

Archiving Psychology's First Nobel Prize Winner:

Challenges and Successes of Archiving the Life and Works of Roger W. Sperry

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Dedicated to Roger W. Sperry

Abstract

Roger W. Sperry was the first psychologist awarded a Nobel Prize. Sperry received the award in Physiology or Medicine in 1981 as a result of his work in split brain research, as well as the culmination of his other endeavors in neurospecificity, equipotentiality, and consciousness. Despite this unusual achievement, systematic documentation of Sperry's work has been very limited. In this paper we describe 30 years of archiving Sperry's life and research. 2017 will be the 32nd anniversary of Sperry's last public speech, which was in 1985 at SSPP. Students from 30 years of History of Psychology classes have been doing projects about Sperry. Over the last three semesters a specific seminar on Sperry was established in which students had access to Sperry's personal materials, such as recordings, correspondences, neuropsychological testing and surgery notes, videos and publications. We will describe the history of the archiving process and the coordinated efforts that involved Caltech, Oberlin, Smithsonian and the Nobel Museum. Steps involved in the archiving process will be described, beginning with dismantling his laboratory to digitizing as much information about Sperry as feasible. This paper summarizes these efforts, focusing on students' research, especially the group that has been working together for the last year. After digitizing written materials as well as audio and video recordings, a website (approximately 150 gigabytes) encompassing the broad range of materials pertaining to Sperry was constructed (www.rogersperry.org). The website includes archives, biographies, publications, vita, projects, and related websites. Each category contains several sub-topics. For example, we included videos, presentations, notebooks, and photos (e.g., notes from Sperry's first course in psychology to never seen before video clippings). Finally, we will highlight the challenges and successes of archiving Roger W. Sperry's life and works from the students' as well as the professor/archivist's perspectives.

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Roger Sperry was born in Hartford, Connecticut in 1913. Based on the information (report cards, class materials, etc.) that our group has been able to collect, Sperry received good marks in high school, where he was also very active in sports. Sperry attended Oberlin College in Ohio. In 1935, he graduated with an undergraduate degree in English, and then went on to attain a Masters of Arts in Psychology at the same institution. Subsequently, Sperry went on to pursue a Ph.D. in zoology under Paul Weiss at the university of Chicago, which is probably what made achieving the Nobel Prize possible. After finishing at Chicago, Sperry worked under Karl Lashley during his Post-Doctoral Fellowship at Harvard University. The summation of his Doctoral and Post-Doctoral work, as well as experience at the NIH and the Yerkes Laboratory landed him the position of the first Hixon Professor of Psychobiology at Caltech (Bogen, 1999). In Joe Bogen's biography of Sperry, he notes that Sperry remained on faculty at Caltech until his death on April 17, 1994 (Bogen, 1999).

Sperry navigated his professional career in phases, and they are as follows: (a) neurospecificity and nerve regeneration; (b) equipotentiality; (c) visual functioning and split brain; (d) consciousness and values. The aggregation of these phases earned Sperry the Nobel Prize for "his discoveries concerning the functional specialization of the cerebral hemispheres." At the time Sperry was working on split brain, Antonio E. Puente worked as a visiting scientist with him. During Puente's time with Sperry, they built a special relationship, so it was natural for Puente to become Sperry's biographer. While students in Puente's History of Psychology classes have been doing projects on Sperry for years, our group has aimed to create a comprehensive electronic archive of Sperry's life and works. We will discuss the history of the

archiving process, as well as archival categories, as a means to share our experiences and highlight the challenges and successes associated with this task. Kevin Collie, a student in our group, notes that our work mirrors Sperry's because the "culmination of many efforts has led to notable outcome." We present this work in 2017 at the Southern Society for Philosophy and Psychology, which is where Sperry gave his last public speech 32 years ago.

