

Natural Selection

A NEWSLETTER OF THE ROCKEFELLER UNIVERSITY COMMUNITY

Culture Corner

“Michelangelo: Divine Draftsman & Designer” (The Metropolitan Museum of Art, November 13, 2017 - February 12, 2018)

BERNIE LANGS

The Metropolitan Museum of Art recently had on view an internationally acclaimed exhibition, “Michelangelo: Divine Draftsman & Designer”, which closed on February 12th. Of the 600 drawings attributed to the great genius of the Italian Renaissance, the show brought together 133 of them from all over the world, the largest number of such works ever assembled by the Master. In addition, the show offered a handful of sculptures by Michelangelo as well as many rare preparatory “cartoons” and one of his early paintings. Drawings, paintings, and sculptures from the hands of other great artists of the period, including those in Michelangelo’s inner circle, were on hand, along with art from other eras serving to drive home essential ideas about what influenced him and why. One of the larger galleries boasted a brightly lit, small-scale reproduction of the Sistine Chapel’s famous ceiling, which hovered above the large space. Many of the drawings in that room were studies for specific images from the Chapel and each of the placards highlighted exactly where you could locate them above on the ceiling. These included a preliminary sketch of God’s reaching arm for the touch that will enliven Adam’s soul, the faces and bodies of the Sybils (including the well-known sheet in the Met’s collection, *Studies for the Libyan Sibyl*), and a letter written by Michelangelo with a tiny self-portrait illustrating the physical misery of this huge undertaking.

Just days after I had seen the exhibit, the curator, Dr. Carmen C. Bambach, and



View of the Met Museum's recreated Sistine Chapel with related drawings on display

Research Assistant Jeffrey Fraiman who was deeply involved with many of the logistics of the project, invited me for an afterhours viewing with only about 25 others in attendance. I jumped at the opportunity.

Given this chance of a lifetime, for what end would I use it? One of the first major exhibitions I had ever attended, was in

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A SPECIAL OBITUARY ON PAGE 7.

GÜNTER BLOBEL, 1999 PRIZE IN PHYSIOLOGY OR MEDICINE

BY JOSEPH LUNA





Michelangelo Buonarroti *Roman Soldiers, Cartoon Fragment for the Lower Left Part of the Crucifixion of Saint Peter in the Pauline Chapel*. Charcoal, with some black chalk, on approximately nineteen sheets of paper, outlines pricked for transfer. Museo Nazionale di Capodimonte, Gabinetto Disegni e Stampe, Naples (and detail)

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1980 at the Morgan Library, “Michelangelo and His World”, which brought together 41 of the Master’s drawings. I specifically recall my strategy on studying his drawings at that visit, and this time, I specifically chose to take the exact opposite approach to understand the profound ideas revealed by the drawings. One can demand that the works of art assist with the progression of one’s own personal theories in hope of completing aesthetic, spiritual or mystical inner dimensions within the soul or psyche. Upon entry to the Michelangelo exhibition, I said to myself: “Rubbish to all that,” and dove in simply to look at the drawings in the hope of experiencing what Kenneth Clark’s aptly calls “Moments of Vision”.

The Michelangelo exhibition gave its audience a chance to discover hints of how a genius of the highest level worked out his ideas. Viewers can see first-hand how his creative process initiated, perhaps as a work on paper in charcoal or in the wonderful textures induced by red chalk, and ended up as the sublime perfection of the frescoes in the Vatican or the perfect sculptures of *The David* or *The Moses*. The long-dead Michelangelo can’t go on camera and reveal how he did it so we are left in the uncomfortable situation of having to imply what his thinking process may have been by examining the clues he left behind and mixing them with tales of his personality gleaned from the reports at the time about his life or writings of his friends, such as Giorgio Vasari in “The Lives of the Artists”.

The Met’s staff, including Dr. Bambach and Mr. Fraiman, do the tireless groundwork for all of us prior to our visit. They comb through the complicated historical record and centuries of scholarship, subsequently devising and writing up their theories. Dr. Bambach and Mr. Fraiman and their colleagues perform the Herculean task of con-



Michelangelo Buonarroti *Sketches of the Virgin, the Christ Child Reclining on a Cushion, and Other Sketches of Infants*. Pen and brown ink. Staatliche Museen zu Berlin, Kupferstichkabinett

densing centuries of study and ideas so that their impressively educated passion sparks the hearts and minds of each one of the more than 600,000 people who viewed show.

