



SCOPE

H. Dunbar Hoskins, Jr., MD: A Tribute

By Stephen A. Obstbaum, MD

H. Dunbar Hoskins, Jr., MD, died on Jan. 27, 2024 at age 84 after transforming the Academy into an international association.

For almost a half century, the leadership of the American Academy of Ophthalmology has been blessed with extraordinary leaders. It has been my distinct pleasure to have been involved in the life of the Academy during this period.

Bruce Spivey, MD, became the Academy's first executive vice president following its separation from the American Academy of Otolaryngology in the mid-1970s. His early experience in the Academy was related to educational programs, and his legacy is the recognition of the primacy of the Academy's initiatives in lifelong learning. His leadership was also integral in the merger of the Academy and the American Association of Ophthalmology which expanded the role of the Academy as the leader of organized ophthalmology both nationally and internationally. Dr. Spivey realized that the broadened mission



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of the Academy required a fresh look. He convened a committee to deal with organizational redesign that marked an important chapter in the Academy's history.

David Parke, II, MD, became the CEO of the Academy and almost immediately began to develop the IRIS® Registry (Intelligent Research in Sight), the nation's first comprehensive eye disease

clinical registry, which has emerged as a valuable resource for ophthalmologists world-wide. He was also instrumental in making the Truhlsen-Marmor Museum of the Eye® a reality. David led us through one of the most trying periods in our history. His management of the Academy's daily business and through the trials and tribulations of successfully guiding the annual meeting during COVID-19 epidemic required uncommon skills.

The tradition of outstanding leaders of the Academy has now been passed to CEO Stephen McLeod, MD. There is little doubt that he will continue in the footsteps of his predecessors to wisely guide the Academy. We as a profession are very fortunate to have had and continued to have such eminent colleagues as leaders of our Academy.

Dunbar was the essential link between the Spivey and Parke eras. I was among those privileged to have served as an Academy president under Dunbar's tutelage. All who knew and admired him learned early on that once he had envisioned a goal, its outcome was assured. He guided our steps

H. Dunbar Hoskins, Jr., MD

to make the vision a reality. Dunbar was a visionary whose concept of the Academy was for it to be the prime resource for data, information, and education. He inherited a new, untested organizational format, drawn from the Committee on Organizational Redesign. Undaunted, he created a structural hierarchy to ensure departmental productivity and fashioned a business model that put the Academy on a firm financial footing.

Although the term quality eye care was often bandied about, Dunbar felt a responsibility to ensure that each ophthalmologist had the knowledge “to do it right the first time.” On more than one occasion I heard him say that this was the most effective and efficient way to deliver care. The impetus for the ONE® (Ophthalmic News and Education Network) was to improve the quality of care globally, by making educational materials available to all ophthalmologists irrespective of geography, particularly those with fewer resources. This was a true labor of love that was spawned through his initiative, and although it depended on many volunteer ophthalmologists, it bore his imprimatur.

Some aspects of organizational redesign presented challenges to governance. The Academy Council was accustomed to having regional meetings several times each year. The Committee on Organizational Redesign evaluated the utility of the frequency and costs related to this plan and determined that an alternative would be desirable.

Over lunch, several of us pondered the alternatives and concluded that a mid-year meeting of the council in Washington, D.C., might be a viable solution. When we presented this suggestion to Dunbar, he seized on it immediately. Although the current format of the Mid-



President's Dinner during the 1997 AAO meeting in San Francisco. Pictured left to right: Merilee Obstbaum, H. Dunbar Hoskins, Jr., MD, and Stephen Obstbaum, MD.

Year Forum has further evolved, the success of this annual event was a direct consequence of Dunbar's enthusiastic acceptance and leadership.

Dunbar was a data-driven individual and embraced the concept of evidence-based medicine. He was instrumental in developing the National Eyecare Outcomes Network for Cataract Surgery (NEON) study, a computer-based registry that obtained data in real time. This project was well ahead of its time but encountered technical difficulties that forced its demise, yet the concept was sound and appropriate. This nascent idea matured into the IRIS® Registry, perhaps the most effective



My gratitude to Dunbar following his gracious and generous introduction.

data collection and analysis instruments in all of medicine.

Even as he served in his executive role at the Academy, Dunbar found time to continue to minister to his patients as an attentive, caring physician. He was an outstanding ophthalmologist and glaucoma specialist and took great pride in caring for his patients. As he said, “Treat your patients as if they were your best friend.”

He acknowledged that he was greatly influenced by his mentor and colleague Robert Schaffer, MD, a prominent leader in our field and an extraordinary role model. Dunbar extended that same outlook to his colleagues. We were the beneficiaries of his wisdom and guidance. I recall a personal situation when his tactful recommendations to me resulted in a positive outcome to a contentious situation. Simply telling me to soften my stance and become more receptive of another's point of view without necessarily altering my own won the day.

Dunbar had an uncanny ability to support the goals each of us aspired to achieve during our presidential year. He made each of us look good. His support and encouragement made each of us perform better. Dunbar was a wonderful friend whom I greatly admired and whom I will miss.



The Great Filter

By Alfredo A. Sadun, MD, PhD

say that the “Great Filter” is behind us. That’s a big deal on many levels.

What is the Great Filter, you might ask? You would have to understand the context which starts with Enrico Fermi at the head of a table with other Nobel Prize winners sitting down to lunch in Los Alamos in the late 1940s. They were there as part of the Manhattan Project and had already built the atomic bomb.

I first heard of this legendary (some would say apocryphal) conversation from my physics mentor at MIT, Philip Morrison. Morrison had done a post-doctoral fellowship in physics with Robert Oppenheimer and then followed him to Los Alamos to direct the famous Manhattan Project. Some of you may have seen the movie, “Oppenheimer,” so you know the setting.

Morrison was sort of Oppenheimer’s chief of staff and privy to most of the important decisions, discussions and diversions there. He was the proverbial fly on the wall. I loved hearing his stories at MIT. A few years later, I found myself at the California Institute of Technology where I got to know the Nobel laureate Richard Feynman, a great legend in physics and the youngest group leader at the Manhattan Project. So, every chance I got with Feynman,

I eagerly tried to confirm some of Morrison’s stories, including the famous Fermi luncheon story. I learned the trick of getting Feynman to talk by giving him the Morrison version to which he would usually say, “Let me tell you the real story.”

But this time, their two versions were very similar. And it went something like this (with a bit of paraphrasing): Fermi would visit from Chicago every few months and stay at Los Alamos for a couple of weeks. There, he was most welcome for his contributions to the theory of atomic fission, for his generally supple and brilliant mind, and for his good cheer. He was a charming raconteur and enjoyed challenging mind tricks which he often set up as bets. He always won the bets as he could mentally calculate probabilities faster than anyone else.

As an example, a few years earlier he watched the first atomic explosion, Trinity, from a distance of about 10 miles away. By letting go a handful of newspaper strips, Fermi interpreted the size of the shock wave as it passed and then pronounced the power of the atomic explosion which turned out to be quite accurate.

But at this luncheon, Fermi was quiet, which made an impression. Eventually, Edward Teller, another Nobel winner, asked Fermi if he was ill. Fermi denied being sick but admitted to being rather depressed. And then he explained why, beginning his monologue with the question, “Where are they?”

“Who?” someone responded.

“The aliens. The visitors from an advanced technological civilization from another planet,” Fermi said.

“Why this nonsense, Enrico?” Teller replied.

“In this galaxy alone, we have 200 billion stars with likely many planets circling each sun. Some of these planets must harbor conditions not too hot, not too cold, etc., so as to be suitable for life,” Fermi said. (We now know

this to be true and nickname them “Goldilocks” planets).

