

Natural Selections

A NEWSLETTER OF THE ROCKEFELLER UNIVERSITY COMMUNITY

BOOK REVIEW: *THE IMMORTAL LIFE OF HENRIETTA LACKS*, BY REBECCA SKLOOT

SHAUNA O'GARRO

I'll admit, I had a preconceived notion about how enjoyable a book about cell culture could be, and it wasn't favorable. I thought of biology textbooks, clinical studies, cold histories of milestones in scientific history. *The Immortal Life of Henrietta Lacks* is none of those things. In this nonfiction work, science writer Rebecca Skloot presents a meditation on science, ethics, class, and race that is both informative and moving.

The book tells the story of Henrietta Lacks, a black woman who showed up at Johns Hopkins Hospital in 1951 with an aggressive case of cervical cancer. Two dime-sized samples were taken from her cervix, and the cells culled from these tissue samples would become one of the greatest breakthroughs in cell culture history: the world's first immortal human cell line. This immortal cell line, named HeLa by the scientist George Gey, went on to become one of the most influential advances in science and medicine. Scientists had been struggling for years to get cells to survive in culture, and HeLa cells proliferated quickly and produced a seemingly never-ending supply for them to work with. The cells were pivotal in advances ranging from the polio vaccine, to gene mapping, to in vitro fertilization. They've been blown up by nuclear bombs to test the effects of radiation, and sent into outer space to monitor the effects of zero gravity. Despite the colossal importance of HeLa, not much was known about Henrietta Lacks by the scientific community.

Just as the scientific community didn't know much about Henrietta Lacks, her family knew even less about her contribution to the world. Although the cells were taken in 1951, the year she died, her husband and five children knew nothing about it. They didn't find out until 20 years later, when they were approached by researchers who wanted to take blood samples from them to use in HeLa research. The news changed their lives,

mostly for the worst. Most of Henrietta's relatives were uneducated; when scientists showed up stating that Henrietta was immortal and helping to cure diseases, they had no idea what that meant. Was she still alive? Were people doing tests on her?

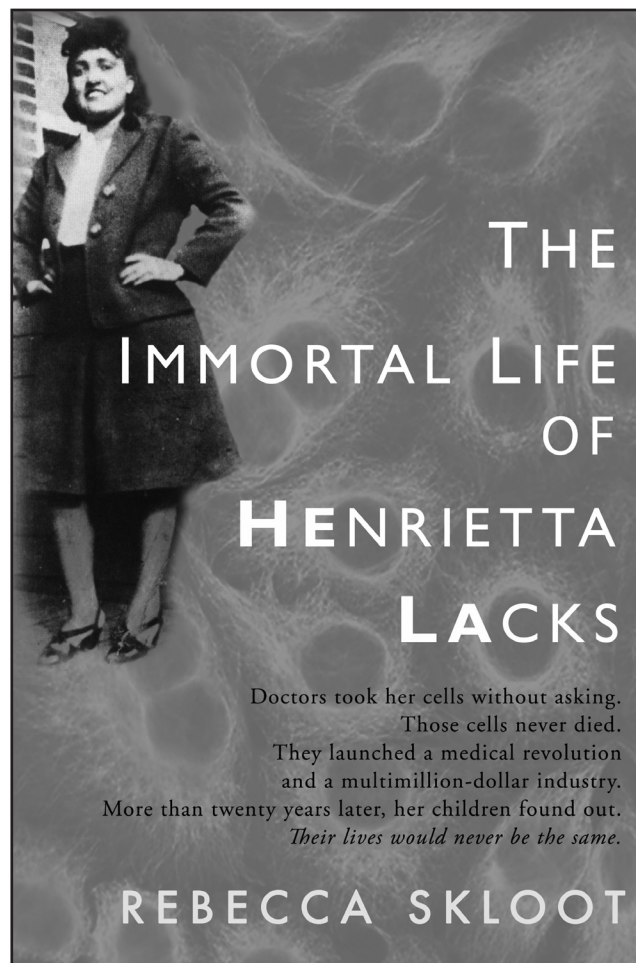
Was she in pain? Were people making money off of her? If she was so important to medicine, how come they couldn't even afford health insurance? The scientists and journalists who kept showing up on their doorsteps didn't bother to answer any of their questions, so the family decided to stop talking.

When Skloot showed up, eager to find out about Henrietta by interviewing as many family members and friends as she could, she was met with intense resistance. The family was hostile to anyone, especially anyone white, who was trying to find out information about Henrietta. Only after proving that she sincerely wanted to tell Henrietta's story was she allowed to talk to the family, and even after working with them for years there were times when the family would question her motives.