A sheet of paper in one of the first galleries held numerous drawn studies of varying images by Michelangelo, some popping into the viewer’s eyes seemingly out of nowhere and retreating as another one emerged in its place. The drawing was crammed tight with idea after idea. On one side, I found of great interest an incomplete profile of a man buried in all the images of faces and bodies, fabulous in solid, confident detail, yet unusually halted in its progression. Other drawings in nearby galleries had isolated sketches on the same page floating in their own spatial realms and aesthetic dimensions, worked out by strokes of chalk, charcoal or pen. Many drawings were fully formed, or at times, there would be a section of a lightly present image

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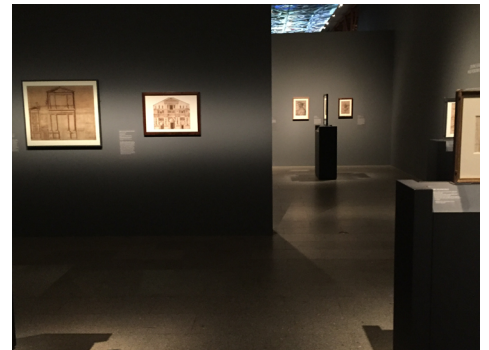
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LEFT: *Mural Fragment of a Male Nude in Three-Quarter Length (Triton or Satyr)*. Charcoal on rough porous plaster. Sernesi Family, Villa Michelangiolo, Settignano; CENTER: Bastiano (Aristotile) da Sangallo (Italian, 1481–1551). *Copy after the Central Episode of the Bathers in Michelangelo’s Battle of Cascina*.



View of the two galleries of the Met Museum’s exhibition “Michelangelo: Divine Draftsman & Designer”.

next to another in sharp detail, reminiscent of da Vinci's obsessive sketches in his famous notebooks.

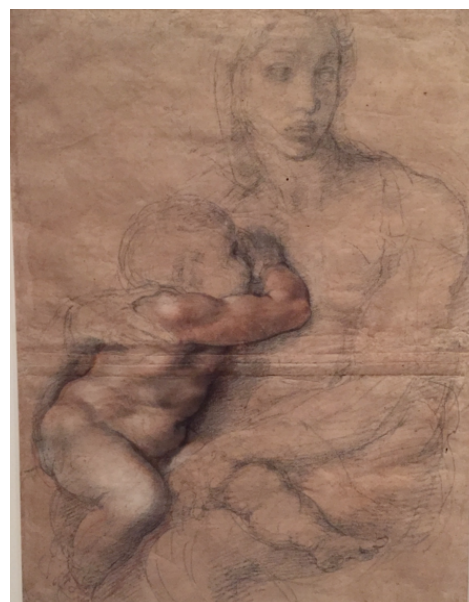
Two of the rare works in the exhibition were large planning "cartoons", one a section of a preparatory drawing for Michelangelo's Vatican frescoes, depicting a detail of Roman soldiers for *The Crucifixion of Saint Peter* in the Pauline Chapel. The second was a design attributed to the Master and his workshop for Michele di Jacopo Cosini's painting, *Venus Kissing Cupid* (the finished painting was also on view). The Vatican fragment left me engulfed in pure amazement and overwhelming awe. The Pauline paintings in the Vatican are of a completely different nature than the Sistine Chapel's ceiling and Last Judgement wall. They seem to present an intense inner contemplative expression of Michelangelo's suffering and spiritual conflicts. The frescoes have a tightness and harsher spatial reality of personal tortured reality than the grand images in the Sistine. Yet the cartoon at the Met had aspects of softness and clarity not apparent in the completed project.

Other highlights of the exhibition included a powerful sculpted bust depicting Brutus, displayed alongside an ancient Roman sculpture of a similarly posed emperor. There was also a sublime unfinished sculpture ambiguously titled, *Apollo-David*, similar in its chiseled texture to the unfinished *Deposition* in Florence in which a self-portrait of Michelangelo appears as Nicodemus. These sculptures are fabulously rough as opposed to the polish of *Pietà* in Saint Peter's in Rome.



