

Natural Selections

A NEWSLETTER OF THE ROCKEFELLER UNIVERSITY COMMUNITY

To Dubrovnik, with love

QIONG WANG

If you are not very familiar with the city of Dubrovnik, Croatia, you must have heard of “Game of Thrones.” Yes, the HBO series was filmed there. Dubrovnik is located on the very southern tip of Croatia by the east coast of the Adriatic Sea. The entire city is built on sea cliffs, encircled by 3-to-5-meters-thick, 25-meters-high and 1950-meters-long brick walls, constructed mostly from the 13th to the 17th centuries. These city walls rise up and down along the cliff rocks, having protected the city for nearly 1000 years from both the sea and the land, are still standing strong and admirable. Five fortresses of different sizes, altitudes and styles are niched in between the walls. The sight of this marvelous city and its geographic setting reminded me immediately of the legendary city of Constantine during the Byzantine Empire, even though I have never been there.

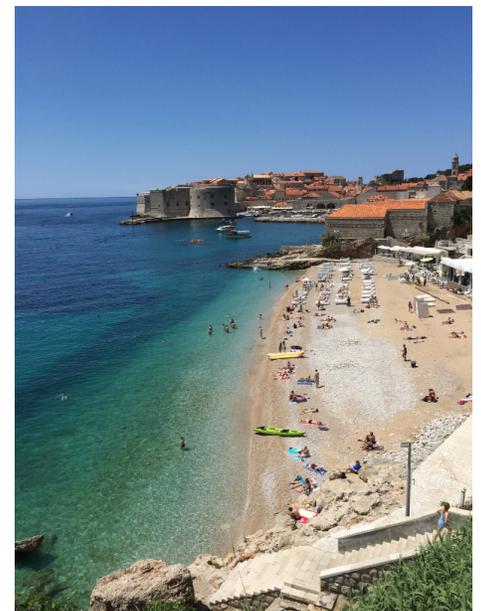
The Nobel Prize winner Ivo Andric said that the city roofs alone could be a subject of an entire study. If you look at any city in the world from the air, Dubrovnik is probably one of the most easily identifiable cities. Climbing onto the top of the city wall, a



sea of red slanted tile roofs of various sizes and orientation flashed in front of my eyes, making me fascinated with their texture and structure immediately. They snuggled so nicely together, without any clay in between it seemed. At some places on the city wall, they are within reach. Under the sun, the roof shadow brought out great contrast for different shades of red, crimson, and maple, random yet harmonious. The 50-shades-of-red on the roof tiles are vibrant but not flirty, because their high spirits are brought securely to the ground by the unanimously clay-colored solid stone houses, a great background color to address the roof tiles.

As a beautiful medieval city on the east coast of the Adriatic Sea, Dubrovnik went through great prosperity during the golden era of Mediterranean trading, and became the business and trading center of the south Dalmatian region, rivaling against Venice at the time. Because of its geographic and business significance, Dubrovnik had always been under the protection of dif-

ferent cross-continental empire powers. Dubrovnik was pretty lucky in this way. Its geographic location is a gift from god, making it far from the most turbulent regions. However in 1667, on a morning just before





any signs of wear and tear for over 1500 years. However, today's Dubrovnik is one of the "youngest" cities I have been to. Walking through the streets of Dubrovnik, you can see people enjoying their lives in every open bar and plaza. Soon after sunset, street lights, city wall lights, restaurants and bars light up the entire city inside and out. Streets are flooded with tables, chairs, and different shapes of awnings. You can hear people chatting, laughing, eating and playing music from a distance. I don't know how late this boisterous scene dies down, but it sure reminded me of New York City.

It is hard not to be enchanted by Dubrovnik when it has a great combination of a naturally beautiful Adriatic beach and the historical depth of a well-preserved UNESCO world heritage medieval city wall. During my last moments in Dubrovnik, I went to the Banje beach to pay the city one more glance from a distance. The beach is located on the east side of Dubrovnik. It was not the smoothest, nor the biggest beach I have set my foot on. As a matter of fact, I could hardly walk on it because of the pain felt from my bare feet. It took me a while to get adjusted without screaming too much. However, I was swept away by the scene the moment I set my eyes on the beach, the water, the blue sky, and the castle in distance. The water by the beach is so clear with zero

contamination that you can see the shadows of kayaks on the seafloor. The water color changes gradually from transparent, to a clear blue-green, and to navy blue, as you look further into the sea. It is like a precious gem. Where the sea ends is not just vast blue sky. Scrubs of green islands are also in sight, very decorative. What distinguishes Dubrovnik Banje beach from many other beautiful Caribbean beaches is the view of the east facade of the entire historical city wall and fortresses, which, if you didn't know, is the signature view of Dubrovnik, and is the site to see Dubrovnik's sunset. ☉

Easter, a major earthquake hit Dubrovnik, killing about half the inhabitants. Many buildings were damaged, including my favorite construction in the city, the Onofrio's Fountain. This 15th century rotunda-shaped monstrous structure was used to supply water to the city habitants in the past via 16 masked animal faces, when drinking water was scarce. This fountain is like no other fountain I have ever seen, cute, oversized and down-to-earth, just like the Baymax of Dubrovnik.