The heart of the book is the relationship that develops between Skloot and Henrietta's youngest daughter, Deborah. Deborah is the Lacks child most affected by learning about HeLa cells, her confusion and anger manifesting in anxiety disorders and other health issues.

Skloot and Deborah wanted the same thing: for the world to know and acknowledge Henrietta Lacks. Through their journey of discovery, Deborah is able to learn more about the mother she never knew and come to peace with the existence of HeLa.

Throughout the book, even in her interactions with the Lacks family, Skloot explores the question of medical ethics. Yes, Henrietta's cells were taken without her knowledge, but that was standard procedure at the time. Institutional review boards were unheard of and the ethical guidelines of scientific research were amorphous at best. Informed consent was not the norm.



Credit: The Crown Publishing Group, a division of Random House, Inc.

It was seen as natural that tissue samples would be taken from patients and used in testing; some researchers even injected their patients with cancer cells to see what would happen. There was, and in many ways there still is, an idea that working toward the greater good overrides the need for a patient's consent. Skloot does not offer her own opinion on this subject. Instead, she simply provides the information in a way that allows the reader to see the situation from both sides: as a researcher trying to help the world and as a patient who feels that some part of them has been stolen.

Skloot is excellent at characterization; despite the vast array of personalities in the story, none of the characters seem contrived or one-dimensional. Sk-

loot not only achieves her goal of teaching the world about Henrietta Lacks, she also introduces you to a host of people whose stories will stay with you long after the last sentence is read. She manages to take several stories (a young woman from southern Virginia whose cervical cells would change the world; a girl who yearns to know who her mother was; researchers and their amazing scientific advancements; a family that sought to understand how someone could be dead and yet immortal) and weave them into one epic and masterfully told tale.

After learning about Henrietta Lacks, you'll lament the fact that it took so long for her story to get told, but you'll be glad that Skloot, who obviously cares deeply about her subject, was the one to tell it. ☉

A Very Brief History of Cell Culture

JEANNE GARBARINO

The story of Henrietta Lacks and her (unknowing) contribution to the advancement of science has recently been resurrected with the publication of *The Immortal Life of Henrietta Lacks* (reviewed in this issue). Despite the clear disenfranchisement of the Lacks family, HeLa cells have helped to revolutionize science as we know it. As someone who frequents a tissue culture hood on a daily basis, this book really sparked my curiosity about cell culture in general. Yes, I know what we do with cells today when using them as a model system to investigate numerous processes relating to health and disease, but how did it get to be this way? In this brief article, I hope to summarize some of the scientific breakthroughs that have brought us to both present day tissue culture theory and practice.

The principles of cell culture began over 100 years ago when the German zoologist Wilhelm Roux showed that the neural plate from chicken embryos could be removed and maintained in warm saline solution for several days¹. This novel concept was taken one step further by Ross Granville Harrison, an American born scientist and Yale professor who, in 1906, not only maintained amphibian nerve fibers *ex vivo*, but also developed conditions under which these nerve fibers were able to proliferate². The groundwork laid down by Harrison was built upon by Nobel Prize winning scientist Alexis Carrel who, at our very own Rockefeller University (then known as the Rockefeller Institute for Medical Research), was able to culture the heart of a chicken embryo for a period much longer than the normal lifespan of a chicken³. In fact, this experiment was quite sensational considering that this heart was kept alive for 34 years and actually outlived Dr. Carrel himself! These findings helped convince other scientists that *in vitro* experiments using animal cells were entirely possible and, thus, could be considered the cornerstone of tissue culture.

For the next several years, it was mainly tissue explants that were used for experimentation. However, due to the pioneering efforts of Katherine Sanford and colleagues, the concept of creating a population of cells from a single cell came to fruition⁴. In addition,

Harry Eagle sealed the fate of the future of cell culture in 1955 by demonstrating that the tissue extracts used to grow cells could be replaced with a synthetic and defined nutrient mixture containing amino acids, vitamins, carbohydrates, salts, and serum⁵. Taken together, these technologies paved the way for a whole new approach to scientific investigation using *in vitro* systems including mutagenesis, cloning, and transformation. But, perhaps the largest impact on society, was the ability to use cell lines to grow purified viruses for vaccine production.