Michelangelo Buonarroti with some assistance by Tiberio Calcagni *Bust of Brutus* (unfinished). Carrara marble. Museo Nazionale del Bargello, Florence

A room with red chalk drawings of unparalleled genius had depictions of emotional subjects such as *Study for a Descent from the Cross* and the dynamic display of *Archers Shooting at a Herm*. I found myself incapable of thinking about anything besides their exceptional power and beauty. I also found myself returning a number of times to gaze at the *Unfinished Cartoon of the Virgin and Child*. The face of the Madonna is similar in its features to many of the faces in the frescoed Sistine Chapel. The delicacy of the figure is ethereal, almost beyond physical reality, and well past thoughts of flesh and blood, perhaps created in the Master's mind from his vision of the Platonic form of feminine beauty itself. His ideal became the blueprint for artists of the time in representing the divine in the guise of paint.



Michelangelo Buonarroti (with slight re-touching by a later hand in pen and ink). *Unfinished Cartoon of the Virgin and Child*. Black chalk, red chalk, traces of brush and brown wash, with lead-white gouache highlights. Casa Buonarroti, Florence

Michelangelo was a captive of the times in which he lived, as we all are. He had to create within the confines of the ideas, society, culture, and territorial realities of Italy during his lifespan of 1475-1564. Michelangelo guided art into a new paradigm reaching untold heights and revealing realms of ideas and thoughts on all manners of subjects, both human and spiritual in nature. We can all thank him for his efforts as well as those who continue to study the works of all of the greats and present them to us for the betterment of Mankind. ■

All Photos by Bernie Langs | NATURAL SELECTIONS

Nessa Noms: Flip Sigi

VANESSA J WU

Flip Sigi has been a long time coming. This Filipino taqueria is headed by Chef Jordan Andino who was born in Canada, grew up in California. He takes inspiration from his Filipino grandmother and draws on skills from the time he spent working in fine dining.

Jordan's first restaurant in the West Village was originally named 2nd City, but has now joined the second restaurant located on the Upper East Side (UES) in sharing the name Flip Sigi.

With two locations, limited edition menu specials every month, and collaborations with other businesses, there's always something new to experience, but always

with a hint of familiarity, maybe even nostalgia. And don't forget the distinctive hot sauces! There's 1st Base, 2nd Base, 3rd Base, and Jordan's very own recipe: Home Run. Put it on your burritos, bowls, burgers, and even Bloody Marys for an extra kick!

Like his hot sauce, Jordan is anything but bland. I had the pleasure of meeting him, and his energy is always so high that you'll probably feel it leaping off the page!

NS: What is the meaning behind the name Flip Sigi?

JA: Flip Sigi basically means "Go Filipino" coming from a play on the words 'Flip' - Filipino and 'Sigi' - which basically means go!

NS: Why do you think Filipino food is gaining momentum?

JA: Filipino food is gaining momentum because, as a whole cuisine, it speaks to the 3 major cuisines that are popular and understood in the United States: Chinese, Spanish, and American. The fact that Filipino food has all these small elements people are familiar with will make them more keen to try something new.

NS: I know you take inspiration from your grandmother's Filipino recipes. Why do you choose to remake other known foods with a Filipino take rather than traditional Filipino dishes?

JA: I like to remake the classic dishes because it helps introduce my culture and cuisine to a wider range of palates. The more that try it, the more people get intro-

duced to my culture via my cuisine.

NS: What are your hopes for the future of your restaurants? Any specific goals?

JA: I hope my future restaurants will be great in number and widely respected among my cohorts and peers. Ideally, we create a culture, company, and restaurant that all people from the US can feel comfortable going to and eating at!

NS: How has your Californian identity influenced your food? As a Californian myself, I actually do get quite a bit of a Californian vibe from your food, your personality, and, to some extent, your restaurant decor!

JA: I would say that California influences my restaurants in two different ways: in my use of avocado and my vibe! I can't help but love that laid-back feeling while trying to eat because it's just how I was raised!

NS: Why did you choose New York to open your restaurants in?

JA: I opened in NYC because as cliché as it sounds, when it comes to food, if you can prove yourself successful here, you're now universally respected.

NS: Why the UES and West Village neighborhoods specifically?

