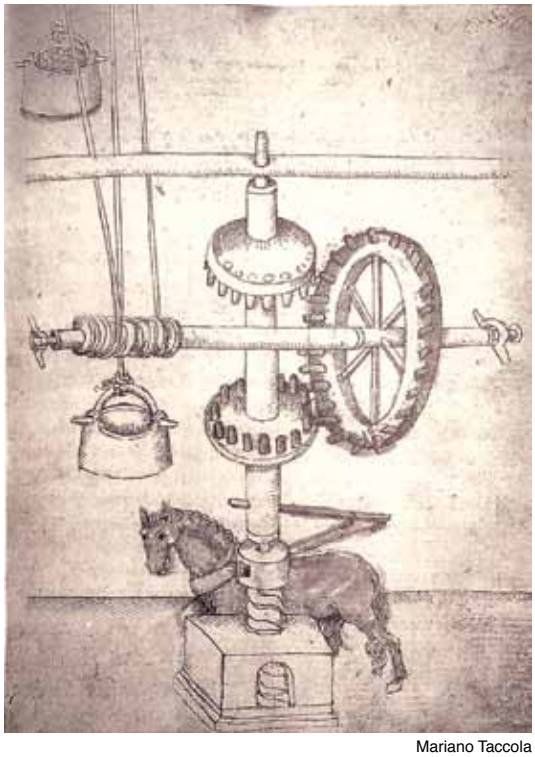
So, he had to take his workforce and put them subjectively, psychologically in a place they had never been before. And Brunelleschi had to do it in such a way that they had enough confidence in it, that they would put their lives on the line for it. Because they were standing on what they had just built, so they had to have enough confidence in their ability to master what Brunelleschi had shown them, which they had never done before, including being able to stand on one layer to build the next.

You can study this for a long time; there's so much to say about it. But to make a long story short, they built the Dome in about 20 years. And they had to invent all kinds of new construction techniques. They invented new lift mechanisms to be able to lift the structural ma-



Leonardo da Vinci

Sketches depicting the main components of Brunelleschi's reversible hoist.



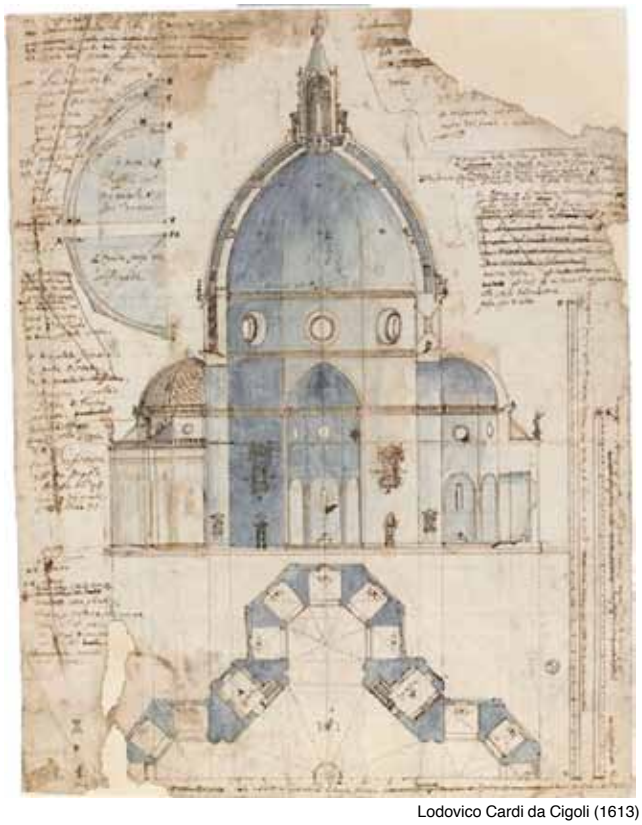
Mariano Taccola

Right: A drawing of Brunelleschi's ox- or horse-powered hoist, which allowed his workers to switch between raising or lowering a weight without unhitching and repositioning the animal.

terials up to the height of the Dome in order to save time, so that the workers wouldn't have to go up and down. They constructed platforms up there so they could eat their lunch and take their breaks up there. In those 20 years, no one, not one person died in the construction of the Dome.

This is an incredibly remarkable feat; but in its construction, as LaRouche pointed out over and over, you have the coming together, the expression of all the principles of physical science, art, psychology, optimism, expressed in the construction and final product of this great Dome.