History of The Archiving Process

As early as the mid 1980s, students in Puente's "History of Psychology" classes have been doing projects related to Sperry. These class projects initiated what would ultimately become a focused effort to etch Sperry's life and works into history forever. When Sperry died in 1994, Puente made one of his routine trips to Pasadena, California. However, instead of visiting Sperry, he was there to help dismantle Sperry's lab, and ultimately decide where various items would go. It is interesting to note here that our (students') original thought was that this process would have occurred prior to Sperry's death. Our rationale was that as Sperry got older, he would have retired, as his health was declining. However, this was not the case. Puente notes that Sperry went from "working to the hospital, and from the hospital to his casket," which indicates that he never truly stopped until the very end. Consequently, his lab was not dismantled until he passed away. Lab materials, including experiment stimuli, notes, patient information, neuropsychological testing items, etc., were sent to the Smithsonian National Museum of American History, the Archives of the History of American Psychology, the Nobel Museum, Oberlin College, and UNCW. Additionally, Mrs. Norma Sperry kept a substantial amount of materials. Due to the high volume of items, Puente secured a variety of important items to store in his lab at UNCW. These materials supplied subject matter for projects, and ultimately the

archiving process. As time went on, students continued to do projects, transitioning from projects into archival work.

Our group was originally part of a seminar class that took place in spring 2016, entitled “Sperry: Psychology’s First Nobel.” There were 13 students in this seminar class, and the purpose was to provide a hands-on, detective-like experience in order to create a comprehensive electronic resource of Sperry’s life and works. In order to do this, we divided into teams to build upon what other students had previously done. For example, there was a website in place, so we dedicated a team solely to that. Other teams were responsible for the organization of biographical materials, Sperry’s personal notes, etc. The class met once a week for three hours. The first half of the class period was lecture style, where we learned about Sperry and the phases in which he navigated his career, so that we had adequate context for our work. However, most members of the class already knew a good deal about Sperry, which is why they elected to take the class. The teams in this class worked on their tasks during the week, so the second half of the class period was dedicated to sharing our progress, as well as interfacing information between groups. Ultimately, this class created the foundation in which to create a systematic archive. At the end of the semester, the class had made a great deal of progress, however, there was still work to be done.

Five of us continued to meet voluntarily during the summer of 2016 to continue working, as we understood the importance of etching Roger Sperry into history. We continued to work on our respective tasks, while maintaining contact with other members of class in case questions arose. In the fall of 2016, the class was offered again; however the five of us that continued to work in the summer took part in the class by way of a DIS (i.e., “Directed Independent Study), a

credit-based applied learning endeavor at UNCW. We helped instruct new members of this project on Sperry, as well as the goal of the class.

In the spring of 2017 (current as we're writing this paper), another Sperry seminar class was offered with same goals. The five of us that helped instruct members of the fall 2016 class have continued to serve the same role for this class. We are either doing this by way of DIS, or volunteering. Just about all of the material that Puente originally possessed had been addressed at the beginning of this semester. However, Norma D. Sperry, Roger Sperry's wife and enabler passed away at the age of 93 in November 2016. As a result of this unfortunate event, all of the materials she had been keeping in her tiny apartment in Philadelphia, Pennsylvania were sent to UNCW, with the agreement that we would send them to Oberlin after we had an opportunity to sufficiently archive them. With our guidance, the current seminar class is tasked with organizing these materials, and digitizing them. Once they are digitized, they will be uploaded onto the website into the current digital framework. Norma has created an intricate physical archive of Sperry's work (papers, notes, etc.), which is representative of her devotion to her husband. At the end of this semester, the website will be updated, and we will continue to ensure that the Sperry legacy lives on forever.

Categories & Process of Archiving

To effectively demonstrate the various archival categories that our student teams undertook, it is necessary to first explain their relationship with the overall project. This context will be provided relevant to the original spring 2016 group (i.e., current state of the material at that time), and how our group chose to navigate these categories. Ultimately, this will facilitate appropriate discussion of the process, and furthermore, provide a platform to showcase associated accomplishments and difficulties.

Website

It is fitting to first address the website, as it serves as the primary product of this undertaking. Previous students had compiled a basic website (www.rogersperry.org), in order to create a space to place digitized materials (i.e., papers, videos, tape recordings, notes, etc) as well as make these materials public. We decided that we would expand upon this website, with the same goal in mind: digitize items, upload them in a cohesive manner, and make them available to the world.