“Even if the odds of life on any given planet are low, and even if the odds of evolution taking one species to intelligence, to civilization and to technology are poor, it still computes to a very high chance that there are thousands of technologically sophisticated civilizations out there,” Fermi said. (This is now known as the Drake Equation.) “Why haven’t they visited us?”

“Come on, you know how vast the distances are. If they left from the other end of the galaxy, it would take them at least 100,000 years to make it to Earth,” Teller said.

“So what? 100,000 years; a million years; 10 million years. Who cares? It’s all just a brief instant in time compared to the 14 billion years of our universe. And if they didn’t feel like a long trip, they would send robots. And to make the search of the galaxy more systematic and complete, their robots would mine planets along the way and self-assemble many more copies of themselves. Hence, they would spread exponentially. We’ll be doing that ourselves within 500 years. You don’t think we’re the only ones, do you?” Fermi asked.

Teller and the others began to see that Fermi wasn’t just being silly. After a long silence one asked Fermi, “So what is your explanation?”

“There are two and only two possibilities. I will call them the ‘Great Filters.’ The first Great Filter would be behind us. That one says that there is one critical step in the evolution of an intelligent creature that is basically impossible. The probability of that is zero and so even with the 200 billion suns to start with, it comes to nothing,” Fermi said.

“Well, we know that’s wrong. We’re here, so that step can’t be impossible,” Teller said.

“Fortunately, Edward, you are wrong. We’re having lunch. So, we’re here, and so we are totally biased,”

From the Editor's Desk

Fermi said. (This is an example of what we now call the Anthropic Principle, an extreme version of ascertainment bias). “We are not a test of that hypothesis. Something crazy may have happened that led us to that which could never happen again. But having happened, we are here to discuss it with sandwiches.”

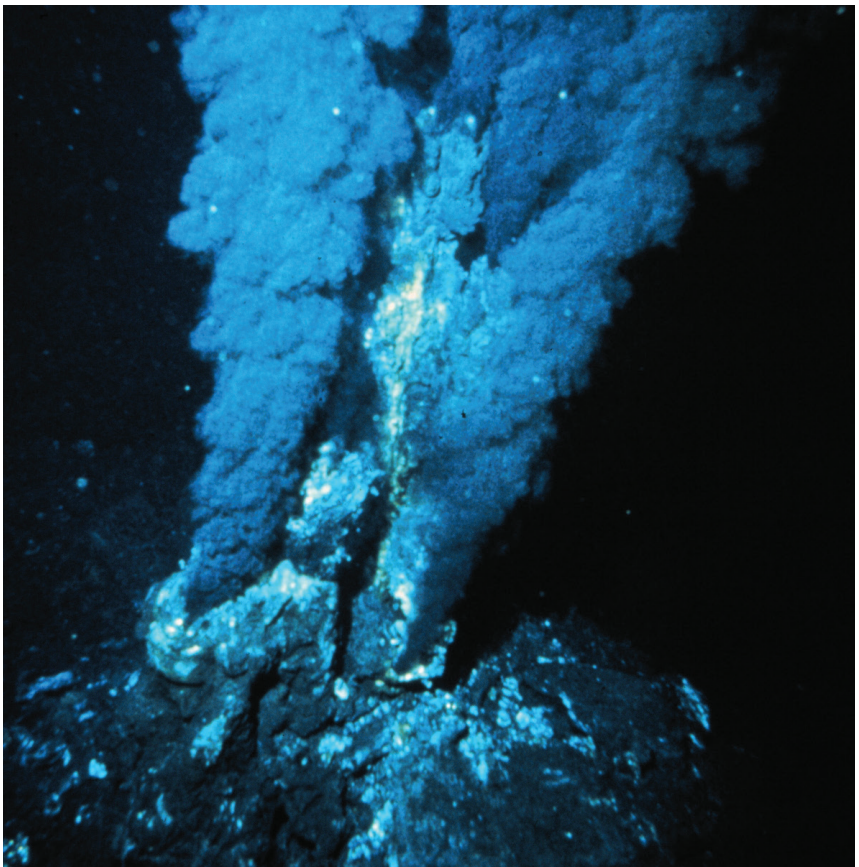
“What is the second Great Filter, Enrico?” another scientist asked.

“Ah,” he said, “You are. You, my friends, gathered around this table have launched us into a world with weaponry so great as to not only win a war, but to lead to another final war where extensive use of these nuclear bombs will destroy all life, or at least all civilization and technology. So, then we won't be sending robots to self-replicate and visit the galaxy in 500 years. It's quite likely that all great technological civilizations inevitably blow themselves up. The second Great Filter is in front of us.”

This is now called the [Fermi Paradox](#). And it still terrifies many physicists today. But there is a point of view that saves us from that. And I want to finish this editorial with that idea.

So, what have we learned in the last few decades that gives me reason to think there has been a miscalculation in the Fermi and Drake computations? On planet earth, life began as early as 4 billion years ago. We have recently learned that single cells began by harnessing energy from alkali vents under the ocean and then later changed their cell biology to become independent for their energy and carbon metabolism needs. But for about 2 billion years, nothing too dramatic happened. And then it did.

Two billion years ago there were prokaryotes that came in only two flavors: Archaea, that were good with the weird chemistry and high temperature of these undersea volcanic vents, and bacteria that were marvels of biochemical wizardry



Deep sea hydrothermal vent. Also called “black smokers” and likely the venue for the origin of life on earth. They provided energy in the form of proton gradients and the minerals for compartments and electron transfers. Image courtesy of: OAR/National Undersea Research Program (NURP); NOAA; P. Rona

that could go almost anywhere on earth. But both were going to be limited to being just one-celled organisms, forever, it would seem. And one-celled organisms are limited in many respects from the sort of thing we find interesting, such as the development of size, specialized organs, motility and amazing organs, such as the eye and brain.

All these things only became possible when the great symbiosis occurred. An Archaea engulfed a bacterium and not only this maximized their mutual assets, but allowed for the accumulation of size and energy that would lead to amazing things. And the resulting eukaryote was a miracle in ways that included taming the toxicity of oxygen and then using oxygen as an asset. In 1966, Lynn Margulis controversially proposed that this event happened and twenty

years later the penny dropped as multiple technologies allowed us to peer backwards in time.

By about the year 2000, the verdict was clear that she was right. But before this symbiosis could happen, several dominoes had to get lined up just so. How did the archaea phagocytose the bacterium? No archaea can do it now. And before that, a marvelous system called chemiosmosis had to be available for energy. As Nick Lane has shown us, this is the proton gradient that got invented in the context of hot hydrogen shooting out of the undersea vents with such a high pH that essentially the atoms got stripped of their electrons and became protons in the physical setting of mineral compartments. Add membranes and this provided free power for the first cells, but this gradient could not easily be sustained and regenerated

From the Editor's Desk

without something else. That became possible when evolution, in all its cleverness, harnessed quantum mechanics for quantum electron tunneling (QET). This allows electrons to tunnel under an energy barrier using a series of iron-sulfur clusters (also conveniently available in the minerals of the undersea vents).

Eventually, these iron-sulfur complexes were aligned by a marvelous molecule that I have been studying for 30 years — Complex I which goes awry in a mutation that causes blindness (LHON). Complex I later got flipped around by evolution to run backwards in another amazing trick called photosynthesis. Some of the bacteria harnessed the process of photosynthesis to use water and sunlight for their energy leaving oxygen as a byproduct (the oxygen in our atmosphere comes exclusively from that).