The idea that pure cell lines could be established and maintained indefinitely was finally concrete. These established cell lines mimicked, at least in part, the major functional and metabolic characteristics displayed by the cell from which they were originally obtained. Scientists were then able to study the cellular processes specific to particular organs and/or tissues with greater ease. Some examples of the cell lines established during this time were adrenal cells, pituitary cells, neurons, myocytes, and hepatocytes⁶. As more and more cell lines were "born," scientists realized that each cell type required a specific nutrient mixture for optimal growth. Additionally, it was being discovered that serum could be replaced with specific proteins, hormones, and/or growth factors. As a result, experimental design became more complex and researchers began to ultra-specialize. As we all are aware, it is not uncommon for scientists to spend their entire careers studying one, or even one aspect, of a specific protein or pathway. This is likely how this came to be the norm.

The next major advancement in the history of cell culture occurred in the 1970s with the development of hybridoma cell lines, which could be used for the production of monoclonal antibodies⁷. This technology was developed by Cesar Milstein, Georges J. F. Köhler and Niels Kaj Jerne and resulted in an equally shared Nobel Prize in Medicine in 1984. Jumping ahead to the late 1990s, a time frame more in line with my own scientific existence (I was in kindergarten in 1984), we see the advent of stem cell biology and the associated bioethical debate. In my personal opinion, the

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enormous medical and commercial value as it relates to stem cells makes this a non-issue, but I digress from the point of this article. In 1998, stem-cell research was catapulted forward by the work of James Thomson (University of Wisconsin at Madison) and John Gearhart (Johns Hopkins University) who, independently of one another, pushed the limits of science by successfully growing human stem cells in culture. Currently, stem cell research is still in its adolescence and our understanding of how we can actually apply stem cell technologies is mediocre at best, although there are some very innovative (and inspiring) ideas out there. The hope, at the very least, is to generate entire tissues to aid in the treatment of some of the most devastating diseases. For example, scientists are working to generate insulin-producing pancreatic cells that can be used to cure type 1 diabetes.

What is on the horizon for tissue culture? Well, I would assume that the ultimate goal is to actually grow entire organs or organ systems. Is this even possible? Could transplant lists become a thing of the past? As this is being written, devoted researchers are trying to generate novel ways to utilize stem cells for improving human health. It is quite possible that we will see, in our very own lifetimes, the generation of new cardiac tissue to be used in heart attack victims and the ability for cancer patients undergoing chemotherapy and/or radiation treatments to receive replacement bone marrow and blood cells. Tissue engineering is the wave of

the biomedical future. It was only one century ago that Wilhelm Roux maintained the first cells *ex vivo*. Considering where we are now, compared to the humble beginnings of cell culture, I do not foresee a negative impact on this inertia (barring any catastrophes resulting in major funding issues). Who knows, maybe we will see a breakthrough so instrumental that we will actually be around to see what will happen a hundred years from now. Now that's truly becoming immortal. ☺

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New York to Ban Coffee?

EUGENE MARTIN

If an apple a day keeps the doctor away, can a really big apple help stave off a national health crisis? This much can be said: the big apple is trying. Ever since the New York City Health Department successfully banned trans fats from being served in NYC restaurants in 2006, it has been on a mission to legislate New Yorkers towards better health, with the hope that the effects are national in scope. Given the influence of NYC, it may even succeed.

But that is also what makes the NYC Health Department's next move, a push to limit the caffeine consumption of New Yorkers, so frightening. First, a disclaimer: I love coffee. I need coffee. For me, a day without coffee seems more like a 16-hour morning. This is why the NYC Health Department's recent proposal to limit caffeine in NYC beverages to no more than 23 mg per liter, which is lower than the concentrations found in some decaffeinated coffees, feels like a personal attack.

The proposed campaign, jarringly named "NYC, Get Some Sleep," is meant to limit the health consequences of insomnia and poor sleep, including poor weight regulation, depression, and impaired immune function. While many aspects of this campaign, such as offering rebates if New Yorkers upgrade their mattresses,

are just as innocuous as putting a "Burn Calories, Not Electricity" sign at the entrances of our elevators, the centerpiece of this well-intentioned campaign is, unfortunately, an effective banning of coffee, Red Bull, and other highly caffeinated drinks. The only discussed alternative, which is levying a heavy sin tax on caffeinated beverages, is almost as bad.

There have been both local and national criticisms of the plan, most notably and vocally through Rush Limbaugh, who stated, "This is Obama socialism at work, folks. The government is telling you what you can and cannot put in your body." Nonetheless, the NYC Health Department seems intent on ignoring these criticisms. In a press release, the Commissioner of the NYC Health Department stated, "Caffeine is an unregulated drug that negatively impacts the lives of millions of New Yorkers. In an effort to con-

tain current and future health care costs, as well as improve the quality of life of millions of New Yorkers, we will aggressively pursue limiting caffeine consumption."

