

Natural Selection

A NEWSLETTER OF THE ROCKEFELLER UNIVERSITY COMMUNITY

A Spin through the Past: Early Centrifuges and Microtomes in Flexner Hall's Historic Lab

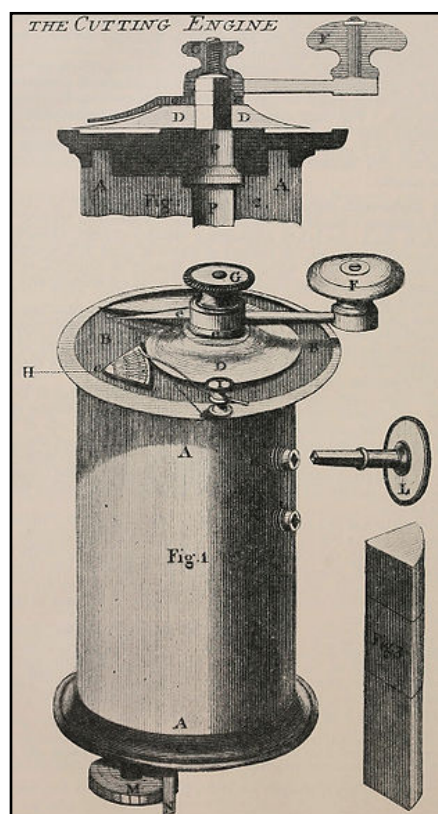
CLAIRE WARRINER

When learning about the accomplishments of past scientists, it seems natural to focus on their moments of discovery. Less often told are the stories of the arduous processes by which those discoveries were made and the technology that made them possible. Rather than a few, once-in-a-lifetime eureka moments, science's great legacy is built on innumerable hours spent, for example, sectioning tissue or waiting for a spin to finish.

The Rockefeller University's Historic Lab, located on the first floor of Flexner Hall, is exhibiting several scientific instruments highlighted in Dr. Carol Moberg's book, *Entering an Unseen World: A Founding Laboratory and Origins of Modern Cell Biology 1910-1974*. The exhibit, curated by Dr. Moberg and Olga Nilova, Outreach and Special Collections Librarian, brings to life the birth of modern cell biology at what was then called The Rockefeller Institute. In addition to copies of historical letters, the exhibit features scientific tools, two centrifuges, and two microtomes, all of which played key roles in the development of this nascent science. Three of these four tools were designed at Rockefeller in response to specific research needs and were the prototypes for modern centrifuges and microtomes used in laboratories around the world today. The instruments are arranged in the display in a way that tells a chronological history, beginning with research done in the wake of Peyton Rous and James B. Murphy's split over the origins of cancer and extending to the use of the electron microscope.

Albert Claude, a Belgian post-doc under Murphy, dedicated his early career in the 1930s to cancer research. He hoped to isolate the cancer-causing agent from malignant chicken tumors, later found to be caused by the Rous sarcoma virus. His goal was to validate Murphy's chemical theory

of cancer, a view that differed sharply from Rous's viral theory. To carry out this task, Claude chose the model B size 1 International Equipment Corporation centrifuge (now present in the exhibit). This small, electrically driven tabletop centrifuge has a 51-degree angle rotor head, spins at a speed of 4,000 rpm, and has to be used in a cold room because it lacks its own refrigeration system to reduce frictional heat. As shown in the exhibit, an external pulley-equipped rotor can be added to the centrifuge to increase its maximum speed to 17,000 rpm. Using this tool, Claude isolated what he believed to be the tumor-causing agent. He was further able to estimate its size and weight by comparing it with the known weight and size of hemocyanin, and the force and time necessary to extract it by centrifugation.



These findings were published in 1937, but what Claude did not know at the time was that the agent he had isolated was in fact the ribosome. In later experiments, he isolated the mitochondria, thus creating the technique of cell fractionation by differential centrifugation, and shedding light on the formerly unseen world of subcellular structures. But the centrifuge Claude used was imperfect. A tenth of his substance of interest was not recoverable and the boundaries of heavier fractions were blurred, implying incomplete sample separation. Better technology was required.

