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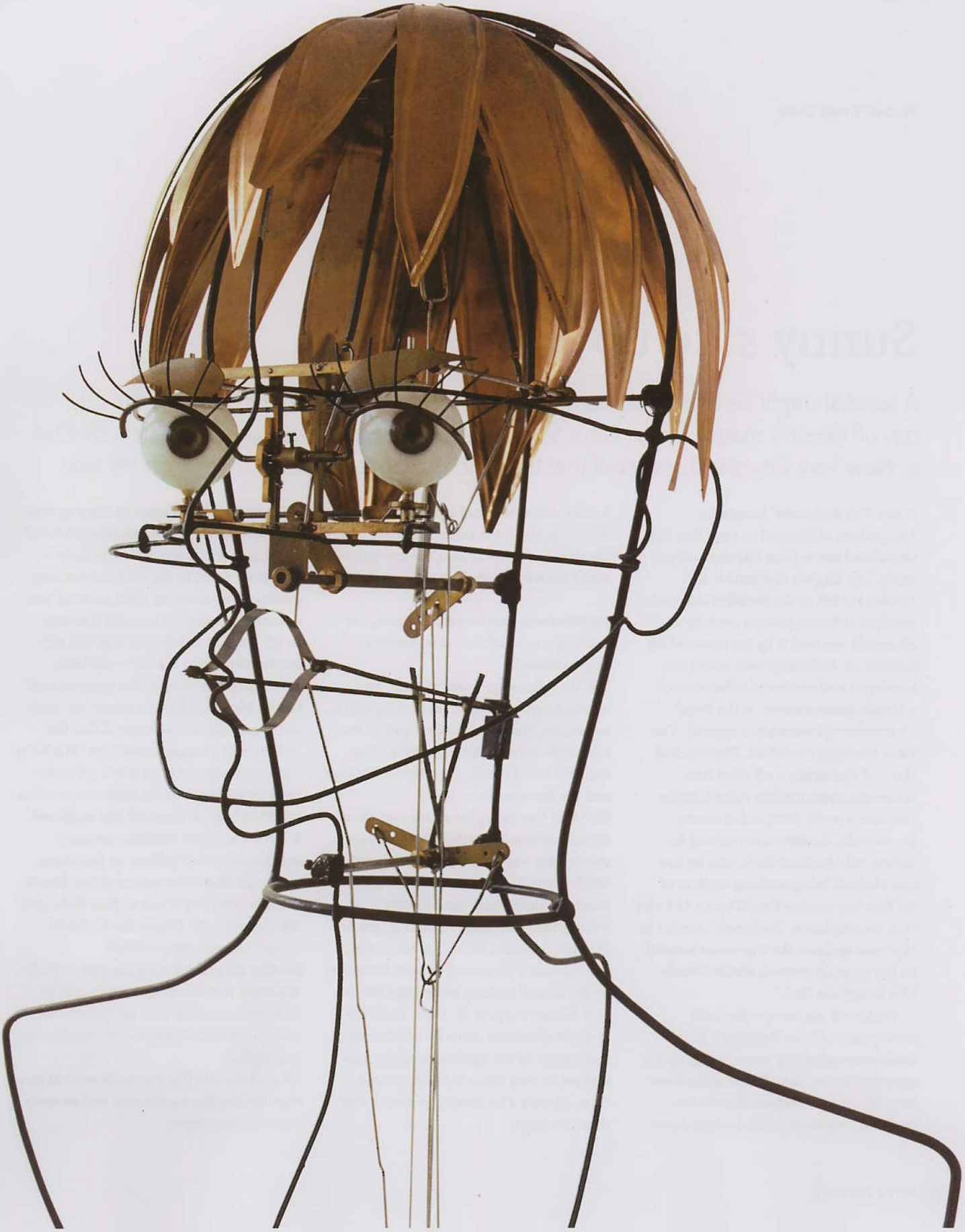

Portrait **David Corio**

Sunny side up

A sundial might be a fair-weather friend, but when it's designed for longevity the odd day off doesn't matter. When Dava Sobel met William Andrewes and his Longitude Dial in New York City, she discovered that this clockmaker has more than time on his side

It was Will Andrewes' Longitude Symposium at Harvard in 1993 that first introduced me to John Harrison (1693-1776). The English clockmaker had devoted his life to the so-called longitude problem of the eighteenth century, and ultimately resolved it by the power of his inventions. Andrewes' own career as a horologist and curator of collections of scientific instruments – at the Royal Observatory (Greenwich, England), The Time Museum (Rockford, Illinois), and Harvard University – afforded him numerous opportunities to look inside Harrison's work. Early in his career, for example, Andrewes completed an unfinished Harrison clock, and he has since helped bring working replicas of the first two marine timekeepers, H-1 and H-2, to completion. Andrewes' interest in Harrison suffuses the ingenious sundial he has recently devised, which he calls "the Longitude Dial."