Dubrovnik has struggled to not show

For Your Consideration – Ones to Watch, Vol. 1 Edition

JIM KELLER

This month we begin our four-part series that will take us all the way up to Oscar nominations in January 2016 by discussing the leading ladies of the Best Actress race. While it was slim pickings for last year's crop, this year appears to feature some strong, bona fide leads out of the gate, but still pales in comparison to the Best Actor race. Last year's narrative was a tale of three actresses overdue for a win (Amy Adams, Julianne Moore and Jessica Chastain). The category was so underrepresented in Hollywood that a supporting actress (not a lead) took one of the top spots. What will this year's story be? Will our top five be true leads? These are the questions we will be looking to answer in the next couple of months. So let's first examine last year's Best Actress nomination results and see who won over Oscar.

Although Reese Witherspoon and Rosamund Pike received Best Actress nomi-

nations for *Wild* and *Gone Girl*, the Best Actress Oscar went to a very deserving Julianne Moore for *Still Alice*. Meanwhile, Oscar queen, Meryl Streep, originally discussed in the lead category, earned a Supporting Actress nomination for *Into the Woods*. Among those performances snubbed by the Academy were Jessica Chastain (*A Most Violent Year*), Amy Adams (*Big Eyes*), and Hilary Swank (*The Homesman*). Rounding out the top five were Felicity Jones for a supporting role in *The Theory of Everything* and Marion Cotillard (*Two Days, One Night*). Both Streep and Cotillard are discussed again this year.

THE QUEEN BEE: Meryl Streep – *Ricki and the Flash* (director: Jonathan Demme):

FYC: This comedic drama focuses on a rock-and-roller who gave up everything to reach for stardom and who returns home to make things right with her family.

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Streep has been discussed every year in this column. As of last January the actress has 16 Oscar nominations under her belt and three Oscar wins—two in lead (*Sophie's Choice* in 1983 and *The Iron Lady* in 2011), and one in supporting (*Kramer vs. Kramer* in 1980). Whether the film ends up being nothing more than summer fun fodder, omitting Streep from consideration is a fool's errand.

THE ACTIVIST: Carey Mulligan – *Suffragette* (director: Sarah Gavron):

FYC: The drama centers on early members of the British feminist movement of the late nineteenth and twentieth centuries—a time when such women were forced underground to pursue a dangerous cat and mouse game with an increasingly brutal State. It is the first film in history to be shot at the Houses of Parliament in the UK and was done with full permission of

members of parliament (MPs). Mulligan earned Best Actress nominations from the Academy, Screen Actors Guild (SAG), and the Broadcast Film Critics Association (BFCA) for 2009's *An Education*. The same role won her the Best Actress award from the British Academy of Film and Television Arts (BAFTA), which also nominated her for its Rising Star award that year. 2011 yielded two supporting nominations from the BFCA (*Shame*) and BAFTA (*Drive*). The film's trailer suggests a strong performance from Mulligan and showcases her range. This film is one of my most anticipated of the year.

THE DARK LADY: Marion Cotillard – *Macbeth* (director: Justin Kurzel):

FYC: The latest adaptation of Shakespeare's play wowed audiences at this year's Cannes Film Festival where it competed for the Palme d'Or. For those living under a rock, the story unfolds when an ill-fated Scottish duke receives a prophecy from three witches that he will become King. Consumed by ambition and goaded by his wife, Macbeth murders the king and takes the throne. Cotillard (Lady Macbeth) continues her hunt for a second Oscar after a Best Actress win in 2008 for *La Vie en Rose* and her aforementioned nomination this year. It's worth mentioning that in 2013 she narrowly missed her first opportunity for a second nomination with *Rust and Bone*—a role that netted her a slew of pre-cursor Best Actress nominations including SAG, BAFTA, BFCA, and France's answer to the Academy Awards, César. Judging on her performance's reception from Cannes, it would be surprising not to see Cotillard in the top five this year.

THE PERENNIAL: Jennifer Lawrence – *Joy* (director: David O. Russell):

FYC: This biopic chronicles the life of Joy Mangano (Lawrence) the struggling Long Island single mom who invented the Miracle Mop and became one of the most successful American entrepreneurs. In 2012, Lawrence won the Best Actress Oscar for *Silver Linings Playbook* (also directed by Russell) after earning her first Best Actress nomination in 2011 for *Winter's Bone*. Last year, she earned a Best Supporting Actress nomination for *American Hustle*.

With this kind of track record we can expect that Lawrence will feature prominently in this year's race. Whether or not she's due for a second win is another ques-

tion.

THE MULTI-TASKER: Kate Winslet – *The Dressmaker* (director: Jocelyn Moorhouse):

FYC: Based on the novel of the same name by Rosalie Ham, the film is described as an Australian revenge comedy drama and stars Winslet in the titular role of a dressmaker who returns to a rural Aussie town, transforms the women, and exacts revenge on those who did her wrong. It explores the themes of revenge, love, and creativity and is described by Moorhouse as "Clint Eastwood's *Unforgiven* with a sewing machine." The former bridesmaid of the Oscar race returns! (Pardon me, I'm still bitter from Winslet's win with a would-be supporting role in 2008's *The Reader* over Streep's wonderful turn in *Doubt*, blech!) To be sure, Winslet is a great actress and I wish her no ill will. Her career has yielded two Best Supporting Actress nominations (*Sense and Sensibility* in 1996 and *Iris* in 2002) and three Best Actress nominations (*Titanic* in 1998, *Eternal Sunshine of the Spotless Mind* in 2005 and *Little Children* in 2007). Could it be her second time around? Time will tell, but Winslet certainly has the goods to take it home.

