



Natural Selections

A NEWSLETTER OF THE ROCKEFELLER UNIVERSITY COMMUNITY

2015: Chinese New Year of the Sheep

QIONG WANG

If I have to name one day of an entire year that I wish dearly to be with my family-on-the-other-side-of-the-planet, it's the Chinese New Year. Also called Spring Festival, it is the most cherished and celebrated holiday in China, as families reunite to ring out the old year and celebrate the coming new year. According to the Chinese Animal Zodiac, every year is associated with one of twelve animals: Rat, Ox, Tiger, Rabbit, Dragon, Snake, Horse, Sheep, Monkey, Rooster, Dog, and Pig. On February 19, 2015 we say farewell to a previous year of the Horse, and welcome the beginning of a year of the Sheep.

The myth of Chinese New Year

The Chinese New Year celebration has a long history, dating back over 4,000 years. According to ancient legends, it began with a mythical beast called Nian. Nian was a ferocious monster with a gigantic horn and sharp teeth. It lived in the deep sea all year long, but once every year it would crawl out of the water to wreak havoc on villages. Every year on this day, villagers, young and old, would flee deep into the mountains to hide from Nian's attack.

One year, while the villagers had started their rush to the mountains, an old beggar came through the neighborhood. An elderly grandmother gave him food, and warned him to hide so as not to be harmed by Nian. The beggar laughed and said that he could chase Nian away. Surprised and hesitant, the old woman left on her own.

At midnight, Nian arrived in the village. It was pitch black everywhere, except for the old woman's house, which shone brightly with candle and lantern light. The monster bounded towards the house, but stopped short, trembling at the

sight of a piece of bright red paper on the door. Suddenly, firecrackers began to explode. Terrified, Nian ran away from the village.

When the villagers returned the following day, they were surprised to find that everything was safe and sound. The old woman told the story of the beggar. Noticing the red paper on the door and the remnants of candles, lanterns, and firecrackers, the villagers suddenly realized that Nian feared the color red, bright light, and loud noises. Rejoicing in relief and excitement, they celebrated. Wearing new hats and clothes, they visited family and friends, and congratulated each other on the prospect of a peaceful year ahead.

Since then, every year on the day that Nian would appear, families adorn their doors with red paper, set off firecrackers, and light candles and lanterns in their homes. The next morning, which marks the start of a new year, people visit their relatives and friends, with festivities lasting for 15 days. This tradition of gratitude and hope has continued till today.

Traditional Chinese New Year decorations

To celebrate the Chinese New Year, families decorate their homes with a variety of red items, as red signifies luck and good fortune in Chinese culture. The most popular ones include lanterns, Spring Festival couplets and paper cutouts.

Red lanterns are usually hung around the house, especially at the front door, where families often put up a pair of large ones. These lanterns burn throughout the night, protecting the family from the evil monster Nian.

Spring Festival couplets are pairs of calligraphic writings of ancient Chinese

poems on a background of red paper. Expressing sentiments about life's renewal, the arrival of spring, and wishes for a prosperous year ahead, they're pasted on both sides of the main door. These Spring Festival couplets originate from ancient "peach wood charms," which are carved or painted charms depicting protective door gods. During the Five Dynasty Period (897-979 AD), Emperor Meng Chang ordered his counselor to engrave an inspirational couplet on a pair of peach wood slats to hang on the door of his living room, starting a custom that gradually evolved into today's Spring Festival couplets.

Besides Spring Festival couplets, it is also common for people to make red paper cutouts and paste them on windows. It's popular to display calligraphic writings of Chinese characters for "spring" or "blessing." These are sometimes hung upside down, since in Chinese, the word "invert" is a homonym for "arrive," thus signifying the arrival of spring or blessing to the household.

Traditional Chinese New Year cuisine

The most important meal during the celebration is the New Year's Eve dinner, when families get together for a sumptuous banquet. The cuisine varies in different parts of China. In the north, it is customary to eat dumplings (jiao zi), which bear the shape of ancient Chinese currency gold ingots (yuan bao), thus signifying fortune. In southern China, people usually eat New Year's cake made of glutinous rice flour (nian gao), since it is a homophone for "higher and higher every year" in Chinese.

Traditional activities of a Chinese New Year

After New Year's Eve dinner, family members typically stay up late together and chat happily until midnight (shou sui), waiting for the first bell ring of the New Year. There are also many New Year's Eve TV programs featuring singing and dancing, entertaining millions of families in China and around the world.

On the first day of the New Year, it is customary for younger generations to visit the elders, wishing them health and longevity. Children and teenagers are given "lucky money" (ya sui qian) packed in red envelopes by their parents and grandparents. These are believed to bring good luck and to ward off evil spirits. People also visit relatives and friends during the New Year celebration period. For these visits snacks are often served; the most popular ones include sunflower seeds, peanuts, tangerines and candy.