While the team tasked with overseeing the evolution of the website created their plan of action and learned about website creation, other student teams began their tasks, which would ultimately result in additional material for the website. The initial website housed Sperry materials, but we discovered that not all of the physical materials stored in the lab were uploaded. In order to fashion the space to do this, members of our group learned *WordPress*, which is a website hosting service that allowed us to create a “ghost website” before we amended the actual website. Though learning how to navigate a new program proved tedious, it allowed us to experiment with color schemes and layouts. Additionally, since we had a “ghost website,” we were able to make progress while we went through the process of getting administrative rights to the current website, as opposed to waiting until afterwards. We designed the updated website to reflect the phases in which Sperry navigated his career, for example, the “publications” tab contains sub-tabs, which allows the user to explore a particular phase (e.g., neurospecificity and nerve regeneration, equipotentiality, visual functioning and split-brain, consciousness and values). During the design process we had to be cognizant of operational areas, such as website efficiency (i.e., amount of data per page), file type and display, and other like factors. While these tasks required a considerable amount of time, they proved useful since they provided a

platform for collaboration, critical thinking and evaluation, and ultimately task execution. After all other teams met their goals and sent the website team the digitized data, the website amounted to about 150 gigabytes. This number is expected to be much larger once we add the documents, videos, and other materials from Mrs. Norma Sperry's apartment. To ensure permanency, we continually back up the website onto a hard-drive. At the end of this semester, when the materials from Mrs. Sperry are uploaded, we will create copies of the hard-drive that will be sent to Caltech, the Smithsonian National Museum of American History, the Archives of the History of American Psychology, and Oberlin College. The website serves a tribute to the life and works of Roger W. Sperry, and is the best way we know how to make the Sperry's contributions to humankind available to the public.

Videos

As Sperry progressed through his career he amassed video recordings of his experiments. While we have videos of earlier phases of experiments, his split-brain videos constitute some of his most famous recordings. Additionally, many of his colleagues and former students were interviewed about him, both before and after his death. We also found miscellaneous videos pertaining to Sperry (e.g., award receptions, panel discussions, etc.). These videos were stored in what is now formally called the "Roger W. Sperry Neuropsychology Lab" at UNCW.

Sperry's personal experiment recordings. Personal experiment recordings include Sperry's early work dealing with neurospecificity all the way up to split-brain experiments. In Bogen's biography of Sperry, he notes that, "these videos quickly brought Sperry to the attention of the neurobiology community," referring specifically to Sperry's videos of rats where he transposed the nerves responsible for flexion and extension (Bogen, 1999). Because of this transposition, when the bottom of the foot was injured, the leg straightened instead of pulling up

(the neural circuitry associated with flexion now innervated the muscles responsible for extension). Notably this video, among others, showed that “No functional adaptation of the nervous system ever took place,” as Sperry put it (Bogen, 1999). Ultimately, no matter how injured the bottom of the rat’s foot became, it was never able to remove its’ foot from the aversive stimulus on the bottom of the foot. In addition, there are numerous other videos portraying Sperry’s brilliant experiments with frogs, tadpoles, and other amphibians. Perhaps it was Sperry’s training in zoology that made these types of experiments possible. Additionally, we have numerous clips involving the ocular system. Famously, Sperry would sever optic nerves, rotate the eyes, and allow the nerves to grow back. The nerves grew back to their original location, so the amphibians forever saw everything as if they were looking at it upside down. These experiments showed that, in the words of Chuck Hamilton, “neural connections are reestablished under genetic control following experimental interruption and also, by implication, during embryonic development (Bogen, 1999).” The final series of experimental videos pertain to split-brain research, where Sperry was able to explore the responsibilities of the right and left hemispheres, and subsequently, their interaction with one another.

Interviews. Our website showcases various video interviews. Notably, we have an interview with Torsten Wiesel, who was awarded the Nobel Prize in Physiology or Medicine jointly with David H. Hubel in 1981 (the other half went to Roger Sperry). Moreover, there are several interviews with Antonio E. Puente regarding Sperry, his experiments, and contributions.

Miscellaneous videos. Miscellaneous videos include Sperry’s reception of the National Medal of Science and Technology in 1989. He was granted the medal for his work in neurospecificity from George H.W. Bush. Roger Sperry’s son, Glenn Michael Sperry, was in attendance and accepted the award on his father’s behalf. Additionally, this section contains the

video of Roger Sperry's reception of the Nobel Prize. Other miscellaneous videos include panel discussions, and receptions.