On March 24, 2005 – the 312th anniversary of John Harrison's birth – Andrewes visited my home, bringing me my own Garden Dial. (It has since been installed in a permanent foundation, transforming an ordinary backyard into a place of sun worship and quiet, happy reflection about the nature of time.) Our conversation that day satisfied my curiosity about his reasons for becoming a "diallist."

DS What was your impetus, in 2005, for creating a sundial? It seems almost a step backward.
WA My original goal was to make an accurate timepiece with no moving parts, something that combined art and science, that drew from the long tradition of art and combined it with the latest technology and the finest craftsmanship.
DS I find fascinating what you said about the lack of moving parts. Why did you – a clockmaker – choose that as your goal?
WA It's true I've always worked with precision timepieces, usually very complicated mechanisms, and of course Harrison's clocks, which are fascinating. But for nearly 30 years I've been intrigued by the idea of making something precise that doesn't move at all. Once a sundial is set, it allows the sun – by which I mean the motion of the Earth around the sun and on its own axis – to create precise time. There's a lot more involved in that than you think.
DS How long has it taken to develop your idea, just counting your actual work time?
WA It took me 15 months to go from a design on paper to the first real working prototype. Finding the right material was a crucial element – a material that can be left outside indefinitely and will not deteriorate. Stone is commonly best, particularly anything in the igneous rock family. Most sundials, however, are made out of marble, and because of that the etching will disappear over time. Marble is a metamorphic rock, so it will get eaten away by acid rain, and sandstone is similar.
DS What kind of stone did you settle on?
WA It's a material used for cemetery memorials, called gabbro. In fact, it's a particular microfine variety of that family.
DS How long might one of your dials last?
WA Generations. Maybe five hundred years – but only time will tell.
DS Why do you call it the Longitude Dial?
WA Most sundials are sensitive only to latitude; unusually, this one incorporates a map and thus also has a critical element in longitude.
DS And the fact that you build each of your dials for specific coordinates makes every one of them unique.

WA Also, all the material and design came together almost ten years to the day after the Longitude Symposium, the conference I organized at Harvard, so it seemed an appropriate name for several reasons.

DS Your design centers on a map that makes each dial's location the center of its universe.

WA Right. The map is actually projected from the point where the dial will stand, so the first thing is to determine the exact latitude and longitude of the location, down to seconds of arc.

DS How do you do that?

WA For the Terrace Dial, I take the coordinates from a computer database, because these small dials can be put anywhere inside or outside the house. With the larger Garden Dial or the Monumental Dial, I go to the site to determine the coordinates myself – and, just as important, to determine the appropriate location. Because if you choose a place in winter, it may look fine, but then summer comes, lots of leaves are out, and suddenly your dial doesn't work! It's also very important to have the right kind of bedrock for one of the large dials, to create a good foundation.

DS That's part of the cachet of the dial, that you actually visit the site.

WA Yes, we have a consultation with each individual. The dial is totally, personally made for them, for their location. I wanted to design something unique, and the great thing about this dial is that every single one has to be different from all the others. The map on the dial plate, the height of the gnomon post, and the length of the gnomon wire – all these things will vary from dial to dial. Also, each dial is numbered and dated. It comes with a certificate that specifies the details of its ownership.

DS But the dial can be personalized, too, can't it?

WA Yes, we can also mark special occasions. A bead mounted on the gnomon wire, which casts its shadow wherever the sun is directly overhead, can be made to commemorate a particular date, such as a wedding or the birth of a child.

I made a dial for a family of seven in Spain. Initially the parents wanted lines marked across the dial for each of their five children. Well, on a Terrace Dial, that was going to be too busy. Instead, since each child was born in a different month, we renamed the months and marked their birth dates with a star. We changed July to Jacobus, and August became Menciae and so on. The parents' wedding date is shown on the dial as a line. The bead's shadow will follow that particular line on that particular date. The owner of this dial feels convinced his children will be fighting over it, because it's the only possession they have that actually is part of all the family, and so it has a special meaning for them. He said, "The dial rediscovers time as a measure of the rhythm of nature. In doing so it has an eternal heart of its own, the one that belongs to our family."