So, with this QET trick, Complex I could maintain the proton gradient. And to exploit this proton gradient came another great invention of biology — ATP synthase. This is a mechanical turbine that uses the proton gradient to mechanically spin, and with each revolution, to pump out an ATP, the universal currency for energy in biological systems. [Watch a movie](#) of this marvel.

So, you had to have five stars aligned for the eukaryote to come into existence: 1) Chemiosmosis for the proton gradient, 2) phagocytosis to make symbiosis, 3) symbiosis to make proto-mitochondria that use 4) quantum electron tunneling to fuel more proton gradients, and 5) ATP synthase to exploit the gradient to make ATP. And with enough ATP the eukaryote, your forebearer 2 billion years ago, could grow to sizes 10,000 times larger than bacteria because they had 100,000 times more ATP. Prokaryotes are brilliant at making all sorts of organic molecules, but eukaryotes are great at producing energy, and energy fuels size and differentiation. Eukaryotes could now

do something even more fun; change into multicellular organisms and that would lead to amazing animals with hearts, and spines and muscles and eyes and ... brains, the energetically most expensive tissue of all. The brain is high maintenance, but so worth it!

The transition from prokaryotic to eukaryotic life forms represents the major evolutionary threshold in the history of life on this planet. It

In evolution you always need to start with an advantageous arrangement from which you can make it even better with new genes and natural selection. In the case of the eye you can always keep moving from good to better as you move from a useful pigment spot to the wonders of a vertebrate eye.

set the stage for a vast expansion in biological complexity, enabling the rise of everything from towering trees to advanced animals with intricate organ systems. Research, including phylogenetics, in the last 20 years has shown the origin and early evolution of eukaryotic cells to be one of the most exciting and challenging puzzles in biology.

Some people like to point to the eye and say it's proof that evolution can't happen. They are ignorant for not understanding that you don't have to go from half an eye to get to a whole eye while they argue that half an eye won't work at all. In evolution you always need to start with an advantageous arrangement from

which you can make it even better with new genes and natural selection. In the case of the eye you can always keep moving from good to better as you move from a useful pigment spot to the wonders of a vertebrate eye. But in the case of symbiosis, I'm in much greater wonder and amazement.

For if all five elements weren't there, all at the same time, you couldn't make the jump from prokaryotes (archaea and bacteria) to eukaryotes. And without that jump you couldn't have the size and complexity that allowed evolution to power up and go crazy with innovative organisms. To be clear, bacteria could never have grown or developed the structural elements that gave rise to big moving parts and specialized systems. And it's never come close to happening again on this planet.

Bacteria were destined to stay small and simple trapped by problems such as surface area to volume problems. Almost 4 billion years have proven that to be true. Eukaryotes were the breakthrough to complexity. And what were the odds of all five stars aligning up first? That this was close to zero is exactly what had to happen to make and get us past the first Great Filter. This only happened once in 4 billion years and maybe it is close to impossible to happen at all. But it did, and we enjoy a hindsight view of an ascertainment bias that makes us almost blasé that it happened at all.

But it was not inevitable; if there are a trillion universes, we might be the only one in which it happened. This is the Great Filter behind us. This also should give us hope that maybe there needn't be a second Great Filter in front of us. And maybe, just maybe, if we as a civilization have enough wisdom and political will, we can avoid the second Great Filter and make it to the future. If Fermi were still alive, I think he'd be surprised, but also, very happy.

I have a slide I sometimes used when lecturing medical students, and it reads: "Over billions of years, every one of your ancestors was a success. Don't mess it up now."

Doheny Eye Institute: Beginnings, Milestones, and Legacy

By John Irvine, MD

In 1944, Los Angeles philanthropist Carrie Estelle Doheny suffered sudden vision loss in her left eye. It severely compromised her total vision, since her right eye was affected by long-standing glaucoma.

Her ophthalmologist at the time, A. Ray Irvine Sr., MD (and my grandfather), offered support to help her make sense of her vision loss. At the same time, Doheny held extensive conversations with Irvine family members about the idea of an eye research laboratory at a local hospital that would also offer expanded ophthalmic services to the community and foster vision research activities. Those discussions launched the birth of what would later be called the Doheny Eye Institute.

Many respected ophthalmologists, including Alan Woods, MD, director of the Wilmer Eye Institute, and Phillips Thygeson, MD, of the Proctor Foundation, were consulted to research the resources and organization of the best U.S. eye institutions. In 1947, with Doheny's \$227,000 donation, the Carrie Estelle Doheny Eye Foundation was founded.

Its mission was to provide diagnostic services, an eye bank, community medical services,

and "to further the conservation, improvement and restoration of human eyesight," Doheny said.

The West Coast lacked a central ophthalmic pathology service at



Carrie Estelle Doheny

the time, so specimens were often sent cross-country to the Armed Forces Institute of Pathology (AFIP) in Washington, D.C., for review and diagnosis. The resulting reports could be slow to arrive.

Once the Doheny Eye Foundation was established, a robust ophthalmic pathology diagnostic service grew and thrived, filling a significant void in the area. Doheny became a tremendous

resource for the community and region. Voluntary ophthalmic pathologists would teach and mentor University of Southern California (USC) eye residents in ophthalmic pathology since there were no full-time ophthalmic pathologists at the university. Additionally, assistance with identification and characterization of clinical microbiologic specimens was offered.

Experimental pathology projects were also initiated using a small vivarium and cell culture lab enabling experiments with adjunct time lapse photography. This was initially done with the help of Walt Disney engineers. With the development of fluorescein angiography, Doheny expanded its offerings to the community to include diagnostic testing.

The gradual increase in research activities required outsourcing to labs with existing expertise in specialized areas not yet developed at Doheny. Accordingly, the Doheny Board of Trustees began to consider an affiliation with a university partner. The goal was to maintain its independence while still taking advantage of the research and academic resources of a larger institution. In 1962, Doheny and USC entered into a formal affiliation agreement which benefited both parties.

Four years later, the foundation offered financial support to the young eye research foundation

Doheny Eye Institute

to create a vision institute, and in 1969 USC sold property to the foundation on its health science campus to create a physical location close to the new resources.

With this acquisition, the board recognized the need for a full-time medical director. Dr. Irvine, who had been serving as the part-time medical director, helped recruit William Spencer, MD, who served as the first full-time medical director for three years. Under Dr. Spencer and the board, the Doheny building design with clinic and laboratory facilities was completed, and the project broke ground in 1973.

In 1974, Stephen J. Ryan, MD, was recruited to become the first full-time chairman of USC's Department of Ophthalmology. Dr. Ryan's first hire was a familiar ally from Johns Hopkins, Ronald E. Smith, MD, who had just completed his postgraduate fellowship and his commitment to the Public Health Service in Alaska. They were joined by Mike Allen, MD, and together they began a consultation service for community ophthalmologists. At one critical juncture, the three clinician scientists leveraged their homes to secure a loan for the clinical enterprise to move forward.

Doheny evolved with the addition of new facilities and the establishment of the Estelle Doheny Eye Medical Clinic. The clinic allowed the faculty to offer their expertise in complex ophthalmological dilemmas and surgery to the community. However, surgeries had to be performed at local community hospitals. As the practice grew, Dr. Ryan recognized the need for a dedicated surgery facility on site in order to attract faculty and provide the specialized and necessary ophthalmic care.

In 1985, the Doheny Eye Hospital, a 32-bed inpatient hospital facility with four operating suites, opened and began providing care



A. Ray Irvine Sr., MD

to the community through a tertiary care practice, and the faculty grew. The hospital also grew to include several entities: a clinical practice, an eye hospital, a vision research institute, and an affiliation with the local eye bank, and so the Estelle Doheny Eye Foundation formally changed its name to the Doheny Eye Institute.