THE IMMIGRANT: Saoirse Ronan – *Brooklyn* (director: John Crowley):

FYC: This film adaptation, based on Colm Tóibín's novel of the same name, follows young Ellis Lacy who is forced to choose between two men and two countries after she moves from a small Irish town to Brooklyn, NY in the 1950s. Ronan has been a favorite of mine since she earned a Best Supporting Actress nomination for 2007's *Atonement*. She also earned Best Actress BAFTA and BFCA nominations for *The Lovely Bones* in 2010 and another Best Actress nod from the latter body for *Hanna* in 2012. After the film bowed at the Sundance Film Festival this year, she was considered the de facto frontrunner by some. This seems to have changed following Cannes, but she is very much still in the conversation.

THE LESBIAN: Cate Blanchett – *Carol* (director: Todd Haynes):

FYC: This drama concerns a 1950's New York department store clerk (Rooney Mara) who dreams of a better life and falls for an older, married woman (Blanchett). It's based on Patricia Highsmith's novel *The*

Price of Salt. The Australian actress earned her first Best Actress nomination for *Elizabeth* in 1999—she went on to reprise the role in 2007 for *Elizabeth: The Golden Age*, which earned her a second Best Actress nomination in 2008. This put a cap on a string of three Best Supporting Actress turns, beginning with 2004's *The Aviator*, which she won for, followed by *Notes on a Scandal* and *I'm Not There* in 2007 and 2008, respectively. In 2014 Blanchett won the Best Actress Oscar for *Blue Jasmine*. Is it too soon for her to win a third? Well, Katharine Hepburn—the record holder for most Oscar wins (portrayed by Blanchett in *The Aviator*)—won her second Best Actress Oscar in 1968 for *Guess Who's Coming to Dinner* and her third (of four eventual wins) the following year for *The Lion in Winter*. Only four other actors in history have achieved back-to-back wins: Luise Rainer, Spencer Tracy, Jason Robards, and Tom Hanks. As I always say, when it comes to the Oscars, anything is possible.

The gap between Best Actor and Best Actress contenders is narrower this year. Last year there were 44 men competing for the top five slots and only 17 women (at a stretch). This year the respective numbers are 52 and 49, but many of the roles for women could be supporting roles, so I'd venture to guess that the difference is greater. The seven women discussed here are those who on paper have the pedigree to earn a nomination. The remaining 42 women are a lot less likely, but could happen if the stars align. Some of these include Juliette Binoche for *Clouds of Sils Maria* who earned a César for her performance and Charlotte Rampling for *45 Years*. Rampling won the Silver Berlin Bear at this year's Berlin International Film Festival. There are also quite a few wildcards where U.S. film distribution or release dates are uncertain: Sandra Bullock in *Our Brand is Crisis*; Annette Bening in the as yet untitled Howard Hughes project from her husband Warren Beatty, and Tilda Swinton in *A Bigger Splash*. Our next insights into the season will come via the one-two punch of the Venice International Film Festival September 2-12, 2015 and the Telluride Film Festival September 4-7, 2015. Because these festivals often offer a first glimpse of several contenders and eventual winners, expect the September installment about the leading men of the Best Actor race to be quite an eye opener. ◊

Where have all the bees gone?

AILEEN MARSHALL

Perhaps you've heard in the news about the mystery of the disappearing bees. It seems no one knows exactly why, but we do know that it's serious. While bees may be an annoyance that can mar your outdoor activities, they are very important for pollinating crops. Some estimates say the drop in the bee population has cost as much as \$200 billion in increased costs of produce, according to a United Nations study in 2005. The USDA has found an average cost per year to farmers to have bees pollinate their crops around \$15 billion. One blueberry farmer claimed that his pollination cost used to be about \$250,000 a year, now it's about \$750,000. Almonds are particularly dependent on bee pollination, and many nuts, berries, fruits and vegetables are also reliant on pollination. This increased cost gets passed on to the consumer in the form of higher prices.

There has been a growing business in beekeepers providing pollination services for farmers, since there has been a decrease in wild honey bees. These businesses are mostly migrant, moving with the seasons. Some have speculated that the constant moving has also put a stress on bees. This also makes it difficult to study this disorder.

The current phenomenon of disappearing bees is called colony collapse disorder (CCD). It is characterized by a hive where there are no live adult bees except for the queen and larvae, and there is plenty of food. With few dead bees found, it is difficult to find a definitive cause. It seems the bees don't come back to their hives. Normally when a hive is abandoned, nearby bees will loot their food, but in CCD, the food remains untouched.

While there have been episodes of bees disappearing in the past, this one is notable in that there has been a sharp decrease of an average of 33% per year since 2006, primarily in the Americas. While it is normal to have

attrition in colonies over the winter, CCD has been notable in the sharp decrease that occurs in the summer.