Year of the Sheep

According to the Chinese Animal Zodiac, 2015 is a year of the Sheep. In Chi-

nese folk tales, the story of the Sheep is similar to that of Prometheus in Greek mythology. Prometheus brought fire to mankind, while the sacred Sheep brought seeds of corn and rice and taught mankind the basics of farming. Beloved by the people, the Sheep made its way into the Chinese Animal Zodiac, symbolizing beauty, calm, sensitivity and creativity. It is believed that people born in a particular year possess characteristics of the animal zodiac associated with that year. Michelangelo, Mark Twain, and Thomas Edison were all born in year of the Sheep.

Chinese New Year greetings

If you want to wish colleagues or friends a happy Chinese New Year during the New Year period (Feb 19-Mar 6, 2015), try greeting them in authentic Chinese, and you will likely spark a big smile on their faces:

Guo nian hao: Happy New Year.

Wan shi ru yi: Wish you every happiness and prosperity.

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Gong xi fa cai: Wish you to make great fortune.

He jia huan le: Wish happiness for your whole family.

The year of the Sheep is right around the corner, so wan shi ru yi everyone!®

For Your Consideration – And They're Off! Edition

JIM KELLER

I maintain that the Oscar race can be likened to a horserace where each studio bets on its thoroughbreds and hopes that they can at least place at the end. The studio is the owner, the public relations department is the jockey, and the horse is the actor or film in the analogy. Here we thrust those roles I've discussed in the three-part Ones to Watch edition under a microscope to separate the nominees from the contenders and to identify the power players for each studio. I've also included my rankings as they stood on Oscar nominations eve—the number in parentheses indicates my placement following nominations. I chose the maximum ten nominees for Best Picture and all categories reflect five nominees. The top five in the table were my nominee picks, those that fall outside of that were outside chances that I had listed.

In the September issue, I examined the Best Actor race. Here are the roles I discussed and where the candidates ended up five months later:

THE CHANGELING: Steve Carell – Foxcatcher (director: Bennett Miller, stu-

dio: Sony Pictures Classics):

FYC: Carell's campaign can best be described as "steady as she goes." Following rave reviews for his portrayal of paranoid schizophrenic murderer and heir to the du Pont chemical fortune, John Eleuthère du Pont at the Cannes Film Festival last May, it was soon announced that he would campaign as lead actor. This raised some eyebrows given that Channing Tatum and Mark Ruffalo who play Olympic wrestling brothers and victims Mark and David Schultz in the drama based on Mark Schultz's autobiography are co-leads while Carell's is a supporting role. But Oscar voters went along and placed him in the lead category as predicted. Don't look for Carell to pull out a win though, despite Screen Actors Guild (SAG), Golden Globe, and BAFTA (British Academy of Film and Television Arts) nominations. The nomination is his award.

THE HAS-BEEN: Michael Keaton – Birdman or (The Unexpected Virtue of Ignorance) (director: Alejandro González Iñárritu, studio: Fox Searchlight Pictures):

FYC: In this tale of redemption and self-reinvention, Keaton plays an also-ran who once portrayed an iconic superhero, and battles his ego as he mounts a Broadway play and works to recover his family and career. Not only is the irony that Keaton played Batman twice not lost, but one could argue his performance is a prime example of imitation of life.

While the race is decidedly between Keaton and Eddie Redmayne for the win, it's Keaton who won the Golden Globe, the National Board of Review (NBR), and two awards from the Broadcast Film Critics Association (BFCA): Best Actor and Best Actor in a Comedy Movie. More on those last two awards in a minute, but one has to wonder if it's Keaton's imitation of life that has given him the edge thus far? And why did the BFCA give him two separate awards for the same performance, especially when the film is not a comedy? These questions may never be answered but they're important to ask when considering all of the angles. Keaton also has the requisite SAG and BAFTA nominations. He is likely your winner.

THE DRUGGIE: Joaquin Phoenix – *Inherent Vice* (director: Paul Thomas Anderson, studio: Warner Bros. Pictures):

FYC: On paper Phoenix's role as "Doc" in this adaptation, based on Thomas Pynchon's novel, which follows a drug-fueled detective (Phoenix) through 1970s Los Angeles as he investigates the disappearance of an ex-girlfriend seemed like primetime for Oscar. But the result was more of a comedic role (Phoenix's only nomination this season was a Golden Globe, Best Performance by an Actor in a Motion Picture - Musical or Comedy) and did not catch on further, effectively leaving him out of the hunt for gold.

THE SELF-STARTER: Eddie Redmayne – *The Theory of Everything* (director: James Marsh, studios: Focus Features, Universal Pictures):

FYC: Despite having no major precursor wins, Redmayne remains steadfast just as his biopic subject physicist, Stephen Hawking did when faced with ALS. At the end of the day it's the Academy that decides who will win, not the precursors. Regardless, Redmayne delivers the goods and has the appropriate honors to assist him in snatching the Oscar from the clutches of Keaton: Golden Globe, BAFTA, BFCA, and SAG. Can he do it?