As the USC ophthalmology faculty found their home in the Doheny facilities, interdepartmental and interdisciplinary research activities became possible, department faculty grew in number, scope, and expertise. This enhanced the education of the USC residents who previously were supervised by community ophthalmologists. Fellowships in all subspecialties were offered and became competitive.

Research blossomed with core grants and funding, attracting international students, physicians, and researchers from Europe, Asia, the Middle East, Latin America, and Australia. It spawned educational, cultural, and research collaborations. Many Doheny alumni have gone on to become ophthalmology department chairs, medical school leaders, and major figures in organized medicine as well as national/international clinical and research organizations.

One of Dr. Ryan's goals was to transform the USC ophthalmology residency into a world-class program to attract the best and the brightest young doctors and nurture their education scientifically, clinically, and politically to become the future leaders in the field. Dr. Smith and Alfredo

Doheny Eye Institute

Sadun, MD, PhD, visited and successfully recruited from top-tier medical schools. The renewed commitment to the resident and fellow education gradually transformed the Doheny/USC program into one of the nation's top 10 ophthalmology programs. This was aided by support from Doheny/USC alumni who supported residency training needs that were beyond the department's budget.

A major strength of this affiliation was patient-related philanthropy. Doheny Eye Institute's fundraising from grateful patients provided USC ophthalmology additional resources and allowed its vision research programs and initiatives to flourish. This was instrumental in creating endowed chairs for many faculty and a vital pillar to successful physical expansion, and also enabled the purchase of additional land and buildings. Doheny resources were critical for the creation of the eye hospital as well as the gradual expansion of separate research and clinical facilities dedicated to Doheny/USC ophthalmology faculty and research activities.

Through the years, Drs. Ryan and Smith forged a partnership that valued innovation, energy, and success, allowing them to recruit well-qualified faculty and create



Doheny Eye Institute today.

a model for the future that supported independent thinking. Their leadership saw the development of a widely used glaucoma implant, the experiment of an intramural "retina institute," development of a retinal chip, creation of an image reading center, and many other groundbreaking collaborations which have advanced and enhanced Doheny's charter mission.

Dr. Ryan frequently stated his vision to transform Doheny and USC into a world-class eye institute with strong international ties to enhance the depth and breadth of potential collaboration. Doheny was positioned for unbridled success, since its founder and board

members were resolute on institutional independence from a university partner while tapping into the resources available through such affiliation and collaboration.

The internationally renowned Ryan Initiative for Macular Degeneration (RIMR) annual conference continues to bring together participants from different backgrounds and disciplines to generate ideas and discuss research challenges to facilitate new treatments and cures for age-related macular degeneration.

After the end of the USC-Doheny affiliation, the deaths of Dr. Ryan in 2013, and Dr. Smith in 2014, there was a challenging period of reorganization. However, the Doheny board continued to look into partnerships. With the support of UCLA'S Stein Eye Institute Medical Director Bartly Mondino, MD, and the University of California Board of Regents, it entered into a 99-year affiliation with Stein. Shortly before his passing, Dr. Smith called this the "merger of the millennium."

Central to the evolution and future of Doheny Eye Institute lies its leadership's foresight and strategic approach to extend collaborations beyond its institutional boundaries, reaping the associated benefits while preserving its fundamental core identity.



Drs. Steve Ryan and Ron Smith

What We're Doing Today – Meet David Hardten, MD

By Alfredo Sadun, MD, PhD

David R. Hardten, MD, is a prominent specialist in cornea, external disease, anterior segment, cataract, refractive, and laser surgery and is also very active in research and education. He is a founding partner of Minnesota Eye Consultants, where with Richard L. Lindstrom, MD, and Thomas W. Samuelson, MD, he conducted many studies relating to LASIK eye surgery, glaucoma management, and corneal transplantation.

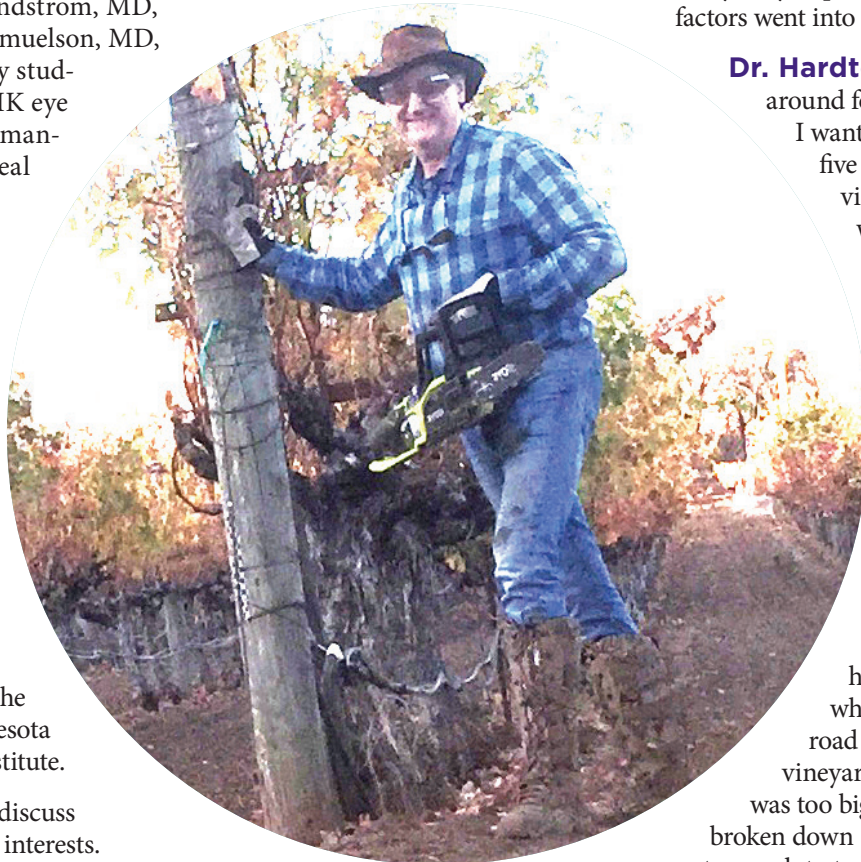
Dr. Hardten graduated from the University of Kansas undergraduate and medical schools, and then trained as a resident in ophthalmology at the University of Minnesota. He completed his fellowship training in cornea and external disease at the University of Minnesota and Phillips Eye Institute.

But we're here to discuss David's avocational interests.

Dr. Sadun: Hi, David. Thanks for allowing us this interview as part of the "What We're Doing Today" *Scope* series on interesting hobbies and avocations. How and when did you become interested in wine?

Dr. Hardten: I have always loved to travel. When I finished my training, most of my short trips were places within the U.S. What became a favorite spot that was easy to get to from Minnesota was California's wine country. We would go twice a year and visit a lot of places. We were struck by the beautiful views, the relaxing times, and a special bond we began creating with wine and the wine country. I'm sure part

of this was how relaxing we found it to spend time with friends over a glass of wine. These were special times. I also came to understand that wine has many nuances — it isn't just the same every time — which is very interesting. How each locale,



At work on the property. Chainsaw in hand, protective gear in place. Dr. Hardten loves to do a fair amount of the work he is capable of himself.

the particulars of the weather that year, the techniques of the winemaker, the specific blending, all of this affected the taste of the wine.

Dr. Sadun: When did you take this to the point of considering the purchase of a vineyard?

Dr. Hardten: We purchased a vineyard in 2019. When my wife and I were first married, we seriously thought about finding a place

in the Napa-Sonoma area of California. However, the busy nature of an early career in ophthalmology added to the chaos of raising young kids made it impractical. But recently the kids have graduated from college, and I have several great partners in my practice. So, we reached the point that allowed us the time away to handle the vineyard. This is a task I can now accomplish.