With these problems in mind, Josef Blum, an instrument maker at The Rockefeller Institute, engineered a centrifuge also on display in the exhibit. Completed in 1945, this motor-driven centrifuge reaches speeds of up to 20,000 rpm and features a specially angled Swedish-patented head. Its most noteworthy aspect is the self-centering direct drive mechanism that automatically balances samples of slightly uneven weight, allowing for greater stability during a spin. This centrifuge was still required to be run in a cold room, but, in 1946, Blum added an exterior vacuum and refrigeration system. This prototype (not shown in the exhibit) became the model for the commercially produced Blum-Sorvall centrifuge in late 1947. These centrifuges allowed for a more precise structural and chemical dissection of the cell and paved the way for the development of modern cell biology.

The exhibit tracks the development of the microtome as well. Crude sectioning devices have existed since the birth of the light microscope, but it was not until the advent of the electron microscope that the need for very thin tissue sections sparked the development of more advanced microtomes. In 1946, Josef Blum developed a prototype (present in the exhibit) for Albert Claude,

which contains many features still found in modern microtomes. This hand-powered Claude-Blum microtome was the first to allow continuous movement of the tissue block and has a system of belts and pulleys that allow tissue to be sectioned at various thicknesses as thin as 0.1 micrometers. Other original features include a circular movement of the tissue block that protected it on the return stroke of the microtome blade and a trough of water into which the tissue sections fall. The embedding medium was a mix of camphor and naphthalene that is solid at or below 4° Celsius, requiring that it be used in a cold room, but which evaporates at room temperature, allowing for residue-free tissue sections. Blade choice was also an important factor in sectioning, but the steel knives and razor blades in use at the time proved inconsistent or quick to dull.

To ameliorate the quality of electron microscope images, tissue fixation had to be improved. With this in mind, the Porter-Blum microtome (present in the exhibit) was developed in 1952 by Keith Porter and Josef Blum. This new model was an improvement due in part to the use of a methacrylate embedding medium and an effective glass knife. The microtome also used a single-pass mechanism that guided the tissue block across the blade in a parallelogram-shaped motion. The tissue was moved

towards the blade by the thermal expansion of a horizontal metal bar heated by a reading lamp, and ribbons of serial sections fell into a water bath below the blade. A revised version of this microtome that could cut sections from 25 to 500 nanometers was developed by Blum in 1953 and made commercially available through Ivan Sorvall. The Porter-Blum microtome proved more reliable and precise than its predecessor and allowed for electron microscope images of greater quality. Interestingly, the instrument was never patented and thus a profit was never collected, despite its commercial popularity. As cited in Dr. Moberg's book, Porter later explained that the The Rockefeller Institute "was operated for the benefit of humanity," a sentiment in keeping with the University's motto.

The Historic Lab's special exhibit on the tools that aided the founders of modern cell biology to carry out their seminal discoveries is a must-see for anyone interested in Rockefeller's past and science history. The pieces in the exhibit transform the exciting story of the birth of this field into something tangible. It reminds the viewer that new questions are the impetus behind the development of improved technology, which in turn allows new answers to biological puzzles. Lastly, this exhibit may even dare us to wonder if in many years, when scientific technology has progressed

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beyond our twenty-first century imaginations, will our own laser-scanning microscope or bench-top sequencing machine sit in the corner of an historic lab? And, more importantly, will there be a story behind these artifacts worth telling? ☉

To make an appointment to view this exhibit, contact Dr. Moberg or Ms. Nilova.

Reference: Carol Moberg, *Entering an Unseen World: A Founding Laboratory and Origins of Modern Cell Biology 1910-1974* (New York: The Rockefeller University Press, 2012).

Summer in the City

AILEEN MARSHALL

New York City has been called the "Capital of the World." There are so many exciting things to see and do here. Unfortunately, it can also be one of the most expensive cities to live in or visit. That makes it tough for those of us in the academic sector, who don't make Wall Street salaries. However, come the hot summer days, there is a wide range of outdoor activities that are either free or inexpensive.

Probably the most well-known are the free concerts at the Great Lawn in Central Park. The New York Philharmonic will present its usual two concerts this year on July 13 and July 15, 2013. Concerts start at 8:00 p.m., with fireworks afterwards. These concerts are famous for people picnicking on the Great Lawn. If you are more interested in hearing the concert, arrive early to get a place up front. The more serious picnickers are near the south end. Enter the park at 79th Street and Fifth Avenue for easy access. More information about these concerts can be found at www.nyphil.org.