THE STRAIGHT GAY MAN: Benedict Cumberbatch – *The Imitation Game* (director: Morton Tyldem, studio: The Weinstein Company):

FYC: Outside of Keaton and Redmayne, Cumberbatch remains one to watch for the win. A great deal has been made in the media about Redmayne and Cumberbatch's films canceling one another out because of their British ties. This argument makes little sense, but sadly is a way to split the difference and hand the statue to Keaton. Cumberbatch plays Alan Turing—the English mathematician/logician who helped crack the Nazi's Enigma code during WWII and who invented the modern computer before being prosecuted for homosexuality by the British government. Like Keaton, Cumberbatch has SAG, BAFTA, and BFCA nominations. Unlike Keaton, he has yet to win any major awards.

THE MONEYMAKER: Brad Pitt – *Fury* (director: David Ayer, studio: Columbia Pictures):

FYC: The extent of Pitt's awards glory

this season was a BFCA nomination for Best Actor in an Action Movie. His hopes were dashed earlier on in a competitive year.

THE ARTIST: Timothy Spall – *Mr. Turner* (director: Mike Leigh, studio: Entertainment One):

FYC: While Spall made headlines last May when he won the Best Actor award at Cannes and won the European Film Award (Europe's answer to the Oscars), he failed to register with any of the other larger film award bodies and subsequently missed an Oscar nomination for his portrayal of eccentric British painter J.M.W. Turner.

MR. DYNAMITE: Chadwick Boseman – *Get on Up* (director: Tate Taylor, studio: Universal Pictures):

FYC: In September Boseman was earning positive reviews for playing the American icon James Brown in this film that chronicles his rise from poverty to become one of the most influential musicians in history. At that time I posited whether Boseman could remain in the awards discussion for the remainder of the season. He did not.

THE NEWCOMER: Jack O'Connell – *Unbroken* (director: Angelina Jolie, studio: Universal Pictures):

FYC: As it turns out, O'Connell's embodiment of Olympic runner and former WWII POW Louis Zamperini also missed Oscar's mark. To be fair, the film, much like its central character, faced insurmountable odds ever since a trailer was released to dovetail with the XXII Winter Olympics last February. The move prompted many Oscar pundits to place the film at the top of their prediction lists and to keep it there throughout most of the season, placing lofty and unfair expectations on the film. There was only one place for it to go, down, and it took O'Connell with it—despite an NBR Breakthrough Performer win he shared with his Starred Up performance.

Not to be outdone, the leading ladies were covered in the October issue. Let's see where they stand:

THE QUEEN BEE: Meryl Streep – *Into the Woods* (director: Rob Marshall, studio: Walt Disney Pictures):

FYC: As indicated in last month's column, shortly after the October issue it was announced that Streep would run a Sup-

porting Actress campaign. There she sits (see below).

THE BRIDESMAID: Julianne Moore – *Still Alice* (director: Richard Glatzer and Wash Westmoreland, studio: Sony Pictures Classics):

FYC: Yes, folks, it appears our bridesmaid is about to become our bride! After 16 years and five nominations, Moore looks to be the one who will take home the top prize on Oscar night. The film follows Alice Howland, a well-respected linguistics professor who begins to forget words, receives a devastating diagnosis, and is severely tested along with her family. Like her counterpart in the Actor category, Moore won the Golden Globe, the NBR, and the BFCA, and has the requisite SAG and BAFTA nominations. Her performance is devastatingly real—a word of caution for anyone with a relative who has faced dementia.

THE COMEBACK KID: Reese Witherspoon – *Wild* (director: Jean-Marc Vallée, studio: Fox Searchlight Pictures):

FYC: Following the film's premiere at this summer's Telluride film festival, Witherspoon became the early frontrunner, but as indicated above, this is no longer the case. No matter, she still finds herself in the thick of the race with an Oscar nomination alongside Golden Globe, BFCA, SAG and BAFTA nominations for her raw performance. Witherspoon plays Cheryl Strayed, the author of the best-selling memoir *Wild: From Lost to Found on the Pacific Crest Trail*, which chronicles her 1,100-mile hike undertaken in an attempt to heal from catastrophe.

THE ARTIST: Amy Adams – *Big Eyes* (director: Tim Burton, studio: The Weinstein Company):

FYC: While Adams won the Golden Globe for Best Actress – Comedy or Musical and earned a BAFTA nomination for her portrayal of painter Margaret Keane, the perennial favorite has been left in the dust following the film's lukewarm reception at New York's Museum of Modern Art in December. What's interesting is that Adams was unseated by Marion Cotillard, who was snubbed by the Academy two years ago for her searing performance in *Rust and Bone*.