Caffeine is not an evil; it is a friend. It has been reported to lower the risks of diabetes, Parkinson's disease, and cavities. It also helped make this article, and countless experiments, possible. That said, the NYC Health Department has been effective in getting legislation passed. With the "NYC, Get Some Sleep" campaign having a proposed start date of April 1, 2010, those of us who love the black gold need to contact our representatives

immediately (with the author's hope this issue of *Natural Selections* comes out in a timely fashion). For more information about the campaign, and information on how to prevent the caffeine ban, please visit: <http://tiny.cc/oMBsb>. ☺



The Bobby Wagner Walk: A Waterfront Escape at our Doorstep

JESSICA WRIGHT

It is easy to forget that New York City is an island. This word conjures up images of sun-drenched beaches and waterside cafés. When standing in Midtown, surrounded by tall buildings and scaffold covered walkways, isle is the last descriptive term that comes to mind. There are many places in the city, however, where Manhattan is easily appreciated for the island it is. At South Street Seaport the tall-ships, departing ferries, and the sadly retired Fulton Fish Market bring one back in time, to NYC as the bustling port city it once was. Along the waterfront trail on the Hudson River there are cruise ship docks, kayak rentals, and even waterfront cafés. Continue on past the George Washington Bridge and the view across the river changes from condominiums to wild cliffs. Up here the smell of the sea is stronger and more appropriate, and it no longer seems so surprising that whales will occasionally bump up against Manhattan's shores.

But there is another place, a little closer to home, where NYC feels more like an island than a sky-scraper filled metropolis: the Bobby Wagner Walk along the East River from 63rd to 125th Street. This path was built in 1939, at the same time as the FDR, and is the oldest section of the Manhattan Waterfront Greenway. Access to the trail sits right at our doorstep, between Rockefeller University (RU) and Scholar's residence. The proximity and noise of the FDR can easily deter the casual walker, but for runners and bikers seeking out a traffic-free path, and for dog owners looking for leash-free dog parks, it is a treasure. This trail has become an integral part of my runs, both for its convenience and because it is a beautiful route in its own right. I have never run in the dark, but I feel safe traveling it alone at all other times of day (from dawn till dusk) and throughout the winter it has remained accessible, even after heavy snowfall. My usual run is just as the sun is setting, making the most of the last light of the day.

Probably the least appealing stretch of this pathway is the first mile from campus, which may be why many easily dismiss the whole route. This section is narrow, passes by industrial buildings and under scaffolding, and is the closest to the cars. But, once you reach the mile mark at 81st Street, a flight of stairs takes you away from the FDR and into Carl Schurz Park (for bikers there is a tire channel on the right side of the stairway). Once on top of the highway, the traffic below is easily forgotten. There are playgrounds, a small-dog park, and benches for reading, kissing, skateboarding, photo-shoots, bird-watching, nursing, and knitting—all of which I've encountered at one time or another. In the summer there are even film screenings and concerts here, organized by the Park's Association. No matter the weather or the time of day, there is

always someone along this stretch enjoying the park and its waterfront views.

The exit from the park is marked by a curved descent that ends at a ferry landing, re-depositing you alongside the river and the FDR. A winding red brick road marks the 1.5 mile mark and passes next to the Asphalt Green Gym. From here there is a half-mile semi-circle stretch that extends to 99th Street. This is my favorite section of the trail. Although you are still alongside the FDR, the traffic here is less noticeable. Instead, the arc of the trail enhances the closeness of the river and frames

a view that changes dramatically as the weather shifts. Heading north, this stretch of river feels wilder, with only the nostalgic green of the Randall's Island Bridge behind it; while on my return, the tall NYC buildings reappear in the distance, welcoming me home.

This stretch of trail is also, apparently, the best place to catch a fish. In the summer several fishermen stand against the railings, their lines arching long into the water below. In the winter they are replaced by migrating diving ducks, a group of Buffleheads. Bobbing in the water and quickly disappearing into the depths to fish, these ducks serve as a link to the Boreal forests and Arctic tundra where they spend their summers. Year-round, cormorants join the ducks and fishermen, while freighters lumbering by alongside remind us that the sea cannot be far away.

The next half-mile (to slightly beyond the 110th Street Pier) is desolate in winter, but is a social hub on warm summer evenings. These nights the pier is filled with families gathering for barbecues, while the benches play host to musical groups,

from bongo players to saxophonists. Beyond the pier, the trail continues on to 125th Street, ending 3.5 miles from the start. This stretch feels more lonely and remote, and is generally devoid of trail-users, including myself. At 125th Street a chain link fence marks the end of the route. Bikers can link to the Triborough Bridge from here, and I have been told that a hole in the fence allows adventurous runners to trail-blaze north, but this is where my experience ends.