Another great Central Park event series is SummerStage. Held at Rumsey Playfield, the series features a wide range of music, dance, and spoken word performances. Some of the big headliners this year will be NPR's *Ask Me Another*, Joan Baez with Indigo Girls, and the Metropolitan Opera. Most events are free, but there are a few benefit concerts put on throughout the summer. For some

of the more popular artists, a line forms in front of the gate well beforehand. There are bleacher seats in back, with AstroTurf up front, sometimes set up with folding chairs. You can bring in food—but no glass bottles—and there are refreshment vendors inside as well. Enter the park at 69th Street and Fifth Avenue and follow the path to Rumsey Playfield. For a complete schedule, go to www.cityparksfoundation.org/summerstage.

One of the best Central Park activities is Shakespeare in the Park. Produced by the Public Theater and presented at the Delacorte Theater in the park, this year's plays will be *The Comedy of Errors* (May 28-June 30) followed by *Love's Labour's Lost*, a new musical based on the original play (July 23-August 18). Tickets are free and can be obtained by standing in line in front of the Delacorte Theater at noon or on the Web site. These are acclaimed productions; I once saw Jimmy Smits on the stage and Tom Hanks in the audience. The complete schedule can be found at www.shakespeareinthepark.org.

Lincoln Center hosts some very fun and inexpensive events in the summer at its Josie Robertson Plaza. Lincoln Center Out of Doors presents a range of international music and dance events, with some special events for children. This series is free and runs

from July 24 through August 11 this year. Performers run the gamut from Ruben Blades to Nick Lowe and many, many others. Mid-summer Night Swing—also at Lincoln Center—is a run of dance events from June 25-July 13 with everything from salsa to disco. There are group dance lessons at 6:00 p.m. and live music at 7:30 p.m. Some events require a \$17 ticket but some are free! More information can be found at www.lincolncenter.org.

HBO sponsors a summer film series at Bryant Park on Monday nights from June 17-August 19. Blankets and food are allowed. The lawn opens at 5:00 p.m., but a crowd usually gathers well in advance to get a spot. The movies begin at sunset, and an old Warner Brothers cartoon is shown beforehand. People will cheer for Porky Pig's famous sign off ("That's all folks!"). The complete schedule will be at www.bryantpark.org/plan-your-visit/filmfestival. At both the Central Park Great Lawn concerts and Bryant Park, it is traditional to have some members of your group arrive early to secure a spot, and have some predetermined arrangement of balloons or a flag for the rest of the group to find.

Another great venue is Hudson River Park. It runs for five miles along the Hudson River and a plethora of summer events take place there, all free. The Moon Dance series features a live band on Sun-

day nights, with styles ranging from swing to tango. At Pier 84, on West 14th Street, dance lessons are given at 6:30 p.m. and the bands start at 7:00 p.m. The RiverRocks series, also on Pier 84, focuses on up-and-coming musicians on Thursday nights. The RiverFlicks events feature two series of outdoors movies. These Wednesday night movies are held on Pier 63 from July 10 through August 21. The theme this year is 2012's blockbusters, including such great movies as *The Hunger Games* and *Argo*. The Friday night movies are more family-oriented, including such fare as *Who Framed Roger Rabbit?* and *Beetlejuice*. These are shown on Pier 46, at Charles and West streets. Both movie series start at sunset. Free popcorn is available if you arrive early. Some seating is provided, or you can bring a blanket to sit on. The RiverFlicks events are usually not as crowded as the Bryant Park movies. The Hudson River Park Trust also hosts several other series of free summer events. More information can be found at www.hudsonriverpark.org.

Two good websites to find information about these and other events in the city are: www.newyorkkled.com and <http://newyork.citysearch.com>. The NewYorkkled site also includes a complete calendar of the city's many street fairs. With all of these options available, one can have a great summer in the city without going broke. ☉

Culture Corner

Television Review: *Da Vinci's Demons* (Starz network; Fridays at 9:00 p.m.)