In order for these videos to be uploaded onto the website, they had to be converted from their original forms. This proved to be a difficult process. A local company called "Carolina Film & Edit," in Wilmington, North Carolina, could convert the VHS tapes to digital files. The specialty (e.g., 8mm film 1-inch VHS film reel) tapes were sent to a duplication specialist company in New York to be converted to digital files. Unfortunately, the tapes were stored in a magnetic filing cabinet in the lab, which was an issue because magnets can have negative impacts on tapes. Consequently, not all of the films could be converted. Once we were in possession of all the digital files, we uploaded them onto the hard-drive. This allowed us to compress the files so that they were easier to work with. When this was done, we uploaded the videos to our Roger Sperry YouTube account, "Roger Sperry History." Uploading them on to our YouTube account allowed us to subsequently embed them into our website. In an effort to make sure we had all of the available videos pertaining to Sperry, we conducted numerous searches utilizing various search engines.

To effectively piece together the videos along the proper timeline, it was important for us to have context. The lecture portion of the class provided us with contextual awareness so that we could archive the videos sufficiently. As a result of the provision of context, we were able to match these videos to Sperry's personal notes, patient forms and surgery notes, patient neuropsychological testing, and publications. This ability prompted detective-like work, because of the necessity to put the puzzle together, which culminated in an exponential increase in our knowledge of Sperry and his life. It is not often that a student gets to see the behind-the-scenes documents and videos that lead to a publication, and ultimately a Nobel Prize. It is even more

rare for the public to experience this. The conception of our website, and the addition of the videos and other categories, provide this opportunity. The difficulties that were associated with this specific task are far outweighed by the learning outcomes, including synthesis, as well as critical thinking and evaluation.

Voice Recordings

Over the years, various voice recordings pertaining to Sperry accumulated. These included Puente's conversations with Sperry, award receptions, and the like. To eventually make these materials accessible to the public, our group decided they should be transcribed. Initially, we searched for software that could do this, however we did not prevail. The various types of software we encountered were not able to appropriately transcribe these recordings. Consequently, it had to be done by hand. A majority of the recordings were in a format that we were able to readily listen to (i.e., did not have to be converted). Because of this, one student in our group transcribed all of the voice recordings by hand. In fact, after she graduated UNCW, she attended graduate school in the United Kingdom. We have been in correspondence, sending tapes back and forth, for transcription. Other members in our group are currently in the process of proofing these transcriptions, so they have not been made available to the public yet. The opportunity to hear Sperry's gentle voice in casual conversation has provided valuable knowledge of who he was. This knowledge makes evident that his work was simply an extension of his personality.

Presentations

Students that came before our group compiled a comprehensive list of all of Sperry's presentations. From his Doctoral thesis presentation entitled, "Action Current Study in Movement Coordination," all the way up to his Nobel lecture in 1981. Due to the work of

previous students, our duty included reviewing the list for validity. After review, we uploaded the list onto our website in PDF format. It is particularly interesting to explore the notebooks, stimuli, and highlighted text that represents the grunt work behind these presentations. It is analogous to watching a house being built, as opposed to just moving in after it's done.

Notebooks

Puente maintained original copies of Sperry's notebooks. Of particular interest is Sperry's "Introduction to Psychology" course that he took with R.H. Stetson in the early 1930s. One could spend hours browsing this notebook, attempting to link his annotated material to his later career. Access to these types of materials provides a one of a kind insight into Sperry's young mind. Perhaps what is more interesting is that, if this notebook and 20 of his classmates notebooks were randomized, you probably would not be able to isolate the notebook associated with the student that goes on to win a Nobel Prize. For our group, this has prompted the question, what *are* the traits that allow a student to go on to do something so extraordinary? Maybe Sperry's early life could provide insight on how to mold extraordinary thinkers.