When I reach this fence, I turn into the wind that blows steadily up the river and chase the last of the light as I head for home. The streetlights gradually blink on, and the 59th Street Bridge becomes increasingly scenic, lit up against a twilight sky. I run to the end of the path, stretching by the newly renovated dog park, enjoying the contagious joy of dogs at play, and then head back across the bridge to York Avenue. Standing at the top of this walkway, with my home on the left and my work to the right, I take the time to appreciate that NYC is an island, and that a waterfront run is always available to me—just outside my front door. ☺



Bobby Wagner Walk at 99th Street—cell phone picture, taken while running.
Photograph provided by the author



This Month Natural Selections interviews Holly Hunnicutt, Administrative Assistant in the Laboratory of Neural Circuits and Behavior.
Country of Origin: United States

New York State of Mind

1. How long have you been living in New York? Over five years. I never thought I would live in NYC, but I wanted to stay with my amazing and brilliant Head of Lab when we moved here from UCSF, and she was kind enough to bring me along.

2. Where do you live? Astoria, Queens.

3. Which is your favorite neighborhood? St. Mark's Place, and also a Greek neighborhood in Astoria along 31st Street and Ditmars Boulevard.

4. What do you think is the most overrated thing in the city? The horse rides in Central Park. They take you on a five-minute ride for \$50.00, and subject the horses to constant danger and sheer terror due to the traffic. The park sidewalks are nasty with horse poop, and pigeons eating from the horses' feed buckets. Just terrible to expose people to this, not to mention the poor horses. **-And underrated?** The mom and pop stores that still exist and add so much character and variety to NYC. I patronize them whenever I can.

5. What do you miss most when you are out of town? My birds—Junebug, Buzzz and Pookie.

6. If you could change one thing about NYC, what would that be? Dial the Bloomberg machine back several notches.

7. Describe a perfect weekend in NYC. It would have to include giving back some of

my good fortune to one of my activist passions: lately it's been mainly health insurance reform and environmental conservation. I would want to go to a comedy club, where I repeatedly laugh until I gasp, and definitely want to eat an amazing authentic Northern Italian dinner at Barbetta Restaurant (owned by Laura Magiolio & Günter Blobel). Then, some live music in a small venue with good acoustics: I'll see just about any kind of music, from the symphony to bluegrass. Also I gotta have some time to just sit, relax and wiggle my toes.

8. What is the most memorable experience you have had in NYC? Taking my niece Olivia, who is from a small town in Virginia, to eat in the garden at Barbetta. We were treated like royalty, the décor was enchanting, and the food was exquisite. Olivia was wowed by the experience and said she felt like a star. It was a magical night.

9. If you could live anywhere else, where would that be? San Francisco, San Diego, Santa Cruz, or Big Sur, CA. Abroad would include Naples, Italy or outside Paris, France. Or in a bird preserve or rain forest in Costa Rica or Belize; developing eco-tourism in threatened bird habitat.

10. Do you think of yourself as a New Yorker? Absolutely, but with one caveat: I could never be that hostile commuter who won't



give my seat on the subway to a pregnant woman or disabled person. **-Why?** I have always been a sincere person, but I can come across somewhat gruff (my nickname in the lab is "der Labordrachenschatz", or "the Lab Dragon"). The people I meet in New York respond well to that. Some of my best friends through the years are New Yorkers, although most of them have relocated to warmer climates. As individuals, New Yorkers are survivors: strong, and truly caring people. That works for me. ☺

DVD Corner

BERNIE LANGS

If you enjoy documentaries touching on musical performances that are not simply concert films, there are currently two very good movies in stores and for rent.

In his movie *It Might Get Loud*, Davis Guggenheim, who directed the environmental film *An Inconvenient Truth*, reminds of us that rock and roll can, and should be, about love of craftsmanship and a deep appreciation of music's history. The film focuses on interviews with and the music of Jimmy Page of Led Zeppelin, The Edge of U2, and Jack White of The White Stripes. Representing three generations of gifted guitarists, they discuss how their love for the guitar grew from childhood and how they struggled in their early years to find not just success, but to make their own statement to add to the legacy of the blues and rock and roll. I have always felt that Jimmy Page has maintained the integrity of the legacy of his mighty band, and he comes across as having never lost his enthusiasm for his instrument and his favorite artists from the past. I was very surprised at how well Jack White handles himself in the presence of his great peers in Page and

The Edge, and he holds his own during the jam sessions that they all enjoy together. I was also happy to learn about how The Edge crafts his unique sound through a system of very impressive gadgets and machinery.