BERNIE LANGS



Superhero Leonardo da Vinci's late self-portrait

Having seen the previews, I decided to watch the first episode of the British-exported television series *Da Vinci's Demons* with the idea in mind of writing a scathing review of the show for its comic book depiction of one of the world's greatest geniuses, Leonardo da Vinci (1452-1519), hero of the Italian Renaissance. As I viewed the show, I became surprisingly engaged and found myself tuning in a week later for the second episode, which, though weaker than the premiere, held my interest enough for me to want to watch future episodes. That's not to say the show isn't ridiculous, cartoonish, and nothing like the times or the man it features. I currently don't watch any television weekly series, so it's quite a shock that I'm engaged with this one.

The show is the brainchild of David S. Goyer, who serves as its creator, writer, director, and executive producer. He is best

known for working with director Christopher Nolan on the screenplay of the recent blockbuster *Batman* movies. Leonardo is playfully portrayed by Tom Riley. My initial anger at the premise of the show sprang from my sense that Leonardo da Vinci, once a real man of flesh and blood, doesn't deserve to be exploited in the way that a fictional character like Sherlock Holmes has been—in other words, depicted as an action figure, as a genius with a racing mind who fights like a ninja and reacts with lightning quick reflexes, who is cursed for “seeing too much—seeing everything.” *Da Vinci's Demons* works best when we are privy to the machinations of Leonardo's mind, when he will see something and we are treated to his inner vision, graphically shown in the manner of what we know from the reproductions we've all viewed of the Master's famous notebooks.

I decided to look over the short overview of the life of da Vinci written by Giorgio Vasari (1511-1574), who wrote biographies of Renaissance masters in his famous treatise, *Lives of the Most Eminent Painters, Sculptors, and Architects*. In the television series, da Vinci's father is depicted as cruel and at odds with his son politically, but that was not the case according to Vasari. Vasari also notes about Leonardo that “often when pass-

ing by the places where they sold birds he would take them out of their cages, and paying the price that was asked for them, would let them fly away into the air, restoring to them their lost liberty.” In the Starz series, Leonardo buys a cage full of birds, releases them immediately, and in the best moment of the first episode, watches them with superhuman power to learn about their method of flight as the cameras capture the birds in glorious slow motion and we are treated again to da Vinci's schematizations of flying. A scene where he tests his flying device on an unwitting assistant is less successful in action and humor.

The show's action tends to center on absurd conspiracies and plots, much of which pits the ruling Florentine Medici family against the Pope in the quest for a mystic “Book of Leaves.” There is also absurd dialogue between da Vinci and his spying lover, who utters an obscenity in bed with Leonardo as ridiculous as Anne Baxter's line to Charlton Heston in the 1950s film, *The Ten Commandments*, when she bemoans her frustration by uttering, “Oh, Moses, Moses, Moses.” But we are also treated in the show to see da Vinci rattle off a sketch of the young woman, quite in Renaissance style except that he would have done her in profile and

not three quarters view. At least they make Leonardo left-handed and maintain his famous scribble.

Many years ago I read Kenneth Clark's famous biography of da Vinci and I took many months to read Clark's multi-volume work of detailed analysis of every single

sheet from da Vinci's notebooks in the collection of Her Majesty the Queen of England. I found this an exciting venture, but I realize that perhaps a dry television series on the real da Vinci wouldn't really be all that great. So we've got what we've got and *Da Vinci's Demons* is much better than the

usual fare that passes as television series entertainment these days outside of some of those on HBO such as *The Sopranos*. I told my teenage daughter that the mainstream series she watches really seem unimaginative and formulaic. "When I was a kid," I chided, "we had a talking horse!" ☉

Stopping to Smell the Rhododendron

JESSICA PHIPPARD

A sense of calm overcomes me as I enter campus each morning, the street sounds fading out as the stresses of the morning commute melt away. It is the landscaping on campus that does this to me. Despite any anxieties about what the day may bring, the flowers and trees in sharp contrast to the urban environment put my mind at ease. This concept of plant life improving mood is a popular study in the field of psychology, and I believe this is true regardless of whether or not we actively revere our surroundings. Whether this is a learned association or something more deeply rooted in our evolution, it matters not; my workday is more enjoyable due to the vibrant surroundings.