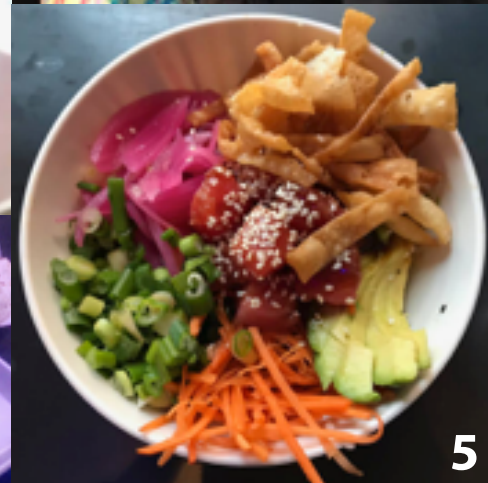
JA: Luckily for me, both the West Village and UES locations came from great contacts in the real estate business. We initially searched [in the West Village] because the reputation that restaurants have in this neighborhood is that of class and quality. We just had to be here to establish our brand as food-serious. We initially searched [on the UES] because with the opening of the 2nd Avenue Q train, this area will eventually be a hotbed of youth and an area that will attract guests in our price range.

NS: Is there anything that sets apart your UES location and your West Village location other than what's explicitly on the menu and what's on the "secret menu?"

JA: The locations are the same but have different fingerprints, so to speak. We want each place to have their own identity for the neighborhood that they're part of.

NS: Of all your monthly specials and collabs thus far, which would you say is your personal favorite? I was a fan of the December longanisa poutine. You should definitely make that a regular item!

JA: I've done so many of the specials and collabs that it's hard to remember. I'd say my two favorites are the Flip N Out Burger and the Sinigang Flip Bowl. Both are regular menu items now, but started as specials! Although I do agree: the longanisa poutine



Photos by Vanessa J Wu | NATURAL SELECTIONS

1. Flip Ramen: The first limited edition item of 2018 – a ramen with both chicken and pork adobo! **2.** The author with Flip Sigi's chef, Jordan Andino. **3.** L.A.E. Me: a collab with black seed bagels now on the official Flip Sigi menu – longanisa, American cheese, and a fried egg on an everything bagel. **4.** From left to right 1) Flip Bowl: one of Jordan's favorite limited-edition item, now here to stay; 2) Longanisa Poutine: Natural Selection's Vanessa's favorite limited-edition item; 3) Cali Burrito: Jordan's favorite regular menu item. **5.** Poke Me: a twist on the classic tuna poke bowl served with sweet miso coconut steamed rice.

was insane!

NS: What about your favorite non-rotating menu item?

JA: Favorite non-rotating menu item – Cali Burrito.

NS: I saw that you're going to be a part of the Food Show at the Javits Center in March. What are you planning on demo-ing? Anything from Flip Sigi?

JA: For the food show in March, I'm going to be on center stage demo-ing the high-

lights of Flip Sigi as well as some fun hacks for the general cook.

NS: Bonus Question: In-N-Out or Shake Shack?

JA: In-N-Out for life!!!! ■

For my review of this restaurant and others: vanessajwu.yelp.com

For more photos from this restaurant and others: instagram.com/vanessajwu

Black Magic Juice

JOHANNES BUHEITEL

I'm confused, disoriented. The ringing from my alarm still in my ear, I'm performing the absolute minimum necessary number of tasks that prepare me to go out and join the herd of zombies slowly moving through the streets. Phasing in and out of consciousness, me and my fellow undead finally manage to stumble into the same type of place, as if we had all been drawn there by an invisible force. It is here, where I get what I crave: A black magic juice whose ingestion will allow me to start feeling like a human being for the first time that day. What I crave, of course, is coffee.

I might be slightly exaggerating for dramatic effect, which doesn't make it less true that many people all around the globe rely on a good morning cup of joe as an essential part of their daily routine. But recently, those people started to grow increasingly worried as news outlets have begun reporting that the State of California wants to force coffee shops and other places that sell brewed coffee to [label it as cancerogenic](#). So clearly, many are now asking: Have we been drinking poison the whole time?

Let's back up a moment: Since 1986, California law requires all companies with 10 or more employees to post clear warnings on or around products that could pose a danger to a potential consumer (apparently, if your company has only 9 employees you're allowed to give people cancer, but let's not go there). This risk is defined by a product containing certain chemicals that are listed in the law's documentation, among them, one at the center of this debate: [acrylamide](#). Acrylamide is formed

as a byproduct of the [Maillard reaction](#), which occurs pretty much anytime food items (especially starchy ones) are heated over a certain temperature. This reaction is responsible for the crust on a seared steak, the dark rind of a freshly baked loaf of bread, or the crispy exterior of a french fry (you know, all the good stuff). And—you guessed it—coffee beans owe their beautiful brown sheen to this chemical reaction happening during the roasting process.