THE PIONEER: Hillary Swank – *The Homesman* (director: Tommy Lee Jones,

studio: Saban Films, Roadside Attractions):

FYC: Early on in the race Swank was thought to be destined for the fifth slot for her performance as pioneer woman Mary Bee Cuddy, who teamed up with a claim jumper (Tommy Lee Jones) to escort three insane women across the plains. That was not to be, as the film failed to impress several critics, and Swank earned her only honors this season from a few smaller critics groups.

THE BUSINESS WOMAN: Jessica Chastain – A Most Violent Year (director: J.C. Chandor, studio: A24):

FYC: Like Streep, and as indicated in last month's column, shortly after the October issue it was confirmed that Chastain would run a Supporting Actress campaign (see below).

THE BRIT: Rosamund Pike – Gone Girl (director: David Fincher, studio: 20th Century Fox):

FYC: Without giving anything away, Pike plays three different versions of the same person with deft care in this mystery-thriller based on Gillian Flynn's 2012 novel of the same name. In another world where a woman can truly lead a film and whether or not they portray a likeable character is inconsequential, Pike would be the front-runner. Sadly, our world (and especially the Hollywood world) is run largely by men who decide what is in, what is out, and therefore who is in and who is out. Make no mistake, Pike is in, but there's no question that the film got a raw deal. Pike stands alongside her peers with Golden Globe, BAFTA, BFCAs and SAG nominations.

The Ones to Watch series concluded in the December/January issue with a look at the Best Supporting Actor and Actress races. Let's see how their contenders have stacked up following January 15th's Oscar nominations:

~THE GENTS~

THE NEWBIE: J.K. Simmons — Whip-lash (director: Damien Chazelle, studio: Sony Pictures Classics):

FYC: It would be a big surprise if Simmons didn't take home the gold on Oscar night. He, like his contemporary Keaton in the lead race, is the de facto frontrunner and has been for some time. He won the BFCAs and has earned SAG, BAFTA, and

Golden Globe nominations for his role as a relentless instructor who knows no bounds when it comes to realizing his student's potential.

THE ACTOR: Edward Norton — Birdman or (The Unexpected Virtue of Ignorance) (director: Alejandro Iñárritu, studio: Fox Searchlight Pictures):

FYC: It seems that Norton has been following just a half step behind Simmons all season. It remains to be seen if his portrayal of the caustic actor who joins the Broadway play put on by Riggan, can topple Simmons. Where Simmons took the BFCAs, Norton won the NBR, earned a BFCAs nomination and matched Simmons SAG, Golden Globe, and BAFTA nominations. Could it be another year where Best Actor and Best Supporting Actor come from the same movie?

THE GOOD GUY: Mark Ruffalo — Foxcatcher (director: Bennett Miller, studios: Sony Pictures Classics):

FYC: It's no surprise that Ruffalo managed a nomination while the film itself fell short. For one, his ill-fated David is the only 100% likeable character. But Ruffalo gives a well-wrought performance imbued with warmth and tenderness that cannot be ignored alongside his more rugged, lived-in contemporaries. He also earned SAG, Golden Globe, BFCAs, and BAFTA nominations.

THE FATHER: Ethan Hawke — Boyhood (director: Richard Linklater, studio: IFC Films):

FYC: There isn't much to say. Hawke landed a nomination due to the unyielding momentum of Boyhood. The force was unstoppable, and while Hawke too earned SAG, Golden Globe, BFCAs, and BAFTA nominations, the nominations are his reward. I would be shocked if he took any hardware home.

THE COMEDIAN: Josh Brolin — Inherent Vice (director: Paul Thomas Anderson, studio: Warner Bros. Pictures):

FYC: Despite a BFCAs nomination, Brolin's hilarious turn as Detective Christian "Bigfoot" Bjornsen in this murky, stoner mystery has largely gone unnoticed. Instead, Robert Duvall took the fifth slot for another murky film, The Judge.

~THE LADIES~

THE QUEEN BEE: Meryl Streep – Into the Woods (director: Rob Marshall, studio: Walt Disney Pictures):

FYC: Unlike last year, Streep's 19th nomination was a cinch. Her performance as the witch in this adaptation of the Tony award-winning Broadway musical carries the film. Her character presides over various Grimms' Fairy Tales characters including Cinderella, and the Baker and his Wife, as they learn life lessons. It's clear that Streep relished every minute of it and she has secured SAG, Golden Globe, and BFCAs nominations. At this late hour in the race, the only one standing in her way of a fourth Oscar is Patricia Arquette, who is picking up awards on the circuit like eggs in a basket.