Dr. Sadun: Where was the vineyard you purchased, and what factors went into that choice?

Dr. Hardten: We looked around for a couple of years.

I wanted at least four to five acres of planted vines. Additionally, we wanted to have a small place to stay on the property. Both my wife and I love California cabernet sauvignon so that was a priority. Many of the vineyards were tough to get to (Think an hour walk on a washed-out road that may have allowed a four-wheeler, plus a mile of road to rebuild). Some vineyards had a home that was too big, too old, and too

broken down (too ugly too, but not enough to tear down). Some lots had a barely functioning well with water contaminated by bromine. The vineyard we finally purchased was up in the mountains, had a great view, and 13 total acres, seven of which were already planted to Cab. All the structures on the lot had unfortunately burned down in the 2017 Atlas Peak fire but we were OK with starting again with the buildings.

Dr. Sadun: Was the soil, drainage, slope, etc. the sort you were looking for to grow the vine you liked?

Dr. Hardten: As I mentioned, we love cabernet sauvignon. The vineyard we just bought could also have grown cabernet franc or almost

David Hardten, MD

any other varietal. But because it does well with cabernet sauvignon, that is what we grow. The hillside allows for good drainage, good sun exposure, and the past owners had sold to high quality winemakers.

Dr. Sadun: How did you learn about the process of tending to the grape and making wine?

Dr. Hardten: I'm constantly learning. I've done some of the WSET [Wine & Spirit Education Trust] courses. But mostly, I depend on great consultants that help out, just like we often do in ophthalmology. I interviewed several vineyard managers and selected Mike Wolf. He and his team really do the day to day management of the vines and vineyard. They have great workers who handle pruning, watering, etc. For our first vintage, we sold most of our grapes to other wineries, but also made about 100 cases of our own wine. We had a consulting winemaker – Patrick Saboe – and he and their team handled the crush, maceration, barrels, racking, and bottling!

Dr. Sadun: What are some of the things you have learned about wine and vineyard that you never anticipated?

Dr. Hardten: Managing a vineyard is farming. Wine is a special finish of great land, hard work, weather, and luck. That's what makes it such a special exciting, interesting pastime.



Olive trees also grow on the property – and pickling olives was this fall's new venture.



Enjoying a wine tasting in Napa with his wife and two daughters.

Dr. Sadun: How has growing wine affected your social world? You must be a popular host.

Dr. Hardten: We have a wine cellar at home with a table for special events. My wife has been very active in the University of Minnesota Foundation Winefest — and we've donated dinners for these charity events. We have a lot of fun with that.

Dr. Sadun: Do you have a collection of many other wines? Do you use that just for pleasure or as a reference for what you are trying to do?

Dr. Hardten: My personal collection in the cellar has a mix of French Bordeaux, Burgundy, Italian, Napa, Australian, port, etc. It's for our personal pleasure. I love the variety.

Dr. Sadun: What connection have you found between ophthalmology and making wine? I've noted that there are many ophthalmologists who are also wine producers and am fascinated by the possible connection. Feel free to philosophize.

Dr. Hardten: Ophthalmologists are detail-oriented planners and creators. Wine is creative, but there is a recipe. Ophthalmologists are also usually interacting with a lot of people (think of the number of patients we help on a daily basis). Wine hospitality is a people-oriented process. Farming is equivalent to the surgical technique we all love.

Dr. Sadun: Can you add an anecdote or two that will amuse our readers?

Dr. Hardten: An additional benefit to our investment is the

wildlife at the vineyard, which we really love. We see lots of coyotes, fox, owls, mountain lions, and bears. We put up an owl box three years ago and had our first set of owl babies last spring. My youngest daughter and I decided to go check it out at night and see if we could see the babies. The owl mom and dad didn't really like us that close, and they started making a screeching noise that kind of sounded like a mountain lion, so we ran back to the barn pretty quickly. Since then, we have installed a camera inside the owl box and now watch the growing chicks from the safety of our home.

Dr. Sadun: So, it sounds like wine is just one advantage of owning your own vineyard. It's added another dimension to your family dynamics. Do you see this as a family legacy?

Dr. Hardten: My kids love nature, have an appreciation for growing things — and they have developed a great appreciation for red wine and the nuances of tasting. They really like being involved in the vineyard business. They help us run social media — Instagram, the website. We also rent out the living unit above the barn — and they help in some of that coordination. I'm not ready to turn it over — but I suspect that I will turn it over to them some future day.

Dr. Sadun: Nice!

Editor's note: We're interested in what you do outside of ophthalmology. If you or a colleague has an interesting avocation for the series "What We're Doing Today," email the Academy at scope@aaoo.org

Retinal Optography: Fact or Fiction?

By Aubrey Minshew, MA

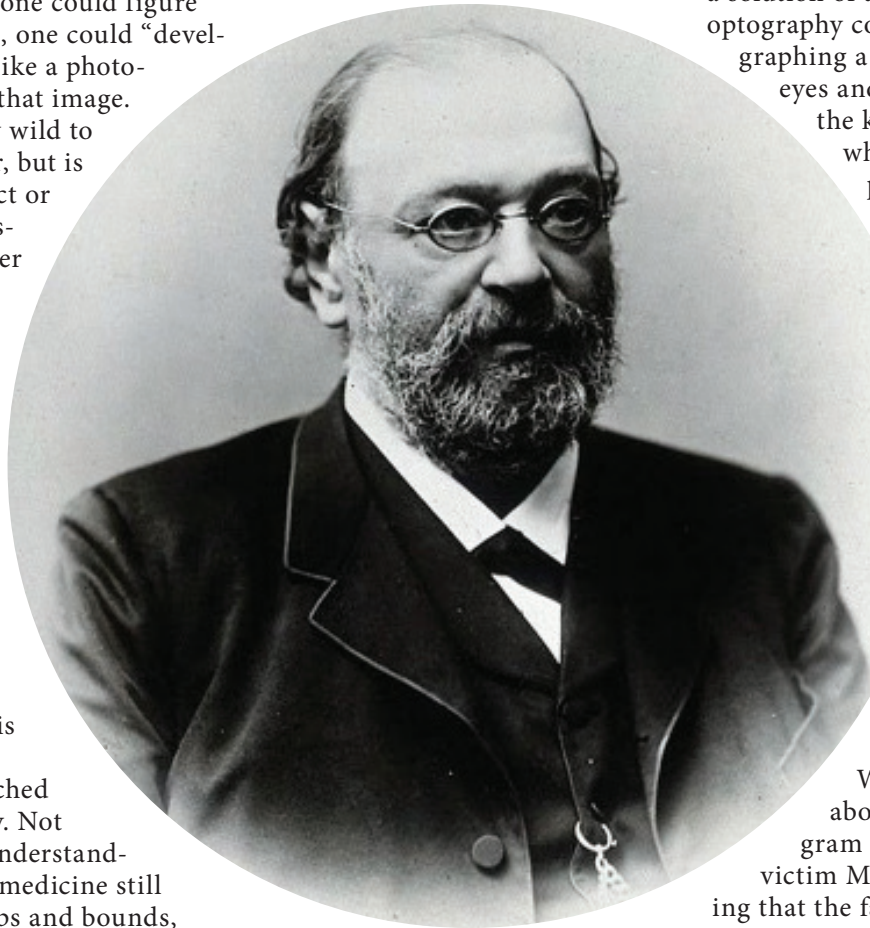
In the late 1800s, there was a popular scientific belief that the last image seen by a dying person or animal was “recorded” on their retina.