So how dangerous is acrylamide? Well, it all depends on how you look at it. The results of studies in which mice and rats had been fed with the chemicals have shown a clear dose-dependent [correlation between cancer and acrylamide](#). Taking these results at face value, we could fairly confidently assume that acrylamide will have a cancerogenic effect on humans as long as—and this is important—one ingests enough of it. I'm stressing this fact, because the amount of acrylamide the rodents were exposed to in these laboratory experiments are [1,000 - 100,000 times higher](#) on a per kilogram basis than what can be expected from dietary consumption in humans, which makes it very unlikely that one can take up enough dietary acrylamide to cause immediate harm.

Of course, this fact doesn't exonerate acrylamide just yet. What about long-term exposure of humans to small amounts of this compound? This is where it gets complicated. You see, long-term dietary studies are usually quite tricky to perform, control, and analyze well. This is due to many reasons, with one of the most problematic being the reliance of many studies on their subject's self-reporting and our tendency to (willingly or unwillingly) misrepresent the number of things we put into our mouths. Nonetheless, these studies have been scien-

tists' bread and butter (no pun intended) for decades, allowing them to assess the influence of diet on our health. And up to this day all of these studies have [failed to prove a clear correlation between acrylamide in cancer in humans](#). This means that from all the information we have so far, we can assume that it is unlikely that the concentrations found in a normal human diet (including in coffee) will have any measurable effect on your health. In particular, your cancer risk is way more likely to be influenced by factors such as genetics, certain habits, such as smoking, or whether you are occupationally exposed to higher concentrations of chemicals or radiation. But, as I mentioned, our current studies aren't perfect, which is why the National Cancer Institute [suggests additional epidemiological long-term studies](#) (that do a better job tracking certain metabolic markers).

But now let's get back to coffee. Should you stop drinking it because of acrylamide? Probably not. Should it get a label because of its acrylamide content? Probably not. Even so, you might say to yourself: "Well, let's just play it safe and cut the coffee". In this case, however, I want you to consider this: In 2014, the results of a [meta-analysis of 21 studies](#) conducted between 1966 and 2013 showed that coffee consumption of 3-4 cups per day was not only not correlated with cancer mortality, but even decreased (!) the likelihood of death from all causes and also specifically from cardiovascular disease. So, the next time you want to reach for this expensive face cream behind your bathroom mirror, think about going into your kitchen instead, because those little brown beans on the counter might hold the actual secret formula for longevity. Black magic juice, indeed. ■

QUOTABLE QUOTE

"When all the trees have been cut down,
when all the animals have been hunted,
when all the waters are polluted, when all
the air is unsafe to breathe, only then will
you discover you cannot eat money."

Cree Prophecy

What to do Indoors When You've Already Watched Everything on Netflix

ELISA LAZZARI

Winter's gone, or has it? Even if most of the cold months are behind us, it might be too early to take out our spring trench coats. On February 2, Groundhog Day was celebrated across the United States, but this year's forecast was dire. Contrasting predictions between Pennsylvania's famous Punxsutawney Phil and Staten Island's very own Chuck left the case unsettled, so we might still have a few weeks of biting weather ahead of us. To play it safe, let's look at some indoor entertainment options:

Bake. This is your chance to ask your cute neighbor for a cup of sugar! There are billions of recipes online, which sometimes require an overwhelming amount of kitchen gear. Whether you're a beginner or a seasoned baker, muffins are always a good idea. They're just as delicious as they are simple to prepare, and once you master the "muffin technique" (see blogs like myrecipe.com or kitchn.com for easy recipes) you'll be able to wow your loved ones with elaborate flavor combos. Think apple-cheddar or dark chocolate-bacon muffins. Next thing you know, you'll learn how to frost and fight on "*Cupcake Wars*." Pros: baking will make your apartment cozy and smell delicious. Cons: some clean up required.

Join a wine club. Wine clubs are a

good opportunity for many reasons. You like to experiment with different wines but don't have much time to browse in local shops? Wine club. You dread inevitable conversations with the too well-meaning salesperson and want to get a good price on bottles? Wine club. Get a feeling for which subscription could work for you on websites like wineclubreviews.net. Also, you'll have plenty of reasons to enjoy another fun indoor activity: throwing wine tasting parties. Pros: show off the cheese knife set you bought yourself at Pottery Barn a year ago. Cons: now your friends will know better if you show up with "2 bucks-a-bottle-with-pretentious-label" wine.

