
D. CARLETON GAJDUSEK



9 SEPTEMBER 1923 · 12 DECEMBER 2008

AS A YOUTH, Daniel Carleton Gajdusek, who everyone called “Carleton,” stenciled the names of famous scientists, including those of microbiologists from Paul de Kruif’s *Microbe Hunters*, on the steps leading to the attic of his Yonkers home. He clearly knew his destiny early in life.

Carleton was born on 1923 September 9, the son of a Slovakian father and Hungarian mother. His Aunt Irene first stimulated his interest in science with her work at the Boyce Thompson Institute for Plant Research in New York. After obtaining an undergraduate degree at the University of Rochester at 19, Carleton received a medical degree from Harvard Medical School in 1946 and then pursued a residency in pediatrics. Following his M.D., he managed to have post-graduate laboratory experiences with three Nobel Prize winners: Linus Pauling and Max Delbrück at the California Institute of Technology and John Enders at Harvard Medical School.

In 1951, Carleton entered the laboratory of Joseph Smadel at the Walter Reed Army Institute of Research. The lab was also a workplace for another distinguished investigator who would play a major role in Carleton’s career, Clarence Joseph (Joe) Gibbs, Jr. Carleton frequently arrived late to the Smadel lab and without wearing the required army uniform. Smadel tolerated this behavior, presumably recognizing Gajdusek’s originality and potential. It was under Smadel’s guidance and support that Carleton was able to first delve into exotic and remote areas, such as Afghanistan, Iran, Turkey, and, as he detailed, “valleys of the Hindu Kush, the jungles of South America, [and] the coast and inland ranges of New Britain” to name a few.¹ These early peripatetic experiences were just a small sample of what would be Carleton’s later continuous Indiana Jones globetrotting and microbe-hunting excursions.

In 1954, Carleton worked as a visiting scientist at the Walter and Eliza Hall Institute of Medical Research in Melbourne, Australia, with Frank Burnet, another Nobel Prize winner. While working on immunological studies of hepatitis in the Burnet laboratory, Carleton visited Papua New Guinea (at that time an Australian Protectorate) and met Dr. Vincent Zigas, a local medical officer who told him about a strange disease named *kuru*, which appeared to be a significant cause of death in a remote area of the Eastern Highlands of New Guinea. By reading correspondence between Carleton and Smadel and others, we are able to vicariously experience the astonishment that he must have felt from observing a new disease of unknown cause, a disease that was devastating females and children of both sexes in the Fore tribe, as well as those with whom they intermarried. This correspondence with Smadel, initially published by the National Institutes of Health (NIH) in a

limited edition monograph, was fortunately circulated more widely in a Raven Press book edited by Judith Farquhar and Carleton. Here is a sample from part of Carleton's letter to Smadel on 1957 March 15:

I am in one of the most remote, recently opened regions of New Guinea (in the Eastern Highlands), in the center of tribal groups of cannibals, only contacted in the last ten years and controlled for five years—still spearing each other as of a few days ago, and only a few weeks ago cooking and feeding the children the body of a kuru case, the disease I am studying. This is a sorcery-induced disease, according to the local populace, and that it has been the major disease problem of the region, as well as a social problem for the past five years is certain. It is so astonishing an illness that clinical description can only be read with skepticism, and I was highly skeptical until two days ago, when I arrived and began to see the cases on every side . . . ”²

Later that same year, Carleton and Zigas wrote the first article that described the clinical syndrome, and in a remarkably complete and accurate form in the *New England Journal of Medicine*. Carleton was able to carry out autopsies on patients with kuru and send tissues to Igor Klatzo at the NIH, forming the basis for a 1959 publication in *Laboratory Investigation* describing the neuropathology.

In 1958, Gajdusek was invited by Smadel, then Associate Director of the NIH, to take up a position at the National Institute of Neurological Diseases and Blindness, the precursor of the National Institute of Neurological Disorders and Stroke (NINDS). This appointment allowed Carleton to have the freedom that he needed to satisfy his wanderlust and insatiable appetite for discovery. Carleton did not disappoint. He and colleagues transmitted kuru to animals in 1966 and then Creutzfeldt-Jakob disease in 1968, culminating in Carleton receiving the Nobel Prize in Physiology or Medicine in 1976 for “discovery of new mechanisms for the origin and dissemination of infectious disease.” Due to the species specificity and long incubation period of the pathogenic agent, these transmissions were remarkable because they involved inoculation of chimpanzees and a wait of more than a year for the onset of disease. The transmissible agent, initially called a *slow virus*, was unconventional with remarkable properties that were not expected of a virus. It was highly resistant to chemical and physical inactivation, raising significant issues from a public health perspective. In fact, this resistance was a major reason for the subsequent epidemic of bovine spongiform encephalopathy (BSE), or, more commonly, “mad cow disease,” as well as the spread of BSE to humans in the form of variant Creutzfeldt-Jakob disease. In addition, the transmissible agent had properties that suggested that it did not contain

nucleic acid. Stanley Prusiner and colleagues subsequently showed that the agent was a proteinaceous infectious particle, which he called a *prion*, resulting in his own receipt of the Nobel Prize in Physiology or Medicine in 1997.