THE MOTHER: Patricia Arquette – Boyhood (director: Richard Linklater, studio: IFC Films):

FYC: Of all of Boyhood's nominations, this is one of the most deserving. Arquette seamlessly inhabits her role as "Mom" through twelve years of film snippets pieced together to create Linklater's crowning achievement. The awards chances of such a unique vision could've gone either way—fortunately the critics tipped the scale in its favor. Arquette's awards season haul matches Simmons' to a T. She won the BFCAs and has earned SAG, BAFTA, and Golden Globe nominations. Look for this trend to continue and for Arquette to take home the Oscar.

THE BRAIN: Keira Knightley – The Imitation Game (director: Morten Tyldum, studio: The Weinstein Company):

FYC: In this come-from-behind WWII drama concerning Alan Turing's (Cumberbatch) plight to crack the Nazi's Enigma code Knightley plays Turing's friend, colleague, and one-time fiancée Joan Clarke. Much like others in this category Knightley has received the requisite SAG, Golden Globe, BFCAs, and BAFTA nominations for her performance. With Arquette as unstoppable as a speeding locomotive, a win would be astonishing.

THE TART: Emma Stone – Birdman or (The Unexpected Virtue of Ignorance) (director: Alejandro González Iñárritu, studio: Fox Searchlight Pictures):

FYC: Stone plays Riggan's (Keaton)



New York State of Mind

This Month, in closing out our Ten Years of Natural Selections celebration Natural Selections reprints an interview with Frank Schaefer, Assistant Director, Laboratory Safety and Environmental Health. Country of origin: USA. The original interview was published in the December 2004 issue.

How long have you been living in New York City? 35 years (all my life).

Where do you live? Richmond Hill, Queens.

Which is your favorite neighborhood? Bayside, Queens because of the quiet surroundings and its proximity to the Long Island Sound.

What do you think is the most overrated thing in the city? And underrated? The most overrated thing about the city is Times Square. It is just too crowded and if you ask me...a waste of electricity. The most underrated thing about NYC is its people. I think New Yorkers are very willing to help one another and don't get enough credit for the good they do.

What do you miss most when you are out of town? When I'm out of town, I generally miss running through the trails in Forest Park and a slice of pizza from Alfies.

If you could change one thing about NYC, what would that be? If I had the power to change anything, it would be eliminating trash

from the streets by enforcing laws that prohibit littering. It's irritating to see people throw trash from New York State of Mind their cars onto the street. It's not only an aesthetic issue, but a problem for the city's wastewater treatment plants as well.

Describe a perfect weekend in NYC. Sunny in the upper 80's. I'd start the day early with a long run and then spend the afternoon with my wife and children watching the horses run at Belmont Park, and win of course. In the evening we would barbeque in our backyard with family and friends.

What is the most memorable experience you have had in NYC? Watching the Mets make it to the World Series in 2000 by beating the St Louis Cardinals at Shea.

If you could live anywhere else, where would that be? I would like to live in South Florida.

Do you think of yourself as a New Yorker? Why? Absolutely, I've lived and worked here all my life.◊

fresh-from-rehab daughter who flirts with disaster, literally and figuratively. Like many others discussed here she has been nominated for SAG, Golden Globe, BFCA, and BAFTA awards.

THE BUSINESS WOMAN: Jessica Chastain – A Most Violent Year (director: J.C. Chandor, studio: A24):

NYC: Without a doubt, Chastain's is the biggest snub among the acting categories this year. She has the misfortune of being the next to earn that honor after Oprah Winfrey last year for The Butler. It's worth

noting that Winfrey had those coveted and soothsaying SAG, BAFTA, and BFCA nominations. Chastain won the NBR and earned BFCA and Golden Globe nominations, but came up short with SAG and BAFTA. It has been widely publicized that Chastain's Interstellar contract prevented her from campaigning for A Most Violent Year until the latter half of December. But by that time Chastain would be on a film shoot. This is likely your culprit, though we'll never know. How different would the race have been if she had campaigned from the get-go? Arquette's win would likely not

be as sewn-up—remember Chastain, like Moore, is overdue for a win and people want to award her. So much so that the Critic's Choice Awards gave her its first MVP Award this year.