Play board games. A great reason to put down our phones and computers, and actually socialize. If you're asking yourself why you should try it, consider the many benefits associated with playing board games. Besides enhancing brain function, board games are known to help reduce stress, increase creativity and strengthen relationships. If the last board game you played was either Scrabble or Monopoly, then you're in for a big surprise. Adult board game options are now countless. Just to name a few: *Settlers of Catan*, *Cards Against Humanity*, *Exploding Kittens*, and *What Do*

You Meme? With updated options like these, you're bound to have fun. If you're looking for someone to play with, you should know that New York City is home to *The Uncommons*, a board game café with one of the largest library of games on the East Coast. Pros: the perfect occasion to spend time with friends and family while wrapped in a sleeved blanket. Cons: too much fun?

Knit. Yes, I'm serious. I'll argue that knitting is one of the very few mindfulness activities that actually results in something useful. You can choose to actively pay attention to every stitch, or, much like doodling, simply keep your hands busy while your mind focuses on other things. Crafts can be very rewarding, crushingly cute (ex. baby hats. Enough said), and of all shapes and sizes. If you're already comfortable with needles and infinity scarfs, challenge yourself with quirkier artwork, such as knitted cactus vases or faux taxidermy. Pros: you won't ever have to worry about *buying* gifts again. Cons: the inevitable learning curve and your supplies may be bulky to carry around.

As much as we all hope Staten Island Chuck was right, winter time gives us a chance to get creative indoors. At the very least, we should be prepared in case a snow storm cuts out the WIFI. ■

Word of the Month

DAKOTA BLACKMAN

Woman

noun | wōm-an | 'wū-mən, especially Southern 'wō- or 'wə- |
an adult female person

The word's primary definition is simple enough: according to Merriam-Webster, a woman is "an adult female person." Also according to Merriam-Webster, it is in the top 10% of most-used online words. This is hardly a surprise. Feminism (a noun which Merriam-Webster defines as "the advocacy of women's rights on the basis of the equality of the sexes") is now in its fourth wave. Its current focus is on using social media to amplify opposition to all-too-common phenomena of violence against women, with an emphasis on sexual harassment. Feminism is seeping into popular culture as well. Beyoncé's song ***Flawless, for example, samples Chimamanda Ngozi Adichie: in the middle of the song, we hear the activist read a few lines from her now-famous speech "Why We Should All Be Feminists." Adichie says, "We teach girls to shrink themselves, to make themselves smaller. We say to girls: You can have ambition, but not too much. You should aim to be successful, but not too successful.

Otherwise, you will threaten the man."

This brief excerpt highlights what is most interesting to me about woman's definition: in these few lines, Adichie reinforces the word's inherent binary. Through the comparison of women to men (specifically, of girls to boys), she places women on one side of this binary, and men on the other. Interestingly, this binary is also reflected in the language: while a woman is defined as a "female person," a man, according to Merriam-Webster, is "an individual human; especially an adult male human." The gendered caveat of the word man lies only in the qualifying clause, skewing baseline humanity with maleness. Woman's etymology further supports this: it is derived from the Old English word wif-man, which itself combines the words wife and man—the former being the Old English synonym for woman, the latter being synonymous for human. The word "man" not only has more definitions than woman, but these definitions also extend beyond the confines of gender and even traverse into different parts of speech (the verb meaning to control or supply, for example). So not only is the word woman binarized, it is also linguistically upholds a gendered inequality. However, this binary does not solely exist within the confines of the language; it has somewhat insidiously entrenched itself into the norms of our

culture. In fact, it is so subtly embedded that it can impact the way in which women think and feel about themselves and each other.

The word is especially appropriate given that March is Women's History Month. It has been recognized as such in the United States only since 1995; before this, starting in 1981, just one week in March was celebrated as Women's History Week. This week, and later the month, builds on the celebration of International Women's Day on March 8th, which has been recognized in the United States since the year 1909, but was only recognized by the United Nations starting in 1975. (It became a national holiday in Soviet Russia in 1917.) The resilience of the women's movement is always striking when its history is considered, particularly in a country like the United States, which touts equality and progressivism in its ideological foundations. Women's History Month has only, within the past twenty-odd years, been adopted as a mainstream, national holiday. It can be disheartening to think about how much more work needs to be done, particularly when the definition of the word "woman" upholds an innate inequality. Yet, one of language's most beautiful characteristics is that it can be fluid and dynamic; with work, the norms embedded both in our language and our society have the potential to change. ■