Carleton's achievements were in not only medicine and science but also a number of remarkably disparate fields, including anthropology and linguistics. In a bound volume published in 1997, Carleton listed receipt of 11 honorary professorships, 15 honorary degrees, 17 honorary memberships, 18 "prizes and medals," and a large number of "Lectures and Awards" (filling 82 pages), along with the publication of more than 1,100 published articles. And that was only in 1997.

How could Carleton accomplish all of this, especially given what seemed to be a patent lack of discipline? Although Carleton was undisciplined in some ways, he attended to the minutest details in other ways. I remember observing him on one occasion; he spent more than 15 minutes precisely and carefully removing barely visible traces of an adhesive from the cover of a lab book. He needed to attend to every scintilla. But Carleton did more than attend to details—he also collected and recorded these details. This activity first became apparent to me when I read *A Study in Nascent Literacy: Neo-Melanesian Correspondence from a Fore, New Guinea Youth*, which Carleton published with Donald Rubinstein in 1970. This softcover book runs over 75 pages and includes letters written from Koiye, a youth in New Guinea, to Carleton and Ivan Mbagintao, a New Guinean whom Carleton had adopted and enrolled in secondary school in the United States; these letters started when Koiye was about 6 years old and continued from 1963–70. During this time, Koiye's literacy improved as a result of a number of environmental changes. A facsimile of each individual letter crudely handwritten by Koiye in Pidgin English and containing various errors is followed on a facing page with a typed version of the letter highlighting the errors, then a corrected version of the letter, and finally an English version of the letter. One page also includes a facsimile of an addressed envelope that Koiye sent to Carleton in the United States. This book is a remarkable archive, carried out simply and beautifully, demonstrating the impact of education and literacy on a once-isolated culture.

Before a website that listed references for a scientific topic existed, Carleton fastidiously compiled citations on particular subjects of interest to him in the best tradition of scholars. In 1975, the NIH published (a 3rd revision of) the *Bibliography of Kuru* by Michael P. Alpers, Carleton, and Steven G. Ono. This work was not only a bibliography but also a compendium of knowledge about kuru, subdivided as follows: i) "all articles in the scientific literature"; ii) "abstracts,

didactic, journalistic, imaginative and passing references to kuru in the scientific literature and in published material outside of it (excepting daily and weekly newspapers)”; iii) “references to kuru in the uncirculated private documents and reports”; iv) “studies related to the kuru region and environs but not specifically on kuru.” There was also the *Bibliography of Scrapie* (1968), *Bibliography of Viliuisk Encephalomyelitis in the Yakut People of Siberia* (1982), and an *Annotated Anga (Kukukuku) Bibliography* (1972) that contained citations on: “Ethnology, Anthropology, and History”; “Linguistics”; and “Medicine and Physical Anthropology,” with an “Appendix: Census Units of the Barua and Simbari Linguistic Groups, Wonenara Subdistrict, Eastern Highlands District.”

Carleton’s interest in details and documentation is nowhere manifested more clearly than in his journals. The journals start on 1937 January 1 when he was 13: “Practiced marionette show with Caselli in the morning. Had 12 people up for supper. Gave marionette show. Cast about 50 soldiers with Bobby’s set. We went to bed about 1:30 a.m. Jan. 2nd.” These journals are an immense and exhaustive record of nearly every detail of almost every day of his life over many decades. They document momentous events, such as his trip to Stockholm to receive the Nobel Prize, but they also include innumerable bits of “reporting,” such as an elaborate listing of hourly fluctuations over days of his blood sugar. The journal entries when Carleton was in the field were typed by him or written longhand and sent to his secretary for typing. Carleton not only wrote about his exotic experiences in the journals, but he also documented them with extensive photographs, film footage, and audio recordings of songs and speech. He collected art and artifacts from the islands he visited and also filled an incredible number of freezers with blood and spinal fluid samples, as well as tissues from patients, various peoples from around the world, and animals.

I first met Carleton in 1967 when, as a third-year medical student, I interviewed for a position in his “Special Chronic Diseases Study Section” laboratory at the NIH. It was the most unusual interview I have ever had. I hardly opened my mouth because Carleton did all the talking (at that time and virtually every time I was in his presence). He was charismatic, passionate, and possessed with an infectious excitement. During the interview, Carleton introduced me to Ivan Mbagintao, who may have still been in high school. Fortunately, I was accepted into Carleton’s lab in July 1969—a sentinel event in my life.