Therefore, if one could figure out the process, one could “develop” the retina like a photograph to show that image. It sounds fairly wild to the modern ear, but is this concept fact or fiction? Surprisingly, the answer is it’s both. Let’s take a closer look.

An image developed from a dead retina is called an “optogram” and the process is called “optography.” To a 19th-century ear, this concept didn’t seem as far-fetched as it does today. Not only was our understanding of modern medicine still growing by leaps and bounds, but photography was brand new technology. Also, people were aware of the linguistic links between the human eye and a camera — for example, there is a lens in both the eye and a camera, and a camera aperture moves very similarly to a human iris. So, in a time where new discoveries were being made every day, it wasn’t a wild idea to suggest that eyes might be able to permanently capture images.

As it turns out, some of this theory is true! In 1876, a physiologist named Franz Christian Boll discovered rhodopsin, a visual pigment in the retina that blanches in light but regains its purple hue in the dark. Boll

called this “visual purple.” Next, another physiologist named Wilhelm Friedrich Kühne created a procedure that fixed the bleached rhodopsin in the reti-



“Willy” Kühne

nas of dead rabbits by washing them in a solution of alum.

According to Kühne, the pattern in the image below is the image of a barred window that the rabbit was looking at immediately before it died. This was enough proof that he soon tried to apply this method to deceased human retinas, but without success. In this circumstance, optography for rabbits specifically seems to be fact.

However, applications of Kühne’s experiments quickly

jumped into the realm of fiction. Based off a fundamental misunderstanding of Kühne’s process, law enforcement in the United Kingdom and eventually the U.S. tried to apply optography to criminal investigations. However, they were not taking freshly dead retinas and developing them in a solution of alum. This forensic optography consisted of photographing a murder victim’s eyes and trying to divine the killer’s face from whatever patterns the photograph showed.

Even though this procedure is not scientifically sound, that didn’t stop forensic optograms from being used in famous criminal cases and from appearing on real trial records.

In 1888, British police inspector Walter Dew wrote about a forensic optogram taken of murder victim Mary Jane Kelly, hoping that the face of her killer, the infamous Jack the Ripper, could be identified in the picture.



Can you see the window?

Museum of the Eye

Then over 25 years later in 1914, a U.S. grand jury admitted a forensic optogram as evidence in the case of the murder of 20-year-old Theresa Hollander, although the boyfriend suspected of her murder was found not guilty.

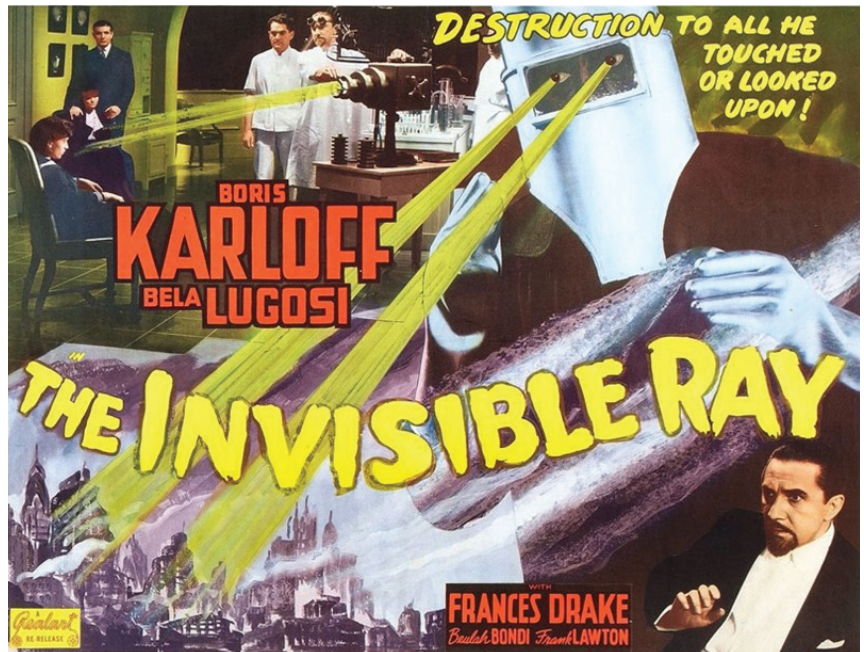
Although forensic optography is scientific fiction, it quickly also became a fixture in fiction literature and media. Forensic optograms have appeared in

Although forensic optography is scientific fiction, it quickly also became a fixture in fiction literature and media

Jules Verne novels, performed by “Dracula” actor Béla Lugosi, and even served as a plot point on the television show “Doctor Who.” So, while we can conclusively say that developing pictures from retinas is both fact and fiction, it would appear that optography’s impact has been far stronger and longer-lasting in the world of popular culture than in the world of science.



An early camera, c1905.



This 1936 film features forensic optography.

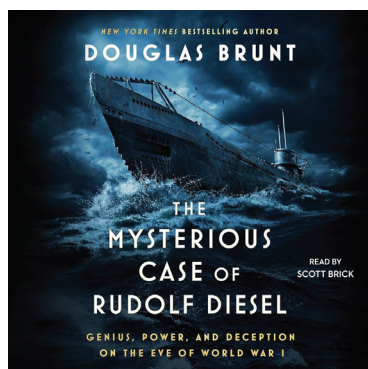


A contemporary cartoon portraying Jack the Ripper, 1888.

What We're Reading This Winter 2024

Book Review Editor, Robert L. Stamper, MD

Senior ophthalmologists share the best of what they're reading this winter. Share what you're reading and send your review to our book review editor, Robert L. Stamper, MD, at scope@aaoo.org.



The Mysterious Case of Rudolf Diesel

By Douglas Brunt

Reviewed by J. Kemper Campbell, MD

“The Mysterious Case of Rudolf Diesel” is a true tale of a neglected historic figure whose disappearance on the cusp of World War I has never been explained. Author Douglas Brunt has written three bestselling novels and is the spouse of television personality Megyn Kelly.

The life of Rudolf Diesel is worthy of remembrance since his invention of the internal combustion engine bearing his name was instrumental in propelling the Industrial Revolution and fundamental to the development of all the transportation modes of the 20th century. He disappeared under mysterious circumstances while crossing the English Channel in September 1913.

The success of Diesel's engine design enabled him to overcome an impoverished childhood as a Bavarian living in Paris and London. He succeeded by using his German academic creden-

tials to become a brilliant student of thermodynamics.

His natural courtesy, civility and artistic temperament allowed him access to the highest levels of society. The worldwide acceptance of his revolutionary engine made him financially secure. He later traveled extensively, enjoying universal acclaim and visited the United States in March 1912 after canceling his initial plan to sail aboard the maiden voyage of the Titanic.

Despite Diesel's altruistic aspiration to improve conditions for middle class workers, corporate and governmental institutions prevailed, and he gained the animos-

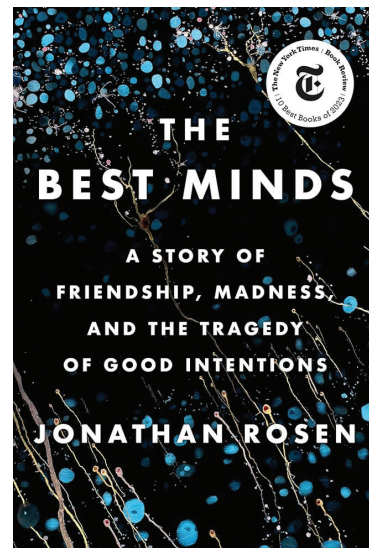
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ity of both Kaiser Wilhelm II for his link to England and America's richest man, John D. Rockefeller, who feared his oil monopoly might lose profit if his engines became universally accepted. His death was reported as a suicide by a compliant press, and his name rapidly faded from history's pages as the horrors of World War I intervened.