Only honey bees are affected by CCD. The type used by North American beekeepers is *Apis mellifera*. Not native to North America, it was brought over by European colonists. Ironically, the crops most dependent are those that were imported from Europe.

The honey bee consists of three castes: the queen, the worker and the drone. The queen is a female who is fed royal jelly instead of honey. She communicates to the workers and drones where the flowers are, and where to build the next hive. The queen has a sack called spermatheca that she uses to store sperm with which the eggs are fertilized. The workers are female; they feed the larvae, secrete beeswax from their glands to build the comb cells, receive nectar and pollen from the drones and later join the drones to look for food. Drones are males from unfertilized eggs. They mate with the queen and go out to forage for food. Pollen and nectar are food for bees. They make honey from the nectar, which is used as food for the colony. Pollen is a protein source which can be used when there is not enough nectar or honey.

There have been many hypotheses proposed and studied as to what is causing CCD. While it is not definitely proven yet, the cause seems to be a combination of pathogens and insecticides. Bees can be infected by varroa mites. These bugs transmit viruses to the bees in the same way mosquitoes infect people with malaria. They can transmit deformed wing virus and acute paralysis virus. These varroa mites have been found in a significant number of studies of CCD. A miticide called coumaphos is most commonly found in CCD hives. Also, there is a fungus called *Nosema* that infects bee's digestive tracts and has been found in some bees from abandoned



Photo: Böhringer Friedrich

colonies. Significant levels of fungicides were found in the wax of CCD hives in a 2013 study. Most evidence so far points to a class of insecticides called neonicotinoids. This class, consisting of imidacloprid, clothianidin, and thiamethonam, was first introduced because it showed a reduced toxicity to bees than earlier generation insecticides. While they do not cause mortality in the bees directly, there is evidence to suggest that low levels over long periods of time cause immunosuppression, making the bees susceptible to the fungus, mites and viruses found in CCD. Imidacloprid specifically can cause impaired communication, decreased foraging, flight activity and olfactory discrimination—all symptoms of CCD. While Europe has been working on reducing the use of neonicotinoids, in 2004 the Bush administration lifted a ban on pesticides that included neonicotinoids.

Many studies have been done on other possible causes, such as cell phones, cell towers and electromagnetic radiation. These studies failed to show any correlation. The USDA suggests the public plant more bee-attracting plants and limit the use of insecticides during midday, when bees are most active. ◉

Twenty-four visits to Stockholm: a concise history of the Rockefeller Nobel Prizes

Part X: H. Keffer Hartline, 1967 Prize in Physiology or Medicine

JOSEPH LUNA

While strolling along a beach one day in the summer of 1926, a young physiologist named Haldan Keffer Hartline came across a living fossil. Before him was a horseshoe crab, *Limulus polyphemus*, with its domed carapace shell, spiked rudder tail and pedipalp legs. Barely changed after over 450 million

years of evolution, this mysterious ancient mariner must've been a startling and alien sight. We don't know what Hartline thought of the creature's primitive book gills, its belly filled with shellfish or its eerie blue blood. But something did enthrall him: the crab's large compound eyes.

Though he was a medical student, Hartline had no interest in practicing medicine, but was fascinated by research, particularly the physiology of vision. How does seeing work? This question first riveted Hartline while an undergraduate, where he worked on the light-sensing abilities of pill bugs. Mov-

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This month Natural Selections interviews Lola Yu, Research Assistant from The Kapoor Lab.

New York State of Mind

INTERVIEW BY MELVIN WHITE

How long have you been living in the New York area? Almost one full year.

Where do you currently live? Which is your favorite neighborhood?

I currently live on the Upper East Side but my favorite neighborhood has to be the East Village. You can get amazing Japanese food, hop from thrift shop to thrift shop, and then hang out at my favorite spot- Barcade!

What do you think is the most overrated thing in the city? And underrated?

~~Probably black and white cookies. Aren't they just sugar cookies with black and white frosting on top?~~ Wait, just had one... There is NOTHING overrated about New York! ;-)

The most underrated thing in my opinion is the street performers. It's easy to overlook them since they're always there but when you actually stop to listen or watch, they're incredibly talented musicians and dancers who you would normally have to pay money to see in any other venue or city.

What do you miss most when you are out of town?

I miss how spontaneous the weekends can be. There's always something to do and you never know where you're going to end up. Sometimes someone will have an extra ticket to a concert or you'll stumble upon a street festival or a friend will be stopping in town (because why wouldn't they want to stop in NYC?)

Has anything (negative or positive) changed about you since you became one of us "New Yorkers"?

I feel like I've become a much stronger person living alone in the city. Everything from dealing with bed bugs to handing over a ridiculously large check every month for a teeny tiny apartment has taught me that life is always going to be tough. Whether or not these little things keep me down is up to me.

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

The cleanliness of the streets. There's always trash piled up sky-high on every street and there's too much dog poop on the ground to comfortably walk without constantly keeping your head down to check what you'll be stepping in next. Also, it really wouldn't hurt to plant a few more trees, bushes, or flowers.

What is your favorite weekend activity in NYC?

My favorite weekend activity is probably hanging out at a bar or restaurant with really good live music. There's no doubt that NYC



attracts the best musicians!

What is the most memorable experience you have had in NYC?