Günter Blobel, 1999 Prize in Physiology or Medicine

JOSEPH LUNA

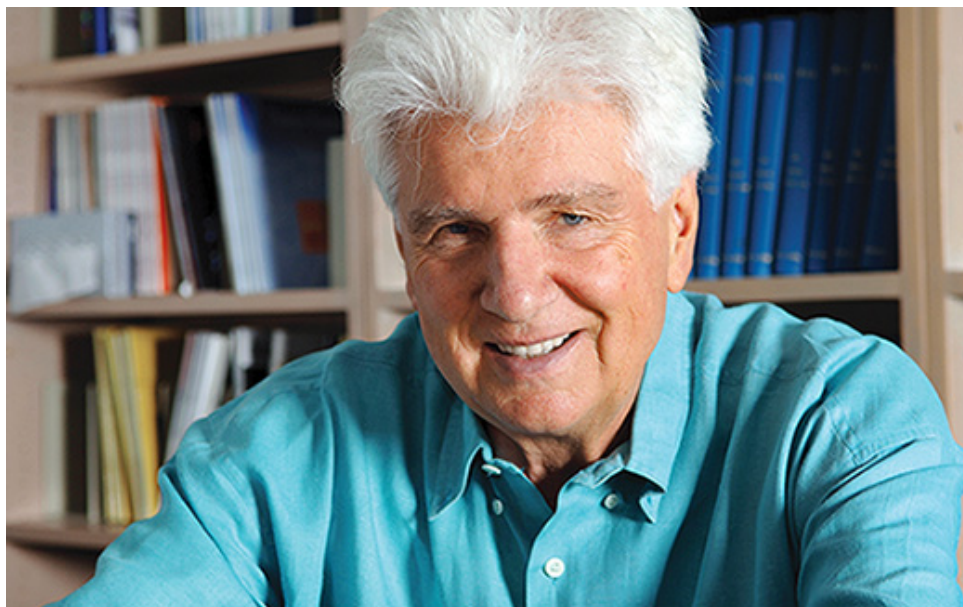
Editor's note: This article was originally published as Twenty-four visits to Stockholm: a concise history of the Rockefeller Nobel Prizes by Joseph Luna in June, 2016.

Let's start with a fantastical scene: picture a band of Neolithic humans in a hot air balloon overlooking modern New York City. What would they see and experience? Lacking a vocabulary and a mental model of twenty-first century life, our ancient friends would be awestruck at seeing miniscule specks and strangely ordered structures, lines and squares, in green and gray. Perhaps the occasional yellow rectangle from which specks would enter and exit would catch their attention. Or they might ponder a box with flashing lights, speeding its way across a grid. It's near impossible to imagine being in their shoes, but it's easy to envision the excitement as they try to describe and make sense of what they saw.

This totally novel experience wasn't far off from what early cell biologists encountered, as they used the electron microscope (EM) as a sort of hot-air balloon to discover the cities inside cells. By the mid-1960s, they had plotted the geography of all sorts of cellular worlds, had given names to energy-making blobs and recycling vesicles, and with the help of radioactive amino acid labeling, had a basic sense of where proteins were made and where they ended up. But big questions remained such as how did a protein know where it needed to go? For a discipline built on EM observations from high above, this was a challenging question to answer, but it captivated a young German post-doc enough to dream as if he landed his hot air balloon and walked among molecules, where the view was much clearer.

Günter Blobel arrived in George Palade's laboratory in 1967, shortly after completing his PhD at the University of Wisconsin at Madison. He joined a dynamic group of researchers who had stumbled upon an odd observation concerning the protein factories of the cell, its ribosomes: proteins destined to remain inside the cell were often made from a pool of freely cytoplasmic ribosomes, whereas proteins meant to be exported from the cell quickly associated with ribosomes attached to the endoplasmic reticulum (ER). How a new protein made this decision to stay in the cytoplasm or go to the ER was a mystery.

Within a few years, and overwhelmingly without much evidence, Blobel and a colleague (and Rockefeller University alum) named David Sabatini formulated what became known as "the signal hypothesis"



Günter Blobel (May 21, 1936 – February 18, 2018) | Rockefeller University

that might explain how proteins got sorted to their proper locations. It represented a truly imaginative and startlingly precise leap, as if one could envision a five digit postal code and a stamp authentication system simply by watching mail trucks from space. Blobel and Sabatini proposed that ER destined proteins contained a special stretch of amino acids that acted like a signal that became apparent the moment the protein was being made at a ribosome. This signal sequence, located at the head of a protein, would be recognized by a factor (or factors) that would, in turn guide the synthesizing ribosome to the ER, where the protein in question could finish being born as it *translocated* across the ER membrane. Once properly sorted into the ER, the signal sequence was no longer needed and could be removed by an enzyme, even while the protein was still being made. Once finished, the protein could then go and do its job.