With that, I give you my predictions as they currently stand: (INSERT CHART)◊

Rank	Best Picture	Best Director	Best Actor	Best Actress	Best Supporting Actor	Best Supporting Actress
1	Boyhood (1)	Richard Linklater - Boyhood (1)	Michael Keaton - Birdman (1)	Julianne Moore - Still Alice (1)	J.K. Simmons - Whiplash (1)	Patricia Arquette - Boyhood (1)
2	Birdman (2)	Alejandro González Iñárritu - Birdman (2)	Eddie Redmayne - Theory Of Everything (2)	Jennifer Aniston - Cake	Edward Norton - Birdman (2)	Meryl Streep - Into the Woods (2)
3	The Imitation Game (3)	Wes Anderson - The Grand Budapest Hotel (3)	Benedict Cumberbatch - The Imitation Game (3)	Reese Witherspoon - Wild (2)	Ethan Hawke - Boyhood (4)	Jessie Chastain - A Most Violent Year
4	The Grand Budapest Hotel (4)	Morton Tyldem - The Imitation Game (4)	David Oyelowo - Selma	Rosamund Pike - Gone Girl (3)	Mark Ruffalo - Foxcatcher (3)	Keira Knightley - The Imitation Game (4)
5	Selma (5)	Clint Eastwood - American Sniper	Steve Carell - Foxcatcher (4)	Felicity Jones - Theory Of Everything (5)	Robert Duvall - The Judge (5)	Emma Stone - Birdman (3)
6	Theory of Everything (8)	David Fincher - Gone Girl	Bradley Cooper - American Sniper (5)	Amy Adams - Big Eyes		Kristen Stewart - Still Alice
7	Theory of Everything (8)	Ava DuVernay - Selma		Marion Cotillard - Two Days, One Night (4)		Anna Kendrick - Into the Woods
8	Whiplash (7)	Bennet Miller - Foxcatcher (5)				Jessica Chastain - Interstellar
9	American Sniper (6)					Carmen Ejogo - Selma
10	Unbroken					Carrie Coon - Gone Girl
						Laura Dern - Wild (5)

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

Part V: Wendell M. Stanley, 1946 Prize in Chemistry

JOSEPH LUNA

In 1898, a Dutch botanist named Martinus Beijerinck faced a naming conundrum. He reproduced an experiment first performed six years earlier by Russian botanist Dmitri Ivanovsky, who found that a disease of tobacco plants causing a mosaic discoloration of their precious nicotine laced leaves could be transmitted to a healthy plant in an infectious manner. Moreover, like his predecessor, Beijerinck found that after passing through a filter too small for any known bacteria to pass, the juice of infected plants could still be used to infect healthy tobacco leaves. This was a puzzling observation, since any attempt to see the infectious agent under a microscope turned up nothing. Ivanovsky concluded that there must be a tiny living bacterium, smaller than any known, which was responsible for the disease. Beijerinck on the other hand wasn't convinced and wanted to call this infectious agent something else to reflect its non-bacterial nature. After what must have been some hand wringing, he settled on an old Latin word for "slimy liquid" and named the new agent a virus.

For the next three decades, exactly what a virus was presented a tantalizing mystery. Viruses behaved as if they were alive, they grew and could adapt, and yet some were so small that they approached the sizes of proteins, or other macromolecules that clearly weren't alive. So which was it? Alive or dead? Beijerinck, for his part, didn't have a definitive answer, but set a vital tone by referring to viruses as contagious living fluids ("contagium vivum fluidum"). Until the 1930s, as the roster of plant and animal diseases caused by viruses expanded, attempts to categorize them on the basis of size were used to justify the living (i.e. large) from the non-living (i.e. small). Still, others thought this essentialist idea might be missing something entirely.

Wendell Meredith Stanley was among them. Trained as a chemist, Stanley initially came to the Rockefeller Institute in 1931 as a post-doc to work with physiologist Winthrop J. V. Osterhout, but was quickly lured in 1932 by Louis O. Kunkel to be a part of the new division of plant pathology. Housed at the Institute's outpost in Princeton N.J., the plant pathology group settled in next to the division of animal pathology in its picturesque country setting, and it was here that Stanley probably first met John Northrop, with whom he would later share the Nobel Prize.

No doubt inspired by Northrop's accomplishment of crystallizing pepsin in 1929, Stanley's task of trying to crystallize a whole virus seemed just possible, if a bit crazy. But he was in the right place: in addition to famed protein crystallizers Northrop and Moses Kunitz next door, Kunkel's plant group had geneticists to study plant virus adaptability and the effects of mutations, entomologists to study the lifecycles of insect-borne plant diseases, and a healthy group aimed at working out conditions for plant cell culture in the petri dish, from roots to leaves. Microbiologists, soil chemists, animal virologists, plant physiologists... the variety of disciplines in the new department was as fertile as their verdant greenhouse.

Uniting the group was a long-standing interest in the Tobacco Mosaic Virus (TMV), the same virus studied by Beijerinck, and upon which virology was founded. Much was known by Stanley's day about TMV, its infectious properties and such, and even a few groups had attempted to get pure preparations of TMV by crystallization. All, however, failed to show that the crystallized virus, when dissolved, remained infectious. Working apocryphally from nearly one ton of infected tobacco

leaves, Stanley succeeded in producing a few grams of needle-like crystals that behaved just like TMV when dissolved. He also found that these crystals were overwhelmingly composed of protein, a surprising result, as it mirrored Northrop's conclusions with much smaller enzymes.