It would have to be when my really good friend came for a day and we ended up staying out until the break of dawn. We walked the Brooklyn Bridge together to watch the sunrise and it was breathtaking.

Bike, MTA or WALK IT???

Walking for sure and MTA but mostly walking. I'm not a very good biker, and I'm also terrified of getting hit on a bike but maybe one day I'll muster up the skill and courage.

If you could live anywhere else, where [would] might that be?

Maybe somewhere in the Bay Area of California. The idea of constant sunny weather is really appealing to me but that's for the future. As of now, NYC is where it's at!

Do you think of yourself as a New Yorker?

I do! I complain a lot about what typical New Yorkers complain about, like the MTA lines not working, the constant construction work in the back, and all the trash on the streets but I always find myself defending New York when non-New Yorkers talk badly about it. ☺

Quotable Quote

"If I have learned anything in my life, it is that bitterness consumes the vessel that contains it." - Rubin "Hurricane" Carter, former middleweight boxer

From Grothe, Dr. Mardy, *Ifferisms: An Anthology of Aphorisms...*, Collins Reference, 2009

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ing on to medical school at Johns Hopkins, Hartline attempted to study vision in frogs by using neurophysiological instruments to record activity from their optic nerves, but it proved more difficult and complex than he imagined. What he needed was a simpler model organism, if there was one. He made his way to the Marine Biological Laboratory on the southern coast of Massachusetts, frustrated by past failures, but on a mission to find the right organism to study.

It was a conceptual leap to propose that studying vision in a weird creature like *Limulus* would yield insight on how animals, including humans, see generally, but the idea wasn't out of place among biologists in the 1920s. By decade's end, the Nobel Prize winning Danish physiologist August Krogh laid the case for studying diverse organisms for general biological insight, predicting for the field in 1929: "for such a large number of problems there will be some animal of choice or a few such animals on which it can be most conveniently studied."

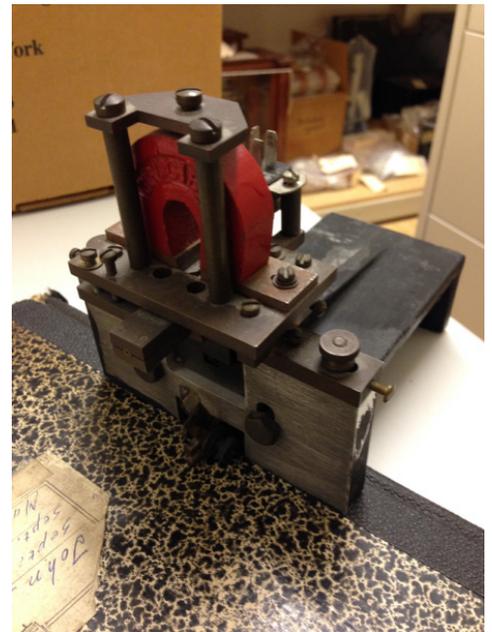
The year before, Hartline published a descriptive study of arthropod compound eyes, where he succeeded in recording nerve impulses after light stimulation in *Limulus* along with grasshoppers and two species of butterfly. This comparative work revealed that light stimulation could induce characteristic minute electrical spikes that could be measured among arthropods. And whereas the grasshopper and butterfly were difficult to handle and gave complex recordings, those of *Limulus* were simple waves and could be studied for extended periods of time when bathed in seawater. But what

really set *Limulus* apart was the size of its compound eye as it opened the possibility of studying its single facets.

As the name suggests, a compound eye can be thought of as a closely spaced array of simpler eyes. Each "eye", called an *ommatidium*, individually acts as a receptor for light directly above it and is composed of a cornea that directs light to a bundle of photoreceptor cells that are in turn connected to a single optic nerve. In small insect eyes, individual *ommatidia* number in the thousands and can really only be seen under a microscope; the same is true for analogous rods and cones in vertebrate retinas. The *ommatidia* of *Limulus* by comparison are fewer in number but comparatively gargantuan: each is about 1mm across, making them among the largest light receptors in the animal kingdom. Based on their large size, Hartline reasoned that it might be possible to take neurophysiological measurements from single optic nerve fibers in the horseshoe crab. Working with Clarence Graham in the summer of 1931, Hartline succeeded in doing just that. Graham and Hartline dissected single *ommatidia*, and devised methods to illuminate their photoreceptive cells while recording from the optic nerve. In went light they could control, out went neural signals to the brain that they could measure. These were some of the first measurements of the most fundamental unit of vision.

In the course of this foundational work, Graham and Hartline made many observations that later came to underlie a basic neural code for vision. They found that the firing rate of the optic nerve from single *ommatidia* varied according to the duration of light and its intensity: under intense light the nerve fired rapidly, under low light it fired less frequently. They also witnessed a form of light and dark adaptation, whereby sudden illumination caused rapid nerve firing that subsided despite no change in light intensity. All of these results helped define how light was predictably converted by photoreceptor cells into electrical signals that the brain could understand.