Winter or summer, it is the tall centenarian London Plane trees lining the main path up from 66th Street that best stand out to me. In the warm months it is their shade which I most readily embrace, but in the cooler months when their branches are bare, I simply admire their striking grace amidst the city backdrop. While they enrich our air with fresh oxygen and provide

a home for birds and small animals, tall trees to me represent a bookmark in history. It is a humbling experience to walk among these London Planes, which have no doubt inspired innumerable great minds over the last century. A hybrid of the American Sycamore and the Oriental Plane tree, the London Plane is a hearty tree ideal for city life; in fact, its leaf is the symbol for the New York City Parks Department. With its far reaching limbs and high leaf to branch ratio, the London Plane tree is the most effective tree in the city at carbon sequestration; as the home of over seventy of these beauties, The Rockefeller University is doing its part to green New York.

While the London Plane represents the largest group of the more than 360 trees on campus, it is just one of forty-five species of trees which make up our robust landscape. In the spring, the blooming varieties of flowering trees lining the gates along York Avenue welcome those of us entering campus, as well as passersby, and wildlife. The magnolias and dogwoods are popular

ing trees and some of the first flowers to declare the onset of spring. Named for the Celtic word "dag," meaning "wooden tool," the dogwoods were so-named for their hard wood. Dogwood flowers, having four petals, are often seen as a Christian symbol, appearing to represent a cross. According to the bible, wood from a dogwood tree was used to crucify Jesus.

Probably the showiest plants on campus are the azaleas and rhododendron: the flowery shrubs abundant in red, white, purple, and various shades of pink. Related to one another, azaleas and rhododendron have a similar flower but the leaves and size of the plant are distinctive. Azaleas and some other species of rhododendron are known to be toxic; for this reason, the rhododendron is a symbol of caution. To receive a bouquet of azaleas and rhododendron in a black vase is a bad omen, signifying a death threat.

Hydrangeas are another mildly toxic, yet beautiful flower found on campus. This plant produces a large pompom of white or blue flowers, with the coloring dependent on the acidity of the soil. The boastful bloom is often seen as a symbol of abundance, devotion, and enlightenment. I especially enjoy spotting hydrangea because they were a favorite element in my great grandmother's garden. Whenever I see one, I am transported back to the time I spent with her. In light of my feelings towards the hydrangea, I realize that some of my fondness for plants is due to a learned experience within my lifetime; however, I do not doubt the deeper evolutionary response. But why are we aesthetically attracted to a toxic flower? Because it is pretty and we know better than to eat it. We know it is important to stop and smell the lilacs, or whatever flower we may be passing, to slow down from our hectic lives and enjoy the simple wonder of our complicated world. ☉



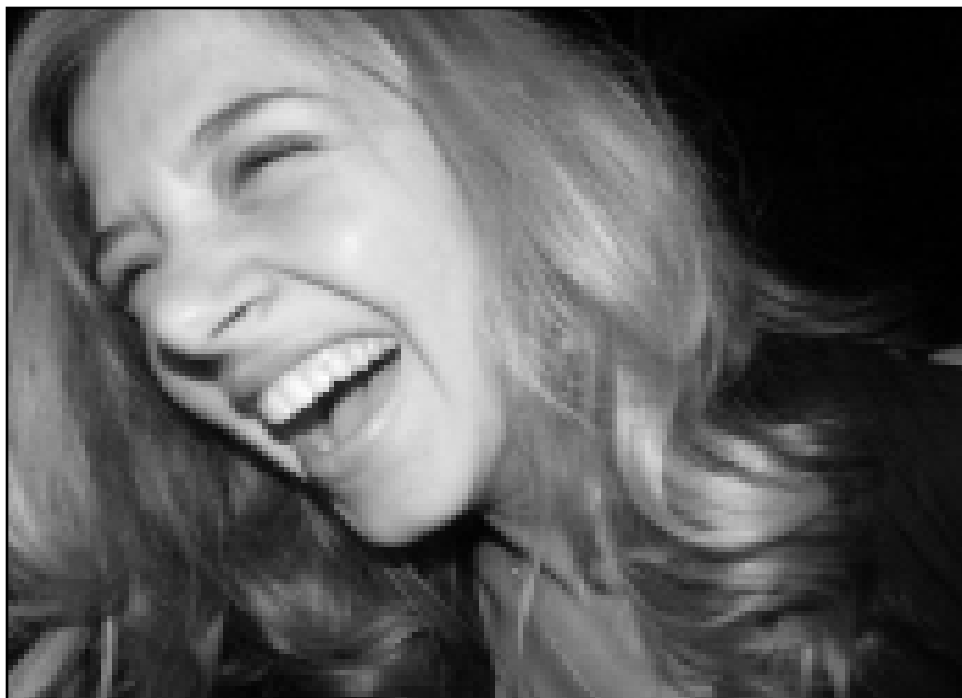
Stop to admire the azaleas, but don't take a bite!
(Photograph by the author)