The scientific world was rightfully astonished. Crystals were well known to be ordered, chemical entities that were clearly not living, and yet Stanley's virus crystals undeniably behaved as if they were alive! The core of biology was broached upon by this discovery, as it prompted scientists to reconsider the very definition of life. For his part, Wendell Stanley remained ever the rigorous chemist, and largely opted not to partake in philosophical discussions, insofar as he interpreted the data pointing beyond a dualist view of life and non-life. Perhaps a virus was both? Perhaps the boundary is arbitrary?

While Stanley's work raised an almost existential question in biology, it turns out that his results were incomplete. TMV is composed of about 95% protein but it also possesses about 5% RNA by weight, a finding overlooked by Stanley, and now recognized as the key ingredient for a virus's living nature. What constitutes life at its boundary with non-life makes the virus a unique arbiter in biology in that viruses satisfy both definitions while satisfying none. Or as Stanley's contemporary and fellow Nobelist Andre Lwoff wrote on the subject, in the end "a virus is a virus!"

◦

Selma – The Movie

SUSAN RUSSO

Ava DuVernay has made a movie, based on the true events depicting the 1965 marches from Selma to Montgomery, Alabama, that still resonates today. With a cast led by David Oyelowo, a young British actor, playing the role of Dr. Martin Luther King, Jr., this movie is a testament not only to King's determination, but his brilliance as a leader, his

sacrifices, his family, his disparate but loyal followers, and his belief that non-violence was the only way to accomplish the major goal of voting rights for African-Americans throughout America. King met with leaders of many factions, such as Malcolm X, a radical leader, whom he convinced (in the movie) not to appear at the march, and members of the Student Non-violent Coordinating Committee (SNCC), persevering in his belief that only non-violence would prove to be the most effective way to make his and his followers' dreams a reality. The Civil Rights Act of 1964 had recently passed, outlawing segregation, a great victory for human rights, but King believed that true equality for all Americans would never be achieved without the right to vote. Selma was chosen as a rallying place to begin the marches to Montgomery, the capital of Alabama. (Selma was a town in which more than 50% of the population was African-American, but fewer than 1% of that population had been allowed to register to vote, due to the all-white registrars' arbitrary requirements). In one memorable

scene in the movie, Annie Cooper, a non-violent activist (played by Oprah Winfrey), when demanded to by the registrar, recited the entire Preamble to the U.S. Constitution, gave the correct number of circuit court justices in the county (67), but was rejected because she could not give all their names (!) This movie highlights many of the people who planned the marches with King – Ralph Abernathy, leader of the Southern Christian Leadership Conference (SCLC), leaders of the Congress on Racial Equality (CORE), and Andrew Young, Jr., who, still living at 82, helped to draft the Voting Rights Act, was a leading activist, and later became an American ambassador. Another march planner was John Lewis, who today is a Congressman (prominently seen in attendance at President Obama's State of the Union address on Tuesday, January 20, this year.) Other notables depicted in the movie were President Lyndon Johnson (played by British actor Tom Wilkinson), whom Dr. King met, spoke, and negotiated with a number of times about the marches and voting rights. Other major characters in the movie were Coretta Scott King, his wife and mother of his four children (played by a British actress, Carmen Ejogo) and Alabama Governor George Wallace (played by another Brit, Tim Roth.) Some notable American actors in smaller parts were Cuba Gooding, Jr., playing a lawyer, Martin Sheen, playing a judge, and Giovanni Ribisi, playing a presidential advisor.

It is a movie filled with moving scenes of real people in moments of confusion, fear, tension, wrangling, human frailty, humor, hope, and triumph. The determination of all the marchers is ennobling. The long marches, with men, women, students, and children dressed for church (as in the 1950's), but carrying suitcases, bedrolls, and food packages, is a testament to courage, resilience and determination. The images of armed police and state troopers with gas masks and night sticks, horses and whips are frightening, and the assaults on the unarmed people are almost unwatchable, as are the depictions of people on the sidelines cheering the fray. The director also utilized actual newsreel footage of the attacks, which is devastating. The violence of the first march was shown on black-and-white TV, and the outrage felt by many Americans led to white people joining the second and third marches. The U.S. Congress passed the Voting Rights Act in 1965.

The original script of the movie was written by English writer Paul Webb in 2007, with additional revisions of the final script by the director, Ava DuVernay. Among the producers of the film were Pathe U.K., Brad Pitt, and Harpo Films (founded by Oprah Winfrey). The production cost \$20 million, which, in Hollywood, is considered a modest amount for a major movie.

Roses are Red, Violets are Blue

AILEEN MARSHALL

Valentine's Day, also known as Saint Valentine's Day, is celebrated on February 14. It is the day that couples customarily show their love for one another. People give their loved ones cards, flowers (usually roses), candy (usually chocolate), or a romantic dinner. If you are well off, you may get or receive jewelry as your Valentine's Day gift. It is a traditional holiday, but not a government holiday, so businesses are still open.