But it didn't end there. Since the late 1930s, Hartline had begun to notice that shining light on one area of the crab's eye would occasionally have the effect of *decreasing* the firing rate in the area he was recording. It was a strange observation, not really followed up, but it percolated in Hartline's mind for nearly two decades until the



Electromagnetic shutter used by Hartline to control light stimulation of the *Limulus* eye. Accession number 359, from the Chase historic instrument collection at RU. Photo by the author.

right instrumentation came in the 1950s. Now at Rockefeller, Hartline, working with Henry Wagner and Floyd Ratliff, recorded from two single adjacent *ommatidia* but only illuminated one of them. They observed that the rate of firing on the *ommatidium* not being illuminated was inhibited by its illuminated neighbor. This "lateral inhibition" as they named it, formed the mechanistic basis of contrast determination, that is, how eyes are able to distinguish borders. But more generally, it pointed to an astonishing realization: far from passively transforming light to electrical signals, the interconnected *ommatidia* in the *Limulus* eye were actively involved in computing. These sense organs in crabs weren't just passing on the "raw data" to the brain where it could be processed into an image, but were actually doing the first steps of data processing. Eyes could think.

By the time he visited Stockholm in 1967 for discovering lateral inhibition, H. Keffer Hartline had pioneered micro-dissection and instrumentation techniques to study individual photoreceptor cells, worked out a series of equations that formed the first mathematical description of a neural network, and brought the first computer into neurophysiological research (and to the RU campus, a CDC 160A). The tools had certainly changed, but the ancient muse, the lowly horseshoe crab, remained the same. ☉



Alfred Nobel and the Prizes

SUSAN RUSSO

Alfred Nobel was born in Stockholm, Sweden, in 1833. He is best remembered for the invention of dynamite and for leaving the major part of his fortune for the establishment of prizes for a person or persons who accomplished discoveries resulting in the “greatest benefit on mankind.” Nobel’s father was an engineer, manufacturer, and inventor. One of his inventions was modern plywood. The family factories were in St. Petersburg, Russia, where Alfred was educated by tutors, showing marked interest in chemistry and languages. From 1841 to 1842, Alfred was sent to Sweden to the Jacobs Apologistic [sic] School. Alfred’s studies in chemistry continued in Russia, then Paris, then four years in the United States. Alfred’s interests also included explosives, taught to him by his father. His 355 inventions included a gas meter in 1857, a detonator in 1863, and a blasting cap in 1865. Nobel’s additional interest in physiological research led to his starting laboratories in France and Italy for experiments in blood transfusions, as well as his making donations to the Pavlov laboratory in Russia.

Nobel died in 1896, but when his brother Ludvig died in 1888, one newspaper mistakenly wrote Alfred’s obituary, characterizing him as the “merchant of death.” Before his own death, Alfred Nobel wrote a will that set aside most of his fortune to create the Nobel prizes. This will was contested by members of his family, so that the prizes were not legally authorized until 1897. In 1900, the Nobel Foundation was established by order of Sweden’s King Oscar II.

Because of these delays, the initial Nobel Prizes were not awarded until 1901, the first in physics to Wilhelm Roentgen, and

also in the will’s stated fields of chemistry, peace, physiology or medicine, and literature.

The Nobel Foundation selects professionals in these fields from around the world to nominate individuals for the prizes (including at least one professor at Rockefeller). The Swedish Academy of Sciences awards the prizes for physics and chemistry; the Karolinska Institute awards prizes for physiology or medicine; and the Academy in Stockholm awards prizes for Literature. The Peace prize is awarded by the Norwegian Storting, the legislature of Norway. In 1968, a Prize in Economic Sciences in Memory of Alfred Nobel was established by Sweden’s central bank, Sveriges Riksbank.

The gold Nobel prize medals are minted in Sweden, with a profile of Alfred Nobel on one side. On the prizes presented in Sweden there is a Latin verse from Virgil which is translated as “inventions enhance life which is beautified through art.” The original 1901 prize money for the award was 150,782 Swedish kronor, which as of this writing is \$19,948. Nobel prizes are not awarded every year, if there are no discoveries deemed to be of significance, nor, frequently, during times of war.

The youngest Nobel Laureate was Malala Yousfzai, who, at 17, received the Peace prize in 2014. The oldest Nobel Laureate was Leonid Hurwicz, who, at 90, received the Economic Sciences prize in 2007. Only two Nobel Laureates refused the Nobel prizes: Jean-Paul Sartre, in 1964, for Literature, and Le Duc Tho, in 1973, for Peace. Three Nobel Laureates were forced to decline their Nobel prizes by Adolph Hitler: Richard Kuhn in 1938 for Chemistry; Adolf Butenadt in 1939 for Chemistry; and

Gerhard Domagk in 1939 for Physiology or Medicine. In 1958, Boris Pasternak was denied his prize in Literature by the Soviet Union.

The prizes were specified in Nobel’s original will to be awarded only to living persons, but two notable exceptions have been awarded posthumously, to Dag Hammarskjöld, for the Peace prize in 1961, and to Rockefeller University Professor Ralph Steinman for Physiology or Medicine in 2011.

The formal elegant ceremony for most of the prizes are held in Stockholm, at the Karolinska Institute, followed by a lavish banquet originally held in the Hall of Mirrors at the Grand Hotel, and held currently in the 1,300-seat Blue Hall of Stockholm’s City Hall. Attending the ceremonies and banquets are members of Sweden’s royal family, members of the Swedish government, representatives of the Nobel family, as well as the honored families and guests of the Nobel Laureates. The banquet’s five courses were reduced to three courses after World War II. The Peace prize ceremonies are held in Oslo in Norway’s City Hall, followed by the banquets in Oslo’s Grand Hotel.