favorites. Often seen as a symbol of the American South, magnolias are most commonly found in Asia. Dating back 100 million years, these stunning flowers are related to some of the oldest flowering plants; having evolved without bees they produce no nectar and instead create protein-rich pollen which is attractive to beetles. Complementary to the magnolia is the white and pink dogwood flower. Dogwoods are common landscap-



*This Month Natural Selections interviews Leslie Church, Assistant Editor in the Communications and Public Affairs Office.
Country of origin: USA.*

New York State of Mind



1. How long have you been living in the New York area? I have been living in New York City for a little over a year.

2. Where do you live? I live in the East Village. Or, as my phone often likes to (appropriately, I think) autocorrect it, the Easy Village.

3. Which is your favorite neighborhood? My own. On the surface it looks to be all hipsters and NYU kids with something to prove, but half of the residents in my building are tried and true New Yorkers who have been living there for thirty years. They have some stories. And we have [the restaurant] Mud! If you like delicious food and dimly lit cozy cafes with friendly waiters who won't judge you for having dinner by yourself, go to Mud.

4. What do you think is the most overrated thing in the city? And underrated? Overrated—Nothing. The city is exactly as amazing and as trying as everyone says it is.

Underrated—This probably isn't what you're going for but I am always amazed at the ability of people to raise children in New York City. I can barely keep myself alive here. I can't imagine trying to do that for another human being.

5. What do you miss most when you are out of town? Chatting with my MTA guy, Jerry, who stands at the 14th Street and First Avenue bus stop and makes sure the nice elderly ladies and the frazzled, running-late-for-work twenty-somethings (like me) actually get on the bus. He remembers everything I tell him about my family and my work life and always has something cheery to say. Like everyone says, it's those kinds of relationships that make the city wonderful. That, and the fact that I never have to walk more than ten feet to find froyo.

6. If you could change one thing about NYC, what would that be?

Ladies and gentlemen: a crowded subway is no excuse for sneezing on the person next to you.

7. What is your favorite weekend activity in NYC?

My ideal Saturday would be a morning jog along the Hudson River Park, then wandering around a farmers market or the Strand bookstore or MoMA, and then sitting on the steps at

Union Square and watching the skateboarders while I eat a falafel sandwich. Unfortunately, many Saturdays turn out to be more like me waking up at noon and spending five hours at brunch with some friends, nursing an accidental hangover.

8. What is the most memorable experience you have had in NYC? When I first moved here and didn't have any friends yet, I used to ride the subway to the end of the line and then get off and explore. Once, I went even further and hopped on a bus and wound up stranded on City Island. It was so neat—a little fishing village completely separated from the city, but still part of the Bronx. I walked the whole thing and then made friends with a nice couple who drove me back to the city.

9. If you could live anywhere else, where would that be? Eventually, when I've "had it up to here" with the hordes of people and the smog and the overpriced rent, I'll move back upstate—somewhere around Ithaca, on the Finger Lakes, by the woods, where my nearest neighbor is at least 500 feet away. But I would have to come back and visit often.

10. Do you think of yourself as a New Yorker? Most people don't know this, but there is a whole enormous state attached to New York City. And I grew up there. So even though I've only lived in the city for a year, I've always been a New Yorker do consider myself a New Yorker. I am not sure when that happened, or if I can, indeed, rightfully consider myself a New Yorker. ☺

NATURAL SELECTIONS



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Email: naturalselections@rockefeller.edu

An RU Graduate Looks Back

MAYLA HSU

What was it like to start graduate school at RU during the Kennedy administration? I had a glimpse of the past when I spoke to Nicholas H. Acheson, RU Class of 1969, who is now an Emeritus Professor of Microbiology and Immunology at McGill University. In a wide-ranging conversation, Acheson, a tall, erudite gentleman, reminisced about student life in a pioneering scientific university, among path-breaking scientists doing research that would launch entirely new fields of inquiry and earn multiple Nobel Prizes. New York City during the social upheavals of the 1960s formed a backdrop.