Valentine's Day was originally known as Saint Valentine's Day. It was a feast day in several Christian churches. Yet, the origin of the saint is murky. There were at least three different Saint Valentines, and

not much is definitely known about any of them. The two legends seem to have melded to make up the origin of the holiday tradition. One was the Bishop of Terni, in Italy, who died around the year 270. The other was also a Roman priest, who was executed in 496. The legend says that Roman Emperor Claudius II felt that married men were too distracted to make good soldiers, so he outlawed marriage for them. Valentine performed marriages for them in secret. He was jailed and sentenced to death for this crime. While he was incarcerated, he supposedly healed the blind daughter of his jailer. On the night before his execution, he

sent her a letter, signed "Your Valentine." This is how the association of Saint Valentine and romantic love began. Interestingly, some Saint Valentines are also considered the patron saints of beekeepers and epilepsy.

Some sources say that the church naming Saint Valentine's Day was an attempt to Christianize the pagan festival of Lupercalia, an ancient Roman festival of fertility, celebrated around February 15. Besides slapping the hide of a freshly slaughtered goat on young women of the city to ensure fertility, the single women would put their names in an urn, and the single men would

pick a name to be paired off with for that year.

The first written reference to a celebration of Valentine's Day comes from the old English poet Chaucer. This poem, "Parlement of Foules," was written in 1382 to commemorate the engagement of King Richard II to Anne of Bohemia. There is a line that translates to "For this was on St. Valentine's Day, when every bird cometh there to choose his mate." Mid to late February was also known in Europe as the time when birds would start to mate.

One of the earliest written valentines was by Charles, Duke of Orleans, in 1415. He was captured during the battle of Agincourt and imprisoned in the Tower of London for twenty five years. While there, he wrote many poems to his wife. One of which contains the line "I am already sick of love, My very gentle Valentine."

The iconic line "roses are red, violets are blue" appeared in 1590 in Edmund Spenser's "The Faerie Queen:" "She bath'd with roses red, and violets blew, And all the sweetest flowres, that in the forrest grew." In 1784, a collection of nursery rhymes was published in England, "Gammer Gurton's Garland," with the poem:

"The rose is red, the violet's blue,
The honey's sweet, and so are you.
Thou art my love and I am thine;
I drew thee to my Valentine:
The lot was cast and then I drew,

And Fortune said it shou'd be you."

Mass-produced greeting cards for Valentine's Day started in England in the late 1700s, which was also a time when postage became more affordable there. Valentine's Day cards were first made in the U.S. by Esther Howland in 1847. She imported paper lace and ribbons from Europe to incorporate in her cards. She is known as the "Mother of the Valentine."

Valentine's Day is celebrated in various countries throughout the world in different forms. In most European nations, the practice is similar to here. In Finland and Estonia, February 14 is known as Friends Day. The practice there is to remember all your friends, not just romantic partners. In Wales, people celebrate St. Dwynwen's Day, the patron saint of Welsh lovers, on January 25.

In many Latin American countries, Valentine's Day is known as the Day of Love and Friendship. People will carry out some show of gratitude for their friends. Valentine's Day is not celebrated in Brazil, since it often falls during Carnival. There they celebrate Saint Anthony's Day on June 12 as a romantic holiday.

In some Asian countries, Valentine's Day has been taken up due to the exposure to Western culture through the media. In China, Valentine's Day is often not celebrated, since it falls close to Asian New Year, but they celebrate on the seventh day of the sev-

enth month of the lunar calendar. It is the day when a legendary cow herder and maid were allowed to be together. Japanese and Korean women are expected to give chocolates to their co-workers. Then on March 14, men are expected to reciprocate with white chocolate or marshmallows, known as White Day.

In India, public displays of affection were socially taboo. This began to change in the 1990s when Valentine's Day and American media became more popular. There are still some that criticize those who celebrate the holiday as being contaminated by capitalism and Western culture. It is also often disapproved and banned in many Muslim majority countries. It is seen as a holiday of Christian origin and thus against Islamic culture. In Iran, they banned the production and sale of any item emblazoned with hearts or red roses in 2011. In Malaysia, they raid hotels and arrest any couple suspected of having sex and hand out flyers in colleges warning students against Valentine's Day. In Saudi Arabia, the sale of Valentine's Day items have been banned since 2002. Police have removed red items from stores and red flowers from flower shops.

This Valentine's Day, enjoy taking the opportunity to show your gratitude for your loved ones, significant or otherwise.

Life on a Roll

ELODIE PAUWELS

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Lisbon is such a charming city! At first sight you wouldn't guess you're in a European capital: some parts of the city recall small villages, and no one seems stressed. In addition, colors are everywhere. This is one of these paradise cities for photographers, where they can daydream as much as they wish.