Soon after I joined Carleton’s lab, I learned firsthand about Carleton’s travels, as he was in the South Pacific for the entire first year of my 2-year tenure at the NINDS. On arriving, I met Françoise Cathala,

a French virologist who had a feverish and driven quality about her, perhaps because she was about to return to France—and perhaps partly because of the time she had spent with Carleton. There was a stream of distinguished visitors to the lab, many of whom I chauffeured to a nearby primate center. There was a certain irony about this facility in which chimpanzees and other nonhuman primates were inoculated with kuru and Creutzfeldt-Jakob disease tissue and became infected and died, as it was located in the Patuxent Wildlife Research Center. The facility was directed by Carleton's associate, Joe Gibbs. As frenetic as Carleton was, Joe was, by contrast, staid and reserved. He was a critical part of the team, always organized and paying careful attention to long-term experiments. One could never imagine fast-moving itinerant Carleton having the patience to focus on investigations of slow viruses with incubation periods that were sometimes in decades. Carleton needed someone with Joe's steady disposition and talents.

Things were unpredictable in the lab, even without Carleton present. I remember receiving a box of six large live sea anemones one day. None of us could remember receiving word from Carleton about this shipment and his plans for it. Did he intend to attempt transmission of some of the neurological diseases that were under study to these exotic creatures? What food did the anemones require, and how would one feed them? A few hours after we made calls around the NIH campus and elsewhere, we found out that an NIH marine biology investigator was frantically trying to find out where his shipment of anemones had been mistakenly delivered!

When Carleton returned, the stream of distinguished visitors from around the world continued. Carleton graciously invited the visitors to his home in Chevy Chase, Washington DC. Like Carleton, the household was unique. One was overwhelmed to see and meet the many children that Carleton had adopted from the Pacific Islands. In one bound volume, Carleton lists more than 30 "Adopted New Guinea and Micronesian children of D. Carleton Gajdusek", six "Non-adopted children resident here for part of their education," and more than 20 "Traditionally adopted children educated in Papua New Guinea." The house was filled with a large number of Pacific Island artifacts, many of them quite large. I realized then how Carleton's work and life completely overlapped and merged.

Carleton called me in 1972, when I was a neurology resident at Johns Hopkins Hospital, inviting me to join a team of 10–15 other physicians, scientists, and anthropologists on an expedition to the South Pacific aboard the *R/V Alpha Helix*. This vessel was operated and administered by the Scripps Institute of Oceanography, University

of California, San Diego. The rationale for the expedition was to obtain population surveys on the overall health, physical development, patterns of child growth, and anthropology of semi-isolated cultures. On 1972 September 19, the boat departed Efate in the then New Hebrides (now Vanuatu) Islands, stopping at a number of other islands in this archipelago (including Mera Lava, Merig, Gaua, Mota Lava, Vanua Lava, Mota, Ureparapara, Lo, Toga, and Hiu), as well as islands in the Solomon Islands (including Santa Cruz, Tikopia, Anuta, Vanikoro, Rennell, Bellona, and Guadalcanal), Caroline Islands (Pohnpei), and Mariana Islands (Guam).

It was on Efate that I witnessed Carleton in a completely different phase—he asked questions and attended to the responses. Although Carleton was a master of the monologue (and his often seemed as though they would never end), he knew how to listen when he needed information, and sometimes this information was important for survival. As a result of this communication, it was Carleton who knew where the villages were on the many islands we visited. Carleton knew the names of the leaders of these villages, and he even knew where the coral reefs were; I remember him directing the captain of the *Alpha Helix*, Alan W. Phinney, through some treacherous waters. In 1976, Phinney wrote Carleton, sounding a bit like Hart Crane: “To you who accomplishes such prodigious and valuable amounts of work with such awesome energy it would seem totally unreasonable that a letter could be years late; yet this the letter and I am that delinquent.”

The *Alpha Helix* expedition was a Gauguin-type trip filled with exotic observations. Surprisingly, however, most of the islands were far more developed than I had expected. Apparently, missionaries go quickly to villages that are discovered, educating the islanders and bringing religion. Then, in a very short time, thatched roofs are replaced by corrugated metal, and islanders begin to wear Western clothes and listen to Western music (even listening to what, at that time, were known as “boom boxes”). Still, some of the islands were very traditional, perhaps because the surrounding coral reefs and rough seas made them difficult to access. Anuta, the most traditional island we visited, even had an anthropology student, Richard Feinberg, collecting data for his Ph.D. thesis.

Carleton and others were able to acquire a number of rare and beautiful artifacts on the islands during his travels. The ultimate destination for most of Carleton’s artifacts was the Peabody Museum in Salem, Massachusetts. During the *Alpha Helix* expedition, he obtained a huge outrigger canoe, large wooden dishes, a huge roll of “feather money,” and many smaller items. These artifacts were sent back by

boat from Guam in an immense custom-made wooden box with more than 180 cubic ft. of packing space. One year after the completion of our expedition, the box showed up in the Baltimore harbor, filled with the artifacts and a couple of dead rats.