This Is It is the documentary, put together by Kenny Ortega, of the late Michael Jackson's rehearsals for what would have been his blockbuster concerts in London. If you thought that Michael Jackson was washed up and a shadow of his singing and dancing self, think again. Jackson sings beautifully and with emotion, and his performance is filled with wondrous dance moves. He is much beloved by his musicians, dancers, and Mr. Ortega, who directed the show. As a musician myself, I have been inspired by the pursuit of excellence by all involved in preparing Michael's concert to raise the bar on how I record my own material. Simply put: I loved this film in the theater and it lends itself to repeated viewing on DVD.

The last couple of years also saw the re-release of two older films from Europe that are definitely worth seeing on DVD.

Bicycle Thieves is an Italian masterpiece made in 1948 by Vittorio De Sica. It tells the story of an unemployed man (played by Lamberto Maggiorani) who is only able to secure work by gaining access to a bicycle, only to be robbed of it. The film follows this man's pursuit of his lost bike through the poverty-stricken city in hopes of recovering his only chance for his livelihood. He is accompanied by his young son, played by the awe-inspiring Gino Saltamerenda. It is a powerful and deeply touching story, and filmed beautifully.

A Matter of Life and Death is a 1946 masterpiece made by the English filmmaking team of Michael Powell and Emeric Pressburger, who also made the classic film *The Red Shoes*. *A Matter* was called *Stairway to Heaven* in the United States, and I watched it repeatedly on television in the late 1960s and early 1970s. It is great

to see it now on DVD and it has lost none of its magic. The movie is about the travails of an air pilot during World War II, played magnificently by the suave David Niven, who should have perished in his crashing plane, but is lost in the fog by the heavenly messenger who was supposed to take him up to the next world. By the time this French messenger goes to gather up the pilot, Niven has fallen in love with an American woman working for the armed services in England (played by Kim Hunter) and he refuses to go to the next world, claiming a change of circumstances. All heaven and earth are affected by his refusal, and the ultimate trial up above is filmed in a surreal glow that leaves one in wonder. This is perhaps my favorite movie, and I hope more people take the time to see this incredible work of art. ☺



View from the lighthouse at Ponta do Pargo, Madeira. Photograph provided by the author

Sunshine is a Fickle Mistress

JEFF SMITH

Water cascaded out of the mountains, poured from fountains carved out of the rock along the path. The temperature lingered around 50 Fahrenheit and the gray clouds surrounding us had started to spurt. I heard a low rumble that I thought could have been the wind. Around the next bend I saw it, the Cascata do Risco. The noise of it was tremendous: roaring like thunder, like a bomb exploding, like a thousand bombs exploding. High in the clouds the

water started, raining over rocks and over the trail and into the Ribeira da Janela below, from there tumbling further until it flowed into the unseen Atlantic Ocean. A locked gate blocked the path under the waterfall and beyond I could see the trail had been cut away by a mudslide. As we climbed almost a thousand feet, well over a mile back to the car, heavy, thick, cold sheets of rain fell, like strangers hidden in the clouds were throwing buckets of wa-

ter.

We were on the beautiful Portuguese island of Madeira off the coast of Africa. The island bills itself as a place of sun, where the sea is always as calm as glass, where the temperature is never very hot, never very cold. In winter, the average low is a mild 55 Fahrenheit, but that's at night, when the sun isn't even shining. During the day, the sun is supposedly bright and warm, with an average high of around 66. Though rain

falls at times, it usually lasts only a few minutes and then blows away. Usually.