Additional historical details and descriptions of the ceremonies and banquets can be found at www.nobelprize.org and www.nobelprize.org/ceremonies/menu/soderlind. The latter link will give you the amazing and amusing panoply of indigenous and foreign menus in Stockholm over the first 100 years of the prizes, which included sandwiches in the austere years during and after World Wars I and II. (Shades of Eleanor Roosevelt’s tuna fish sandwiches during Churchill’s visit to the United States during World War II....) ◊



Horsefeathers

GEORGE BARANY, CHARLES FLASTER, AND BRENT HARTZELL

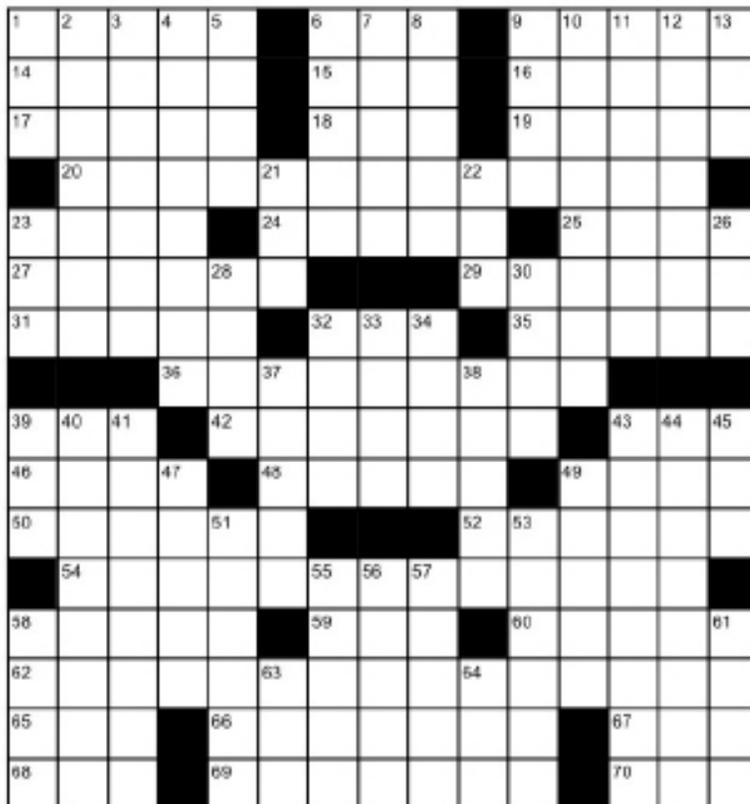
George Barany is a Rockefeller alum (1977) currently on the faculty at the University of Minnesota—Twin Cities; Charles Flaster is a retired school teacher now living in Atlantic City; Brent Hartzell holds a master's degree from the University of Minnesota and works in the areas of public policy analysis and government budgeting. GB wishes to note that during his nine years at The Rockefeller University (1971-1980), the remarkable event highlighted in this puzzle occurred three times. Nobody expected a 37 year gap until the next such event! For more about this specific puzzle, including a link to the answer, visit <http://tinyurl.com/horsefeathersNSpuz>. More Barany and Friends crosswords are at <http://tinyurl.com/gbpuzzle>.

Across

1. Common ingredient in a chaud-froid
6. Org. that sent Stephen Colbert to Iraq in 2009
9. Trades, or 1955 winner of 20-Across
14. Groucho's brother
15. Admission requirements, informally
16. They're famous in Canton and Cooperstown
17. Judaism : kosher :: Islam : ____
18. Réunion, for one
19. Dickens' Heep
20. First jewel
23. One of "The Addams Family," informally
24. Check endorser
25. "May ____ why?"
27. Vinegar vessels
29. Yogi's pal
31. Canada's arboreal emblem, or jockey Eddie who won 54-Across twice and rode Secretariat in his last race
32. Brady's measure: Abbr.
35. Ahmadinejad, e.g.
36. Second jewel
39. Pin cushion?
42. It may be definite or genuine
43. Like some keys: Abbr.
46. Kazan who directed "On the Waterfront"
48. Very, to Verdi
49. Actress Kunis
50. Great Dane
52. How some meds are taken
54. Third jewel
58. Dance related to a horse's gait
59. Bigfoot's shoe width?
60. Cabinet units: Abbr.
62. Twelfth winner of U.S. thoroughbred racing's Triple Crown
65. Fastball, in slang
66. One with a lot of hits
67. ____-Puf
68. T or F: Abbr.
69. Ratifies (obsolete)
70. Chairman pro ____