DS What a beautiful thought. Why do the names of the months appear around the perimeter of the dial?

WA When you tell time on the dial, you need to look at the date ring to see how many minutes to add or subtract from the time shown, in order to equate sun time with clock time. The shadow will tell you several things. On the hour scale, it tells the time where you are – your local eastern standard time or Pacific time or European time. Where the shadow falls on the degree scale, between the map and the hour scale, it tells

PHOTOGRAPH: PITKIN STUDIO, ROCKFORD, ILLINOIS, U.S.A.

you the number of degrees the sun is east or west of Greenwich at that moment. Wherever the shadow falls on the map, it is noon in those places.

DS You couldn't have done this, could you, without your own experience as a scholar and an artisan?

WA I've been very fortunate in having had an extremely rich education from working with great collections. That helped me gain a sense of what is wonderful and excellent and beautiful. And I've tried to incorporate that experience into this dial, to create a harmony between precision, on the one hand, and elegance and artistry on the other.

DS But what about your own work with your hands?

WA My own clockmaking experience has obviously helped me to do this. But I've realized that to produce more than one dial at a time, I've got to use modern techniques. Gone are the days when you could sit down at the bench and do everything yourself. I have help from several talented individuals specializing in the latest technology, such as laser etching and water-jet cutting, which have been developed only recently.

DS How precise is the dial?

WA It keeps time to the nearest minute. For civil purposes, that's good enough. If you're having a meeting and you arrive within a minute, you're considered on time.

DS How many dials have you made?

WA Seven to date. Yours is the first Garden Dial. There's a Monumental Dial at Pomfret School in Connecticut, and five Terrace Dials: two in New York, one in California, one in England, and one in Spain.

DS How have people reacted to these dials?

WA On the dial for Pomfret School, we engraved the names of all 99 of the 2004 graduating students around the outside. One of the parents told me a few months ago how meaningful it was for her to have her son's name on the dial, because he'd now gone off to college and she missed him terribly, but she could walk by the dial each day on the way to work and run her fingers over the letters of his name, and feel close to him. The dial is actually being used in some classes now. I purposely made it to tell standard time, so it will show the right time for most of the year when school is in session. Your dial tells daylight saving time, because you will be outdoors looking at it most often in summer.

DS So your choice of daylight or standard really depends on where the dial is, or the use?

WA Yes, you may live in Indiana or Saudi Arabia where you don't have daylight saving time, or sometimes not even standard time. Each dial is made for where it will be and what kind of time is told there, and for whatever is most convenient for the user.

DS I see that one of your Terrace Dials has no occasion lines marked on it. Why not?

WA The lady who commissioned this dial didn't want any occasions on it. I think she feels that it will belong to the house rather than to her. It's true that each dial is tied to its particular spot. So in generations to come you could go back to that spot and know that your ancestors once stood there, too.

"My Garden Dial has been installed, transforming an ordinary backyard into a place of sun worship and quiet, happy reflection about the nature of time"

DS And the time between you disappears...

WA Exactly. You know that they touched it and no one's moved it. If they move it, it won't work, because it is linked to that particular place.

DS Telling time on the dial also gives me a sense of my place in space.

WA Most of us today just rely on our cell phones and watches. Time has become separated from space, and many people don't realize how time developed or understand its origins.

Another little feature is the way the mirror finish on the black stone will reflect clouds in the sky. Looking at the dial, you can see clouds moving across the map, and because the dial is oriented on a north-south axis, you can determine the direction of the wind. But the most exciting thing is that it's always going to keep time! Unless something goes wrong with the planet – and then we'll be the first to know!

DS You mean something like a major earthquake?

WA If the tilt of Earth's axis were to change, you'd be the first to know, you could measure it with this. If the dial suddenly goes wrong [laughter], you don't take it to a watchmaker, you go to God. ✦

Meeting up in New York City, Will Andrewes had an opportunity to show Dava Sobel the personalized dial he had designed for a Spanish family (previous page). His Longitude Dial comes in three sizes: Terrace, 12.5ins diameter; Garden, 23ins; and the Monumental model, 48ins. (The Terrace model shown left was made for a client in New York state)