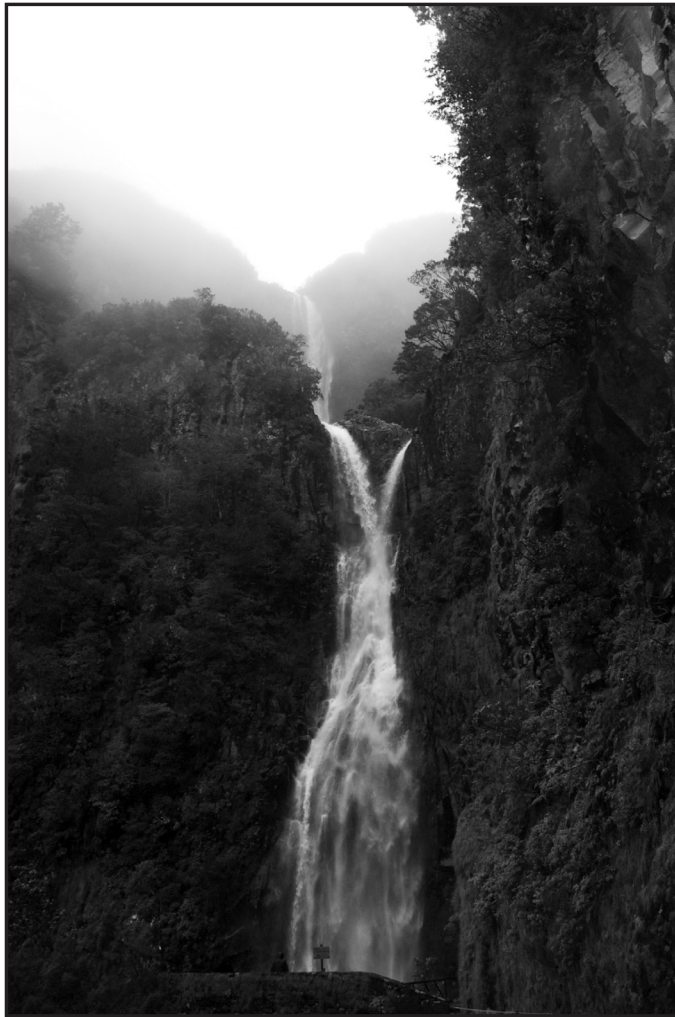
This is not a common destination for Americans. We were asked quite a few times, “Why did you pick Madeira?” True, there are islands closer to the U.S. that offer warm sandy beaches and a better exchange rate. Our answer was always the same: we spun a globe, closed our eyes, and poked. Truth was, we had come to Madeira looking for sun, and that’s exactly what we wound up doing while we were there.

In the late afternoon we finally found the car, hidden in the smoke of gray clouds high in the Paul da Serra Mountains. The silver Renault Clio hatchback was parked facing the obscured valley below. A fierce wind blew rocks across the parking lot. Soaked through the thin waterproof jacket I’d brought—turns out it’s only water resistant—I turned over the ignition, eager for the heat. Unfortunately, the car was in gear and I, unused to a manual transmission, neglected to depress the clutch. The car, pointed towards the cloud-obscured cliff and valley below, jumped forward, scaring both me and my traveling companion. I held my hands up in the air, not touching the wheel or the key, my heart in my throat. The car hadn’t moved that far; we weren’t parked that close to the edge. But the fright was there nonetheless.

The highest point on the island, Pico Ruivo, sits at 6,109 feet. The lowest is, well, sea level. Cliffs rise from the ocean to some of the highest elevations in Europe. The most famous sea cliff, Cabo Girão, rises 1,932 feet. We took a side trip to a *teleférico* (cable car) in the village of Achadas da Cruz. A steep road twisted straight down to the edge of the cliff where three men argued at the cable car’s top tower, one of them gesturing pointedly toward the sea. I smiled at them as I passed and approached a metal guardrail, then recoiled like it was electric. I had expected a cable car like I’ve seen in Disney Land or the Bronx Zoo, a pleasant sight-seeing journey that also takes you to the other side of the park. This was a cable that dropped vertically nearly 1,000 feet to a small village nestled along a stretch of coastline. As the three men continued to argue in Portuguese, I wondered what had happened to the cable car. It wasn’t at the top, nor was it at the bottom. It was, simply, gone. Another cable, a few feet away, held a small metal contraption with a hook. This was the cargo cable, where supplies were lowered to the village. Because the cable car seemed to have vanished, the only way out for the people below was via boat. The sea, though, was rough. Huge waves, some as high as 30 feet, crashed over black rocks, sea spray washing over thatched roofs. The sea itself was white with foam. It looked like beaten egg whites, like

the white sands of New Mexico swirling in a breeze, like a huge soapy bath, like boiling milk.

Madeira has been pummeled by rain since November. Locals told us they hadn’t seen this much rain in more than 14 years.



Cascata do Risco, Rabaçal, Madeira. Photograph provided by the author.

The week before we were scheduled to arrive, a wall of mud flowed out of the mountains and ripped through the center of Funchal, flooding parking lots and streets and stores. Boulders the size of our little Clio stood in the middle of streets. Sidewalks were caked in mud. More than forty lives were lost. We debated canceling our trip, but were reassured by friends and the owners of our hotel that all was fine, the island would return to normal. The sun didn’t get the memo.

One day, as we were driving in search of the sun, rain began to fall. Wind whipped trees and branches and leaves across the road. The car’s thermometer read 4°C (forty Fahrenheit). The rain turned to sleet, jabbing the windows. The sleet turned to hail the size of pencil erasers. White pellets bounced off the pavement, off the car. Five minutes of hail falling so fast the road was white with it. The black macadam looked like the whipped white waves. I worried about the comprehensive damage waiver (CDW) I had refused to purchase and Europcar’s warning that I’d be liable for the cost of the car, 13,110 euros, if it were damaged. I searched for a tree under which to hide, but the roads on this island are so narrow that only one car can pass at a time. To stop by the side of the road would be to stop in the middle of the road, and there was a bus behind me that didn’t seem interested in stopping for anything. Around the next bend, though, the hail stopped—like we had walked through a door into a different room where the sun was shining.