Down

1. Rhine whine?
2. In July 2014, she became the first person



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3. Makes a stack
4. Good Samaritan's assurance
5. Secretariat in 1973 or 62-Across in 2015
6. Blue Sox home
7. Like a jockey's attire, perhaps
8. Daisy also called a marguerite
9. Elisabeth or Andrew, acting siblings
10. Team blessed with Curry's favors?
11. Noted password user
12. Continues, as a band
13. Safe networking protocol
21. Corp. whose nickname matches the name of the 20-Across and 36-Across winner in 2008
22. Girl having a ball?
23. Cable channel whose first broadcast was "Gone With the Wind"
26. Japanese garden pond denizen
28. Trillion: Prefix
30. River to the Seine
32. Brady's bunch
33. Equipment for Vonn
34. Ancient Andean
37. Poet's Muse
38. Writer George
39. Verbal shrug
40. Mobile one?
41. Without a watch?
43. Marker encountered four furlongs into 54-Across
44. Like top high school athletes
45. Saturday Night Live's 62-Across?!
47. ____ nothing (betting option)
49. Manufacturer
51. It "struck back" in a 1980 film
53. Control tower devices
55. Some tides
56. Past, present, or future
57. Seven: Prefix
58. "Poker Face" singer Lady ____
61. Make-believe, or runner-up to Secretariat in two Triple Crown races
63. It may be kicked down the road, metaphorically
64. Shakespearean or theatrical Prince

Free Summertime Fun

SUSAN RUSSO

One of my top picks for a great summer spot in Manhattan is Bryant Park at Sixth Avenue between 42nd and 41st Streets (behind the main New York Public Library) www.bryantpark.org/plan-your-visit/calendar.html. On this website you will find pages and pages of events for all ages, abilities and temperaments – ping pong, arts and crafts including jewelry making (materials provided), petanque (French for bocce ball); free books to read; classes in ballet, fencing, fly fishing, golf, juggling, knitting, modern dance, tai chi, yoga, language classes, “walking meditation”; and pianos for you to play. There are poetry readings, a fitness club, book clubs, poetry readings, “reel talks”, and performances by “Shakespeare in Bryant Park.” In case of rain, events are held under a tent at the “Reading Room” where talks are also given by the likes of “comics superstar” John Romita, Clifford the Big Red Dog, Dr. Ruth Westheimer (the Sorbonne-trained 87-year-old sex therapist and media regular), and many others. Games are there, too, from chess and checkers to Apples to Apples to spelling bees. There’s a “Cowboy Sing-a-Long for Kids” and there are nine “Accordions Around the World” events, where all players are welcome, culminating in the Accordion Band Festival on Friday, August 28. There are vendors for food in the park, and a number of sandwich places on the avenue and adjacent streets. If you’re hot or tired, I’d suggest that you duck into the architectural gem of the Library, a cool spot on a hot day, with special exhibits and tours, restrooms, a café, and a library shop (and a great children’s library with books, DVDs and computers).

The Bryant Park Summer Film Festival on Monday nights www.hbo.com/hbbryantparkfilmfestival is fun, too, but

very crowded, so someone has to get there early (best around 4:00pm) to find a chair if you’re alone, or spread out your blanket on the lawn to hold space for late-coming friends. It would help to buy a big helium balloon so they can find you. Also, the movies don’t start until dark, so bringing a game, reading, a snack or supper is a good idea. There are restrooms available there, too.

Central Park is another oasis for a full day of fun or just for quiet relaxation: www.centralpark.com/events.

Besides playing fields, people watching, statuary, benches by fountains and ponds, and quiet gardens, for the theater fanatics there’s Shakespeare in the Park. Free tickets are available by lottery (for the few), but the rest of us sit, stand, sleep, read, kibitz or snog on line for hours, and listen to “pitches” from vendors (food is delivered by a least two diners to the line) and amateur musicians and an occasional con artist giving golf “lessons”. The park opens at 6:00am officially, and, for a popular play or actors, you usually have to get there no later than 7:30am for the 12 noon distribution of two tickets to each person on line for that evening’s performance. More information is available at <http://publictheater.org/en/programs--events/shakespeare-in-the-park>. While this queuing may seem insane, millions of people have endured it since Joseph Papp started in this theater in 1962 with *The Merchant of Venice*, starring George C. Scott and James Earl Jones, for the glorious setting in the open-air donor-built Delacorte Theater, with the Belvedere Castle in the background and the skies going from dusk to dark, the amazing quality of the well-known and tyro actors who play in the rain (only downpours postpone the shows, but usually they resume when

rain lessens), and the accompanying live wonderful music.

And for the kids, in Manhattan there are these “splash parks” and water playgrounds:

On the East side:

- The “Imagination Playground” at Burling Slip (John Street between Front and South Streets);
- East River Park at the FDR Drive, enter between Montgomery and East 12th Streets;
- The “Ancient Playground” just north of the Metropolitan Museum at Fifth Avenue and 85th Street.

On the West Side:

- Heckscher Playground at Seventh Avenue and Central Park South;
- Madison Square Park Playground at Madison Avenue between 24th and 25th Street (you and the kids might also enjoy the art exhibit throughout the Park, “Fata Morgana” by Teresita Fernandez);
- Chelsea Waterside Playground in Hudson River Park at Eleventh Avenue at West 23rd Street;
- Hudson River Park Pier 51 Playground at Jane Street;
- Pearl Street Playground on Pearl Street between Beekman and Fulton Streets;
- Teardrop Park at Warren and Murray Streets;
- Nelson A. Rockefeller Playground at Battery Park City (North End Avenue and Vesey Street).

PLEASE DON’T FORGET TO PACK SUNGLASSES AND SUNSCREEN FOR YOUR OUTDOOR FUN. ☺

Life on a Roll

QIONG WANG