Acheson, 71, was at Harvard University doing a senior year project in James Watson's lab, when he first learned of newly discovered viruses that infect bacteria, known as bacteriophages (or "phages"). The new phages were a curiosity because they use RNA—not DNA—as their genetic material, so understanding them illuminated an entirely new form of life. As Acheson began thinking about graduate school, RNA phages had been recently isolated from the sewers of New York City and described by Norton Zinder at RU, which prompted Acheson to become interested in RU's graduate school. During the admissions process, he interviewed with then-

President Detlev Bronk, and remembers barely getting a word in edgewise as Dr. Bronk enthused about various subjects like Greek philosophy and the graduate program. As a driving force behind establishing the graduate school at RU, which saw its first graduating class in 1959, Bronk saw students as instrumental in shaking up the hierarchy of science and research, making it sound like a very appealing place to study.

The summer after graduating, Acheson went to Chiapas, Mexico, to work on a project in ethnobiology, and met many students from New York. They were lively, intense people who made NYC sound like an exhilarating place to be. He arrived on the RU campus in the fall of 1963, which was an extraordinary time to be studying science at RU because the molecular biology revolution had begun. There were new tools available to identify and study specialized structures of cells and to more thoroughly decipher how DNA and RNA encoded proteins. Since viruses parasitize cells and exploit their replication in order to reproduce, they too could be used to understand the fundamentals of life. It felt like a time when exciting new things were just about to be discovered.

Acheson recalls that students were given a great deal of support and attention from professors, and were immediately accepted as junior partners in their labs. They were free to take classes, read scientific journals, and try possible thesis projects that might not always succeed. Although he began projects on poliovirus and chikungunya virus, he dropped these studies early on. By his second year, he took a cell biology course taught by George Palade, the pioneer of electron microscopy (EM), who was using it to study subcellular structure. As President Bronk had hoped, students brought together labs that previously did not interact. After being inspired by the potential of EM, Acheson chose a project bringing together the interests of Igor Tamm, his Ph.D. supervisor, a medical virologist, with those of Palade: studying a newly isolated RNA alphavirus called Semliki Forest virus (SFV). SFV grows in chick embryos, and after preparing thin sections of infected cells, Acheson used EM to photograph the virus nucleocapsids (similar to the shell casings) assembling in the cyto-



(Photograph courtesy of Nick Acheson)

plasm, and developed techniques to describe the biochemistry of the virus. These descriptions of virus growth became his thesis project and led to several publications.

"We would talk to each other a lot, student-student interactions...There was a lot of cross-fertilization that happened, that hadn't before the Ph.D. program was brought in." He fondly recalls working on the fifth floor of Founder's Hall, one floor below the ultracentrifuges housed in Alexis Carrell's former lab, which was lit by skylights from the days when Carrell did not allow any light bulbs, as he believed that research was optimally carried out by natural light. The lab also kept a goose on the sixth floor as a source of red blood cells for hemagglutination assays, a fast quantitative assay for virus.

There was no rush to finish graduate school, and academic life was perhaps more contemplative than it is now. Life experience was appreciated, even if it meant time away from research. Tamm, an Estonian who had escaped World War II by hiding on a coal barge to Sweden, suffered lifelong effects from breathing coal dust, and because of his health, he valued the richness of life. So he approved when, in the summer of 1964, Acheson took four months away from his Ph.D. program to study German at the Goethe Institute near Munich, followed by travel in Europe. And in 1967, after an animal behavior course, Acheson went to Uganda to study Colobus monkeys, visiting the actual Semliki Forest where the virus he was studying was discovered, all with the blessing of his professors and the university. "Detlev Bronk really felt that once a student was there, they were going



(Photograph courtesy of Nick Acheson)

to be nurtured and helped and developed into a full human being, not just a scientist. He was a pretty special kind of person.”