Photos

Both on the website created by previous students, as well as in the UNCW Neuropsychology lab, we found all kinds of photos related to Sperry. These include personal photos and experimental photos, including fish and amphibian cross-section negatives, as well as monkey neuronal tissue cross-section negatives. Routinely, we were able to scan these photos and place them on the website. Additionally, we contacted the archives department at Caltech, who generously let us place their photos on our website as well. Operationally speaking, this was probably one of the smoothest categories to archive. The real challenge and subsequent learning opportunity was made apparent as we matched these photos to videos, notes, and ultimately

publications and presentations. Oftentimes, this project feels like a journey through a history museum as opposed to a class.

Colleagues & Lab Personnel

Based on the available data, as well as Puente's personal accounts, Sperry's lab was conducted like an orchestra. At any given time, there were all kinds of masters and PhD students, as well as visiting investigators. In an effort to construct a comprehensive list of all the people that worked in Sperry's lab, the time period, and their role, we started with Colwyn Trevarthen's book, "Brain Circuits and Functions of the Mind. Essay's in Honor of Roger Sperry." At the end of his book, he provides a list composed by Chuck Hamilton, however, he notes, "it omits a number of graduate students who assisted in significant experiments (Sperry & Trevarthen, 1990)." To make the list more historically correct, we reviewed all of the authors on all of Sperry's publications. If the authors were not represented in a category on Chuck Hamilton's list, we researched and/or corresponded with them until we accumulated enough data to support a rationale decision regarding which group they fit into. If we could not contact them or find direct evidence of their exact role in the lab, which was the case for about 15 individuals, we left them "uncategorized." During the investigation process, we came across a paper by one of Puente's "History of Psychology" students, written in 1995. This paper proved to be very helpful with our efforts, because it explained relationships of each of the graduate students. Additionally, the student author provided correspondences between each of Sperry's graduate students, so we were able to confirm their role first hand.

Another key highlight of the investigation process was that we discovered one of Sperry's visiting investigators, Dr. Jenny Yates, actually works at UNCW. Yates is currently a part-time professor in the department of Philosophy and Religion and teaches graduate liberal

studies. As soon as we found out that Dr. Yates was on faculty at UNCW, we asked to conduct a video interview with her. As a result of this interview, we discovered that her interest in Sperry's work led her to write Sperry during the time he was conducting split-brain research, because "she was interested in how the unconscious is related to right hemisphere of the brain." She ended up teaching Sperry the "history of the philosophy of the mind-brain relationship," and he taught her how to do brain research. Her experiences led her to write a book entitled "Psyche and the Split-Brain." In addition to Yates, many of the individuals that worked with Sperry have fascinating stories. They are professors, surgeons, psychiatrists, psychologists, philosophers, and the like. In an effort to capture their stories, we have hyperlinked their names on our website to the most relevant information about them. It comes as no surprise to our group that those who interacted with Sperry went on to achieve meaningful work.

Obituaries

After Sperry died at age of a heart attack and complications associated with a neuromuscular disease, various obituaries were written about him. These obituaries are from Caltech, colleagues, media outlets, and friends. The students that came before us assembled an eleven-page document containing Sperry's obituaries. We uploaded the document as is, because of the fact that no new obituaries were located. Continual review of Sperry's obituaries reminds our group of the contributions he made to the world.

Publications

Sperry, with the help of his colleagues and students, produced a plethora of research articles. We are in possession of these articles, however the digitized versions placed on the website are copies. Previous students began the process of digitizing the articles and archiving them on the website they had created. Our group completed two main tasks regarding the

archiving of the articles (a) we ensured that the article matched its' title (the articles are hyperlinked to the title); (b) we organized the articles by year and phase (e.g., neurospecificity and nerve regeneration, equipotentiality, etc.). Consequently, the website user is able to choose to view the articles by phase, or the year in which they were published. In addition to archiving the articles, each person in the class was responsible for presenting an article to the group each week during the lecture portion of the class. This was particularly interesting, because other members of the group may have been archiving the notes and stimuli that culminated in the article that was being presented. This facilitated collaboration, because of the varying viewpoints. Students exchanged thoughts and ideas, in an effort to successfully put the pieces of the puzzle together. Our review of Sperry's publications ultimately revealed to us the variety and intricacy of Sperry's work.