After the Dome was completed, Nicholas of Cusa organized the Council of Florence in order to get a unity of the churches. That's a long story in itself; I won't go into it. But he chose Florence to hold the Council because, as the people came from all over the world to this council, they would be confronted by seeing this huge Dome. It convinced them, just by its very presence, of all the things I've been telling you about—of the power of the human mind; of the power of optimism; of the proof that if you want to improve society, you improve the power of the human mind. You do what Trump said at Davos; you create the conditions by which ordinary people can do extraordinary things.



Lodovico Cardi da Cigoli (1613)

A cross section drawing of Brunelleschi's Santa Maria del Fiore.

LaRouche spoke about this at great length; he wrote about it, talked about it, used it extensively as his pedagogical example of the principles of political economy. When you pull this thread, it goes for a long time. There's so much you can say, and so much you can learn, and so much you can discover by thinking about and researching what happened here. And LaRouche brought it all together in a single idea.

Now you have that idea being presented by the President of the United States at a time when many people are completely pessimistic; at a time when many people are emphasizing nothing but the problems of the world. Even Klaus Schwab, the founder of the Davos World Economic Forum, said, "We thank you, Mr. President, for injecting a note of optimism into our deliberations, because while we have many problems we have to face, it's only with optimism that you will face it." This is what the enemy fears. They want us to wallow in pessimism; they want us to wallow in the problem; they want us to wallow in the fear and the danger.

EIRNS/Stuart Lewis

Lyndon LaRouche often referred to the Dome to illustrate his principles of political economy. Shown: Mr. LaRouche at the National Press Club in Washington, D.C. on April 9, 1986.

But there's no reason for fear and danger! The optimism that's expressed by what Lyndon LaRouche taught us about physical economy, that President Trump expressed at Davos, is all we need. You can summon that optimism by actually understanding what Lyndon LaRouche tried to teach us about the importance of the Florentine Dome.

Further Thoughts

It really boils down to this question of the nature of the human mind. What's the fundamental characteristic of the human mind? That's to be creative. It's not that creativity is

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An interior view of Brunelleschi's Dome.

something which happens accidentally or not often, or is a random occurrence. Creativity is the natural condition of the human mind; it just needs to be inspired; it just needs to be sparked.

Just look at Lyndon LaRouche, for example. His whole method of organizing was to spark creativity in others. He'd use jokes; he'd use humor; he'd use irony; he would shock you. But it would always be with the idea of evoking creativity; that's what great leadership does. A great leadership inspires the people who look to that individual for leadership, inspires them to find what it is in themselves that allows—as Trump said—ordinary people to do extraordinary things.

That really is the essence of physical economy. The plans don't exist. There isn't a written plan for us to look at. In the case of the Dome, there are no surviving drawings or blueprints to show us how it was constructed. To this day, there are big debates about it. No one had been able to look into its structure—no one is going to take it apart to see how it was made.

But there was a social process which went on in Florence at that time, which involved Brunelleschi, the workmen, the politics of the city, the politics of the world at that time, the fight to demonstrate that if you want to improve man, improve the mind of man. The construction of the Dome improved the minds of the people who built it. And it improved the minds of the people of Florence, as it still does to this day. It has improved the minds of whole nations. of people all over the world who have come to Florence and seen it.

You just see the effect on Trump. Asking the question about where Trump might have gotten this idea from is wrong. It came from him; he's a builder. Think about the buildings he built. My wife pointed out to me a video she saw of Trump from decades ago, when he was in his 30s, talking about how much he loves building, how much he likes to create structures, and how beautiful they are. That's not a quirk of Trump that he happens to be a builder, but it's because he's a human being. Human beings like great things and leading human beings are the ones who are able to inspire that in themselves and in others.

We have a unique situation in the world today, because you have leadership. We have leadership in the United States. There's Xi Jinping in China—look at what Trump said in his speech in Davos about China. He said, the relations between the United States and China are better than they've ever been. Nobody thought this could happen. He said that he and Xi Jinping have a good relationship. "He's for China, and I'm for the U.S. But other than that, we love each other."

So look at this unique leadership. We have Xi Jinping, we have Trump, we have Putin, and we have Narendra Modi—who's a very inspiring figure. Remember that Modi has a resonance with Trump which was very visible in the joint appearance of Modi and Trump in the Houston event last September.

This is a unique time in human history in which we have this kind of leadership. All of these leaders, in their own ways and in their own cultures, from their own standpoint, are very optimistic people. They want to take their countries to places beyond where those nations are now; far ahead of where their populations are and where their establishments are. That becomes infectious. We have a unique contribution to make to this process. Not by trying to micromanage it, but by trying to give the world our unique contribution, which is Lyn's optimism, Lyn's uniqueness, Lyn's creativity; which is very present, not only in the United States, but throughout the world.

That's what we have to contribute to this, and we ought to do it.