Science communication was slower in the 1960s than now, and was accomplished mostly through the professors’ phone networks, attending seminars and conferences, and sitting to read entire issues of journals as they arrived. The volume of information was lower, and time could be spent thoroughly reading and thinking about science articles as they were published. Newspapers—not TV—were an important means of learning what was happening in the outside world. Acheson comments that “science has evolved such that you are all the time writing grants and publishing papers, and have a big lab with a lot of postdocs and have to churn out a certain number of papers per year. Everything is very high-pressure, so it’s very difficult to find the time or to be the kind of person who appreciates mentoring on a person-to-person basis. It’s changed.”

Looking back, Acheson remembers a science-focused life on the RU campus for students, who were housed on the campus and served breakfast and dinner in the Abby Aldrich Dining Hall by young black women dressed in white uniforms, which “sounds like another century.” (*It certainly was another century!*) It was here that students and staff, together, in shock, watched TV coverage of the Kennedy assassination,

“a devastating blow for people my age, and of course others as well.” Lunches were served in Founder’s Hall, where, seated at long tables, students ate for free with professors, and during this time, had many scientific exchanges and made lifelong friendships. One professor arranged for free tickets to dress rehearsals of the Metropolitan Opera, which were held midday during the work week and which Acheson enthusiastically attended.

After a year in RU student housing, Acheson and his roommate decided it was too confining to eat, sleep, and work on campus, so they moved to the Lower East Side to “a crappy apartment,” which was a completely different environment from RU. He remembers sometimes seeing the poet Allen Ginsberg in his neighborhood, and went to hear Miles Davis perform. He was a fan of a band called The Fugs (“whose name was like the other word”), who performed political and satirical rock. Watching belly dancers at a Turkish restaurant was an occasional diversion. A New York experience not commonly associated with RU research was the familiarity Acheson developed with night court, to reduce the numerous parking tickets he acquired from street parking violations. (Because professors used the electron microscope during the day, students used it late into the night, and he frequently overslept and missed the 9 a.m. deadline to move the car.)

New York City in the 1960s was a time of cultural upheaval, and many RU students were politically engaged. Acheson was in a discussion group that published a student newspaper about the Vietnam War, and they investigated RU investments and the support of big business for the war. “We were very aware, [and were] in a bit of a rebellious mood. That’s what was going on.” He found time to electioneer for Lyndon B. Johnson during the 1964 election campaign against Barry Goldwater, “who said bomb the hell out of them, with nuclear bombs—that was his policy. He was a kind of an anti-intellectual, inspired fear in a lot of people like me.” Acheson remembers 1968 as a particularly tumultuous year, with the assassinations of Martin Luther King, Jr. and Robert F. Kennedy, police attacking demonstrators at the Democratic National Convention in Chicago, and Mayor Daley saying, “f**k you” on national TV. The defiant spirit of his class prevailed up until the end. At commencement, some graduating RU students—Acheson thinks he was one—wore “Stop ABM” (anti-ballistic missiles) buttons on their gowns. In his address to the crowd, the president said that some students had requested that commencement be “devoted to what they regard as more socially important or relevant matters than science,” but that request was denied.

By the end of his studies, Acheson felt ready to leave, and was well-prepared to move on with molecular biology techniques he had learned at RU. After a post-doctoral fellowship in Switzerland, he went on to direct his own lab studying tumor formation by polyoma viruses at McGill University in Montreal, Canada, where he has now retired. He has written a textbook, *Fundamentals of Molecular Virology* (John Wiley & Sons), which is now in its second edition and is aimed at senior-level undergraduate students. Looking back, Acheson says that student life at RU was a formative and happy time. “We were given a great education and also enjoyed life at the same time. It’s a great luxury, but that’s what life is all about, right?” And while scientists come and go, research is forever. Fifty years after a young graduate student took the first pictures of Semliki Forest virus in an electron microscope, that virus is still studied, serving as a model for pathogenic alphaviruses, vaccine development, and in gene therapy for cancer. ◉



(Photograph courtesy of Nick Acheson)

Life on a Roll



The Basilica of Sacré-Coeur by Elodie Pauwels, <http://elodiephoto.wordpress.com>



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