For many, this all sounded needlessly baroque. One attractive alternative was to consider different types of ribosomes, where each type was responsible for ferrying a nascent protein to a particular location. Another idea postulated that the mRNAs encoding proteins somehow got to the correct place before undergoing translation from any nearby ribosome. The signal hypothesis was one of many possible models, and a far-fetched one at that. But it made very precise predictions that could be tested, the first of which was the existence of a transient signal sequence.

Myeloma cells provided the first foothold for testing the signal hypotheses, since they secreted lots of IgG antibody light chains that could be readily detected. Using cell-free

translation systems, based on these cells, other laboratories had observed slightly heavier IgG molecules than those secreted from intact cells, suggesting that a larger precursor was made and pruned to a final, smaller form. Yet, worries of an *in vitro* artifact abound. Blobel first repeated this experiment, and once confirmed, tinkered with his cell free system to uncover the order of events. Using detergent, he separated ribosomes from bits of ER (called microsomes) and added a drug that blocked new IgG production. He then let the ribosomes that had already started making an IgG to finish, keeping track of what they produced and when. Early in the experiment, only the smaller form emerged, which made sense if these ribosomes had already been at the ER and were nearly finished making IgG when Blobel had isolated them. But later in the experiment, a mixture of larger and smaller forms showed up: ribosomes that had just started making IgG indeed made a larger version. But lacking sufficient ER targeting, the signal sequence wasn't pruned efficiently. Blobel had glimpsed a totally new feature in the early lives of proteins.

This was just the start. Over the ensuing years, Blobel and his team devised ways of recapitulating numerous aspects of protein targeting in the cell, from isolating the complex that ferried a signal sequence bearing protein to the ER (the aptly named "signal recognition particle") to later confirming and characterizing the protein channel at the ER (the *translocon*) that nascent proteins traversed for proper processing. In part because of Blobel's efforts, the hot air balloon view gave way to detailed explorations from the ground. A dream, as all good hypotheses are, turned out to be true. ■



INTERVIEW BY GUADALUPE ASTORGA



How long have you been living in the New York area?

Practically all my life, I was born and raised in Upper West Harlem, with the exception of 4 to 5 years that I lived in Puerto Rico.

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

The Heights, in Washington Heights. I don't feel like I have a favorite neighborhood, for me it's more like spending good times in certain areas of the city that become favorite memories.

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

The most overrated thing in the city are the new buildings with rents that are not affordable, and the most underrated are the people that can't afford high rents.

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

I would say everything...the lights, the sound escapes, the 24-hour grocery stores, just everything the city offers.

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

Well, I'm a native New Yorker. So, I'm trying to keep a positive disposition with everything that's rapidly changing and taking place here in the City.

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

I feel I'll pass on this question, lol.

What is your favorite weekend activity in NYC?

Staying up late listening to music (vinyl or live is even better), I dedicate myself to the arts; so, weekends allow me to concentrate on creating new works or sharing time with some of my friends that are in the arts musically or visually.

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

I have to say writing my name on the subway trains in 1970 when I was 14, and watching my name go by as I sat on the bench at the station with other writers.

Bike, MTA or WALK IT???

It all depends where I have to go; sometimes I drive, take mass transit, or cab it.

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

I've been to a number of cities worldwide, and entertained the thought that I can live there during my stay. After a couple of weeks, I get homesick and want to return to NY, so for now I'll just say that I'm not sure.

Do you think of yourself as a New Yorker?

If I don't think I do by now, I don't think I ever will. ■



Life on a Roll

IN THE MIDDLE OF PARIS, FRANCE

ELODIE PAUWELS

<https://elodiephoto.wordpress.com/>

The Saint-Jacques Tower, with its flamboyant gothic style, is located in the middle of Paris. It is all that remains of a church built in the 16th century and demolished during the French Revolution. The 171-foot tower has had many functions since then (including a shot tower!) and undergone many phases of restoration. It is now open to the public (tour guide only), and the view from there is simply stunning. ■