Vita

As one would imagine, Sperry's vita is quite elaborate. His vita probably required the least amount of work on our part, simply due to the fact its' content would remain "as is." Most of the work associated with the vita was transforming it into an interactive digital document. For example, under the "vita" tab on our website, the user can choose what they would like to view. Clicking "appointments" will take you to that section of the vita, and so on. Viewing all of Sperry's accomplishments, awards, publications, and presentations all in one-place makes our group wonder how one person could possibly do so much. The most reasonable explanation to this inquiry is that Sperry truly wanted to understand the nature of reality.

Student Projects

Years of Puente's classes on Roger Sperry have produced numerous student projects. These projects are in various formats, and include:

- Applications pertaining to Roger Sperry.
- Photos of a student's visit to Oberlin College's archives.
- A Roger Sperry art gallery.
- Roger Sperry's family tree from ancestry.com.
- A presentation that was given at a local high school.
- Student films on Roger Sperry.
- Student-conducted interviews with Sperry's colleagues.

They represent a quest to understand Sperry's life, and subsequently, share that information. Our exploration of these projects has allowed us to understand how previous students viewed Roger Sperry.

Index Cards

Sperry kept detailed notes of articles and books that he read. These notes were written on 6"x8" index cards, and filed alphabetically by author and article name. Generally speaking, the notes include facts from the readings, inter-author comparisons, as well as his opinions about the subject at hand. Our group found a collection of nearly 1,000 index cards in stored in the lab.

Each card was scanned into a PDF file, and uploaded onto our hard-drive. Due to the volume, we have not yet uploaded the index cards onto our website.

Emails

Over the years, Puente has accumulated a large number of emails pertaining to Sperry. In an effort to ultimately archive these emails, a student from our group has been investigating and saving them. For ethical and security purposes, this process must be done in Puente's presence. Due to his current schedule, as well as the volume of emails, this task has not yet been

completed. After we review these email correspondences, we plan to upload them onto our website.

Private Materials

Materials that we consider private are those that are directly linked to a patient, and they contain personal information. For example, pre and post operation WAIS (i.e., Wechsler Adult Intelligence Scale) forms, surgical notes, and the like. These items have perhaps provided some of the most important enlightenment to our group. In Sperry's articles, he only references a handful of split-brain patients. However, we discovered that there are upwards of 30. As it turns out, Sperry did not write about a large majority of the split-brain individuals. We know this because we have the original records and correspondences from the hospital where surgery took place. Following this discovery, we asked *why?* We have yet to determine a suitable answer.

To make the situation more confusing, we discovered that there are multiple patients with the same initials. Because of this, we subjected all notes and forms to scrutiny before attempting to match them to one of Sperry's articles. Also, the data for each individual patient varies tremendously. Some patients have detailed notes, even indicating how long the surgery lasted, the drugs that were administered, and "how the cuts" were. Oddly, Bogen (one of the neurosurgeon who worked with Sperry) described some of his cuts as "jagged." On the other hand, data for some patients remains scarce.

In an effort to construct an understanding of each patient based on the available data we have, we have begun to populate an Excel spreadsheet. Columns include the patient's initials, pre-existing conditions, whether or not we have WAIS forms for them, the publication(s) that they are tied to, whether or not we have video of them, and about 15 other valuable factors. This process has proven to be fascinating, because its' provision of Sperry's insights. Several students

in our group are working on case studies for patients that we have the most available data for. We would eventually like to place these materials on the website, however, names of the patients will not be made available to the public.

Conclusions and Future Directions

Roger Sperry dedicated his life to science, in a genuine search for the *truth*. With his brilliant experiments, he revolutionized neuroscience. This archival work serves to forever etch Roger Sperry's dramatic contributions to mankind into history. Our groups' endeavors represent a major milestone in the creation of a comprehensive electronic resource dedicated to Sperry. These endeavors also represent a rarity in academia. It is not often that a student gets to investigate personal materials from a Nobel Prize winner. In addition, our mentor Antonio E. Puente, who worked with Roger Sperry, is currently serving as the 2017 president of the American Psychological Association. This has been a dramatic, once in a lifetime experience that has produced invaluable knowledge that will be a part of us for the rest of our lives. It will be exciting to look back years from now to see how other students were influenced by Roger Sperry's life and works.

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