This book is recommended for its review of pre-World War I history,

augmented by a helpful appendix and index with a four-page insert of vintage photos of people and events from Diesel's life.

The Best Minds: A Story of



Friendship, Madness, and the Tragedy of Good Intentions

By Jonathan Rosen

Reviewed by Robert Stamper, MD

In a most readable way, the author depicts the evolution of his intense boyhood friendship through the trials and tribulations of maturing and finally into psychosis.

Both are children of college professors growing up in a middle-class neighborhood. Along the way, we get a wonderful picture of Michael, a person almost effortlessly successful at everything he tries from schoolwork to friendships to sports.

In contrast, the author is a self-described “slow reader.” We get a very well-depicted transition into puberty, where Michael's challenges are rare, contrasting with the frequent and more “normal” ones for Jonathan. Surprisingly, this results in some interesting competition between the two friends which threatens their friendship.

Both are accepted to Yale University. Michael finishes in three years, graduating summa cum laude. He becomes a Wall Street wunderkind and is extremely successful until suddenly he becomes

What We're Reading

paranoid and threatening. Nine months in Columbia University's psych ward seems to help a little and he is released to the care of his parents. He seems well enough that he applies and is accepted to Yale Law School as a sort-of poster child for mental illness as just another disability. That the story has a tragic ending is easily predictable by the subtitle.

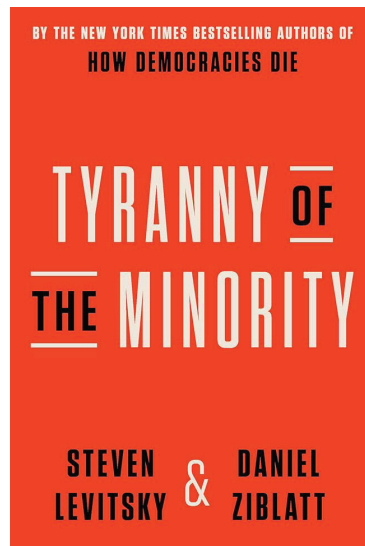
In the meantime, we learn that Jonathan goes on to advanced degrees and a modestly successful career as an author.

This is not just a true story of one person, it is a well-researched riff on the status (or lack thereof) of care for serious mental illness in the United States. Laws prevent involuntary treatment of seriously mentally ill patients unless they are clearly dangerous to themselves or others; this, combined with the lack of any major therapeutic facilities to care for psychotic individuals, leaves the care of most people with early to moderate psychoses to their family and friends who are ill-equipped for the burden (and who sometimes become victims).

Community mental health facilities, promised when the old-fashioned and unlamented custodial, punitive, anti-therapeutic mental hospitals were closed never materialized. The community psychiatry establishment, based on principles developed by Freud and Jung, among others (who themselves had little or no experience with psychoses), have little to offer except medications; often the side effects of these medications interfere with voluntary adherence.

As any of us who live in cities are becoming increasingly aware, this is a problem that should concern us all. We have a duty to those who are ill to find effective methods of treatment and, when treatment fails or is inadequate, involuntary con-

finement in humane, treatment-oriented facilities until the ability to function in society is returned. This is a well-written, well-documented story of one nightmare that should be a wake-up call to everyone.



Tyranny of the Minority: Why American Democracy Reached the Breaking Point

By Steven Levitsky and Daniel Ziblatt

Reviewed by Samuel Masket MD

“Tyranny of the Minority,” written by two Harvard Professors, a *New York Times* Bestseller, and a *Newsweek* Best Book of the Year, provides a comprehensive review of American democracy from its outset with the framing of the Constitution to its current threatened status.

As the authors suggest, owing to demographic changes, the U.S. is moving either toward an unprecedented multiracial democracy or toward the end of democracy as we have known it.

The book provides an excellent review of the compromises that were made when our country was in its infancy and the Constitution was being enacted. What may not be apparent to many is that there were always deep divides between the North and the South, particularly regarding “states’ rights,” perhaps a euphemism for slavery.

But the long and short of it is that, absent significant acquiescence by the larger North, a union would not have been possible and, as history has taught us, that union is tenuous at best as evidenced by the Civil War. Key among the compromises made to persuade the less populated South to join the new country were the electoral college and the U.S. Senate; the latter has equal representation across all states, such that the same power exists between all states in that body, despite wide variation in population.

Furthermore, with regard to the Senate, precedent (the filibuster) now requires that a super majority of 60 or more votes is needed to enact most, but not all, legisla-

Key among the compromises made to persuade the less populated South to join the new country were the electoral college and the U.S. Senate; the latter has equal representation across all states, such that the same power exists between all states in that body, despite wide variation in population.

tion. The electoral college’s indirect election of the president in lieu of a simple majority vote was agreed upon in order to assure the smaller populated South that the presidency would not always go to the more populous North.

What We're Reading

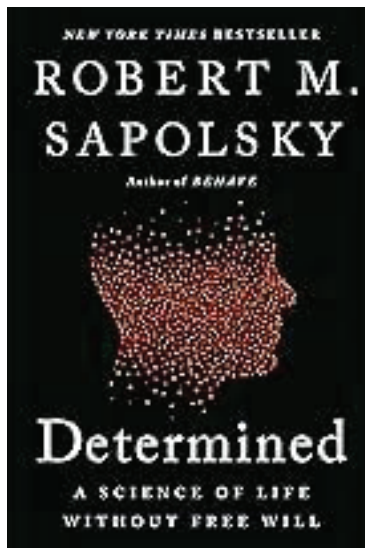
As another compromise, Supreme Court justices were to be appointed by the president, and for life.

Finally, the framers agreed to a very rigorous means for amending the Constitution. All of these factors combined, now enable a governing minority to determine policy rather than have the rule of the majority establish policy, programs and law for the country. The authors give examples of the sense of the majority that are in contradiction to the government; they include legislation for gun control, separation of church and state, voting rights for all, women's freedom to choose means for birth control, etc. Polls clearly indicate that majority opinion differs from current public policy for those issues.

A recent example of minority rule is that in 2016, the electoral college elected Donald Trump president with a minority of the popular vote. He actually "lost" to Hillary Clinton by nearly 3 million in the popular vote. By happenstance, Trump was able to appoint three Supreme Court justices — one third of the court — in a single four-year term.

The authors provide historic comparisons to other democracies and give clear examples of how some countries failed, but others evolved to remain current in order to provide for majority rule, the essence of a democracy. As they suggest, it is now imperative that we also make progressive changes to our Constitution, etc., or face the likely end of our current democracy.

One wonders whether the framers would create the same document if they were present today or if they had had today's precedents nearly 250 years ago. I consider this book to be essential and urgent reading for all American citizens.



Determined: A Science of Life Without Free Will

By Robert Sapolsky

Reviewed by Alfredo Sadun, MD, PhD

Robert Sapolsky is correct, of course: There is no free will.

Most physicists agree. But in other fields, some intelligent professors will argue that there is free will. When asked whether he believed in free will, Albert Einstein famously said no. When asked how he could go on, day after day, knowing he had no free will, Einstein said, and I paraphrase: Because, millions of years of evolution have determined that I would harbor this illusion. And he quoted the philosopher Arthur Schopenhauer, "Man can do what he will, but cannot will what he wills."

We are wired to feel that our will is free. That's a great boon for us as natural selection prefers that we feel in control. Indeed, the arts such as literature and music, tap into this powerful feeling. When I hear Beethoven's 9th symphony, the music makes me swell with a sense of agency and even power.