I left the boat on 1972 November 22, flying from Pohnpe to Honolulu, Hawaii, with critically important biological specimens: five large boxes of sera along with six boxes of blood clots on dry ice that weighed 375 lbs. and cost \$175 for shipping. These samples had an unimaginable amount of human effort attached to their acquisition, processing, and packing. It was at the Pohnpe airport where Carleton, after seeing a coffin being loaded on to a plane, smiled and said that he now realized how we should have planned to ship the samples back—in a coffin! The plan was for me, on arriving in Hawaii, to call Leon Rosen, the Director of the Pacific Research Section of the National Institute of Allergy and Infectious Diseases, NIH, in Honolulu. I arrived in Honolulu a bit past midnight and managed to store the boxes in a cold room facility at the airport. The next morning, Rosen and his staff came and helped repackage and ship the samples.

Rosen was just one of Carleton's many friends from around the world. In 1997, the NIH published Carleton's "Correspondents and Mailing Lists," in which "a reprint mailing list of addresses of recipients" fills 50 pages with more than 20 names on each page. He never missed a year sending copies of reprints of recent publications and journals. The 1997 volume also has a "Friends and Family List" with more than 20 names, followed by contact information on each of 22 pages. Carleton's extraordinarily large "interactome" of friends and colleagues seemed to regularly increase, even in his 80s. I felt privileged to be a part of this group.

I kept in touch with Carleton after the *Alpha Helix* expedition through letters and visits to the NIH. I attended some of his distinguished lectures. He was known for showing slides on two screens and a film on a third, along with a nonstop narration.

Carleton's journals chronicle an exceptional and original genius with a superhuman hunger for life, but one who had a full complement of human flaws as well. In 1986, Carleton was arrested for child sexual abuse and later convicted as a result of a plea bargain. He spent 12 months in a county jail and then left the United States. In an almost predictable way, Carleton published an "Arrest Journal" that details the events leading up to his incarceration and includes key documents, such as a transcription of an incriminating (but ambiguous) phone call and FBI investigative reports. I visited Carleton in jail on two occasions, speaking to him by phone while he remained on the other side of a glass partition. Carleton, with his propensity to shock, told me how

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17 November 2008

Dear Raymond,

I am alone in the Far Arctic in darkness and alone, with Dr. Michael Lerman & his wife now have returned to the U.S.A. and I face the Arctic alone until late December. It is a bit difficult, but my reading sustains me. If you are traveling to Europe please visit me, I can offer you exciting adventure ... not just my senility,

Do let me know if either of the two journals I am now sending you are duplicates. If my stock of journals is getting to be an encumbrance, I leave to you their proper archiving,

Do keep me informed with your doings. It sustains me.

With Love,

Carleton

FIGURE 1.

fortunate he was to be able to read all of Shakespeare in an environment that had none of the usual interruptions or distractions. After serving his time in jail, Carleton spent his remaining years primarily in Tromsø, Norway; Amsterdam; The Netherlands; and France—as well as lecturing in Europe and Asia.

In 2003, I attended Carleton's 80th birthday celebration on an estate in Bologna, Italy. Paul Brown, his trusted colleague and friend who contributed so much to Carleton's scientific enterprise, organized the event. In 2005, I visited Carleton in Amsterdam. He was hugely obese with edematous ankles resulting from congestive heart failure. Although Carleton raved a bit, he still manifested the unabated forcefulness that I had first witnessed almost 40 years before. Shortly before Carleton died, I received some letters from him, two recently bound volumes of his journals from the 1950s, and handwritten pages recounting daily events up through November 2008. Energy still filled these writings (although the penmanship, which was never very legible, had markedly declined!) (Figure 1). He wrote about the darkness of the Norwegian winter days, but I didn't realize how dark they would be.

Carleton died on 12 December 2008 in Tromsø. A small group of his friends held a memorial service for him at the time of the summer solstice in 2009. I realized then that although Carleton had died in darkness, I would always associate him with light.

Elected 1978

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ACKNOWLEDGMENTS

The author thanks Professor Judith Farquhar and Dr. Paul Brown for their assistance and suggestions.

ENDNOTES

1. NobelPrize.org, "D. Carleton Gajdusek—Biographical." Accessed at http://www.nobelprize.org/nobel_prizes/medicine/laureates/1976/gajdusek-bio.html
2. Farquhar, J., and D. C. Gajdusek (Eds.). *Kuru: Early Letters and Field-Notes from the Collection of D. Carleton Gajdusek* (New York, N.Y.: Raven Press, 1981), 8.