By the end of the week, I was exhausted from driving. Not because I did all of it—my companion could not drive a stick-shift—but because of the winding, twisting roads that switched back and hair-pinned through dark cavernous tunnels hundreds of years old and turned corners to face down cliffs that dropped 500 feet, sometimes more, into an abyss I couldn’t even see. Often there was nothing between the car and the ocean below but a cement pylon no bigger than a block of dry ice. I clutched the wheel like a life preserver. I shifted gears quickly because I feared having only one hand on the wheel. I mumbled to myself that there was no cliff, that trees or a road bed would protect a fall. Once, I had driven towards one of those ancient rock-walled tunnels without realizing that the road, just wide enough for one car, was closed, blocked by fallen rocks. I maneuvered a ten-point U-turn facing a crumbling

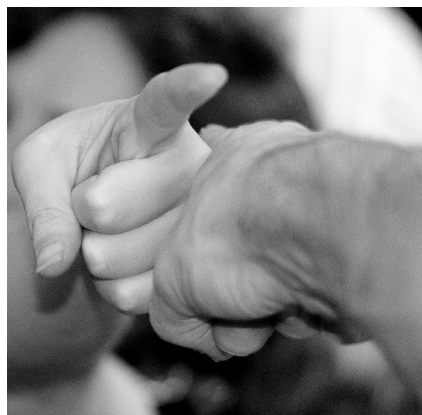
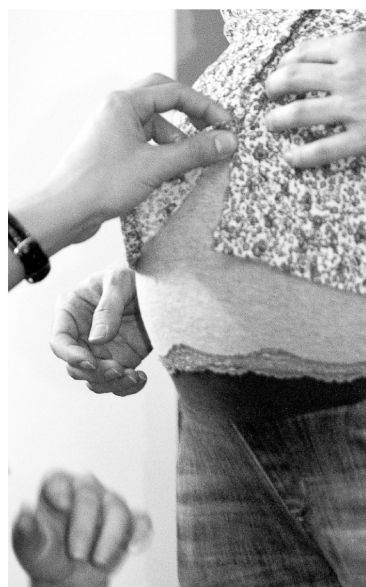
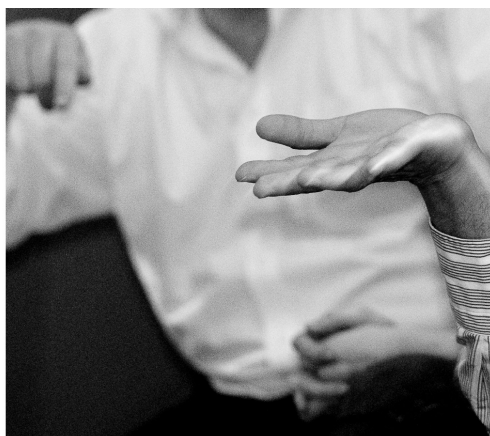
shoulder, a sheer sea cliff ten stories high, and the wide, rough ocean. Each time I shifted into first I worried that I would gun the engine and find myself slipping down the side of the mountain into the rocky shore below, Toonces-style. Later, in a small village, cross-traffic forced me to stop just below the crest of a hill. The streets were wet from rain and my left front tire was on a metal grate. When I shifted into gear, the wheels spun. A woman emerged from her home to investigate the smell of burn-

ing rubber. I let out the brake and rolled backwards down a windy road between two rock walls while wishing I hadn't refused the CDW. Eventually I managed to get the car moving and surged through the intersection in the blind hope there would be no cross traffic.

We stole away from Madeira in the middle of a clear night. A sleepy-eyed night clerk roused himself from a wicker sofa long enough to watch us through glass lobby doors. The storms, for the

nonce, had abated and the seas were calm, a gentle rustle over the rocky shore. For only the second time in a week I could see stars. The yellow lights of Funchal guided me to the airport; I pretended each lamp was the sun that had spent the week eluding me. Despite the stormy seas and the wind and the sleet and the hail and the rain and the paralyzing heights, I felt a little sad as the plane took off into a bright, blue sky. The sun was rising. It was going to be a beautiful day in Madeira. ☺

Life on a Roll



Can U Handle It?
Digital Discussions by Daniel Andor