Indeed, "Ode to Joy" is about the exhilaration of agency. That's what our hearts say. Hence, the overwhelming popularity of free will. As for, Einstein, his attitude seems to be, "Just roll with it and compartmentalize. Let your heart feel the music but don't let your

mind fool itself." And here's where Sapolsky brilliantly lays it out.

Most minds are lesser to Einstein, and they fool themselves. It justifies individuals who puff themselves up with feelings of superiority for being so clever and hardworking as to deserve to win the human race. It is bad, but much worse is that we judge and condemn others for their short-

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comings. I would contend that it's OK to punish offenders in order to create deterrence or keep serious criminals in jail to safeguard society. But Sapolsky argues brilliantly that to pretend that this is justice, much less to contend that it is moral to punish, is terribly wrong.

Sapolsky is the consummate educator. He cleverly uses metaphors and analogies to bring concepts to life. His delightful

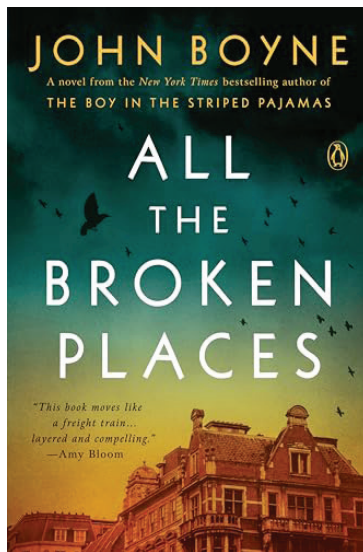
What We're Reading

sense of humor reminds me of another author, Douglas Adams. He freely digresses because many scientific truths are just too cool not to mention. And his breadth is amazing. He is also able to show consilience between subjects as varied as quantum physics, neuroscience, thermodynamics, and the philosophy of ethics.

Surely, this book and its message will elicit a great blowback. Sapolsky knew that going in and he should be commended for his great courage in pursuing this enterprise. Religious fundamentalists of all faiths will say that there has to be agency for a soul and to have sin, and they want to keep blaming the sinner. Left wingers will argue that the absence of free will gives misogynists and anti-LGBTQ moralists a free pass. Both the left and right wing love the idea of moral accountability, and how can you have that if we have no real agency?

Yet Sapolsky proves with a meticulous recitation of quality neuroscience studies that those that we condemn never had a chance. This is why Sapolsky wrote this book. He painstakingly researched and built his case against free will to save us from the self-serving and arrogant attitude that everyone has a fair chance, that luck averages out, that freely made bad choices are what keeps others from living lives as good as ours.

Sapolsky taught me that this is rubbish because bad choices began from a legacy of evolution, cultural as well as biological, and that antecedent bad choices compound the problem all the way to the present. Bad luck with genes, culture, parents, socioeconomic, etc. are like compound interest, and it all just gets worse over time. When you see revolting behavior, remember, it's all determined, and that should help us remember that the quality of mercy is not strained.



All The Broken Places

By John Boyne

Reviewed by Robert Stamper, MD

John Boyne, an Irish author, some of whose many novels have been *New York Times* bestsellers, wrote a gut-wrenching novel almost 20 years ago called, “The Boy in the Striped Pajamas.”

This book about a friendship between the son of the Auschwitz concentration camp commandant and one of the Jewish boys incarcerated there became a bestseller and was turned into a movie still viewable on some streaming services. His newest book’s subject, a sort of a sequel, was conceived shortly after the previous novel was written but was shelved in the author’s back burner until Covid enforced some solitary time. The long wait was worth it. This novel is a worthy successor in every way although with a different premise.

Imagine, if you will, that you are a 12-year-old child whose father is daily committing horrible crimes. He is a loving father dedicated to his family but also to his work. You are dimly aware of what he is doing but have pushed it to the back of your mind until he takes you one day to actually see what his work is about. Your father is ultimately caught and executed for his crimes. You and your mother are forced to assume new identities to escape immedi-

ate punishment. But, somehow, throughout your life, the past has a way of rearing its terrible head. You are racked by guilt but not entirely free of the past doctrines your parents and your schooling drilled into you as a child.

This is a fascinating story of a 92-year-old woman, who, the usual definition of “holocaust survivor” notwithstanding, is indeed a survivor. Her past intrudes itself in multiple different ways into her relationships and her many attempts at assuming a “normal” existence during her long life. She recognizes that although she was still a child at the time, she is not the entirely innocent, helpless bystander she wishes she were.

How she deals with her guilt throughout her life and how that guilt informs a major challenge she

Imagine, if you will, that you are a 12-year-old child whose father is daily committing horrible crimes. He is a loving father dedicated to his family but also to his work.

faces in her old age make compelling reading. We, as readers, are faced with the question: Is there a difference between evil done with no remorse and evil done with remorse? Another question raised is can remorse absolve someone from complicity in a crime?

In twists and surprising turns, we find out that, in both small and large ways, at least some atonement may be attainable.



News From the Foundation

By Gregory L. Skuta, MD, Chair, Foundation Advisory Board

I hope that 2024 is starting off on a positive note for each one of you. As I reflect on the past year, I am filled with pride to be a senior ophthalmologist among such a distinguished group of individuals. We share a unique and invaluable bond forged through our unwavering dedication and wealth of experience in the field of ophthalmology—a profession we hold in high esteem. Each of you has played a crucial role in advancing the standards of eye care, and for that, I extend my heartfelt gratitude. Your gifts have had a positive impact on the lives of our patients. We raise a glass to you in 2024 with hope and confidence in the future.

JOIN THE PARKE CENTER CAMPAIGN TO TRANSFORM THE FUTURE OF EYE CARE

The Parke Center will be named for David W. Parke II, MD, the Academy's CEO from 2009 to 2022, in honor of his leadership at the Academy throughout his career, and for his deep commitment to ophthalmology.

Located at Academy headquarters in San Francisco, this state-of-the-art center will be a hub for ophthalmic collaboration and will facilitate partnerships as academic researchers and other partners use the space for teaching and conferences. Equipped with the latest technology, the center will be a model for high-tech learning.

Thanks to donors such as the Ophthalmic Mutual Insurance Company (OMIC) and the David and Molly Pyott Foundation, with the commitment of Academy leadership, the campaign has already raised over \$1.5M toward the \$2.5M goal. This project's success depends

on your support. Together, we can turn this vision into a reality.

Your financial support is invaluable. Regardless of size, every contribution plays a pivotal role in advancing ophthalmology. We are pleased to offer naming opportunities for this state-of-the-art meeting space. For more information on naming opportunities, ways to name specific rooms, or if you have questions, visit the [Parke Center Campaign](#).

LEGACY IS IMPORTANT

The [1896 Legacy Society](#), named for the year the Academy was founded, is a special group of donors who have included the Foundation in their estate plans through cash gifts, bequests, or other planned gifts. 1896 Legacy Society members are integral to the Academy's mission and are regularly informed of our achievements, challenges, and future plans.

Members are recognized through invitation to our annual donor reception and other events, and by acknowledgment in the Foundation's annual report, on our website, and on the donor wall at the annual meeting.

We would be honored to count you among its members. As a special thank you for members who commit to joining, we have created a new lapel pin, that distinguishes your support to others. Become a member today.

Questions for the Foundation?

Contact Tina McGovern, executive director, at tmcgovern@aao.org or +1 415.561.8508; or Todd Lyckberg, director of development, at tlyckberg@aao.org or +1 415.447.0361.

SCOPE

The Senior Ophthalmologist Newsletter

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