Frank Brink

1910–2007

BIOGRAPHICAL *Memoirs*

A Biographical Memoir by
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and Bertil Hille

NATIONAL ACADEMY OF SCIENCES

FRANK **BRINK** JR.

November 4, 1910–June 6, 2007

Elected to the NAS, 1959

(Courtesy of Rockefeller Archive Center, http://rockarch.org/)

By Alan B. Steinbach and Bertil Hille

Frank Brink, Jr., biophysicist, was an educator, researcher, facilitator, and founding editor of the Biophysical Journal. He collaborated with Detlev Wulf Bronk in early work on physiological biophysics of nerve cells and in implementing a pioneering graduate program in the life sciences. He was known to a generation of students at The Rockefeller University as their Dean of Graduate Studies.

This memoir starts with a short autobiographical sketch written by Frank Brink, Jr., for the National Academy of Sciences. It was written in the third person and the present tense in July 1983 after his retirement. We added two editorial items in brackets.

Brink's short autobiographical sketch

Professor Emeritus Frank Brink, Jr., of the Rockefeller University is a distinguished biophysicist who also served as the University's first dean of graduate studies. He is an authority on the biophysics and biochemistry of neurons, particularly the ionic processes directly relevant to the cycle of excitation, response, and recovery in nerve fibers. He has studied energy transformations involved in linking oxidative processes of metabolism to electrochemical events in peripheral axons of nerve cells.

Much of Dr. Brink's work, as a scientist and educator, was conducted in collaboration with the late Detlev W. Bronk, with whom he was associated for 40 years. Their joint research considerably augmented understanding of the physical basis of neuronal activity.

Dr. Brink joined what was then The Rockefeller Institute for Medical Research when Dr. Bronk was appointed president in 1953. He was appointed a member, a title that changed to professor when the institute became a graduate university granting the Ph.D. degree, in 1954. He was a major participant in the creation of the graduate education program, as acting dean of graduate studies from 1954 to 1958 and dean from 1958

to 1972. He was named Detlev W. Bronk Professor in 1974, a post he held until 1981, when he became professor emeritus.

Frank Brink was born in Easton, Pennsylvania on November 4, 1910 [parents, Frank and Lydia Wilhelm Brink]. He received his bachelor's degree from Pennsylvania State University in 1934, a master of science in physics from California Institute of Technology in 1935, and a Ph.D. in biophysics in 1939 from the University of Pennsylvania where he worked at the Johnson Research Foundation for Medical Physics, of which Dr. Bronk was director.

Dr. Brink was an instructor in physiology at the Cornell University Medical College from 1940 to 1941 and a lecturer in biophysics at the Johnson Foundation of the University of Pennsylvania from 1941 to 1947. He was appointed assistant professor of biophysics at The Johns Hopkins University in 1947 and associate professor in 1949.

During World War II, from 1941 to 1944, Dr. Brink was a special consultant to the Air Surgeon of the U.S. Air Force. From 1962 to 1965, he served on the President's Committee on the National Medal of Science, of which he was chairman for two years.

He was elected to the membership in the National Academy of Sciences in 1959 and in the American Academy of Arts and Sciences in 1961.

In 1983 he received an honorary doctor of science degree from Rockefeller University.

He was a member of the Biophysical Society, the American Physiological Society, and the Society of General Physiologists. He was a member of the Divisional committee for Biological and Medical Science in the National Science Foundation from 1953 to 1959 and of the Committee on Science and Public Policy in the National Academy of Sciences from 1963 to 1966.

He was the first editor of the *Biophysical Journal*, 1960-1964, and has served on the editorial boards of *The Journal of General Physiology, the Journal of Cellular and Comparative Physiology, the Journal of Neurophysiology*, and *The Proceedings of the National Academy of Sciences.*

Dr. Brink was married to the former Marjory Gaylord [1909--2003]. They had two children, Patricia Mayer and David Warner, and two grandchildren, Jesse Gaylord Brink and Shantia Mayer. Dr. and Mrs. Brink resided in Doylestown, Pennsylvania.

On the first typed page of this document from the National Academy of Sciences records, Brink had written in pen, "Presumably, this is the information to be released when I die. Hopefully, it provides the information requested by the Academy. F.B." We start with this personal statement because Frank Brink left remarkably few traces of himself and was an exceedingly quiet and private person. In addition, material he supplied to Who's Who in America (2007), listed his hobbies as: reading, cycling, travel.

Brink, Bronk, and biophysical contributions

Except for his year as a Master's student in physics at Caltech, Frank Brink was educated, lived, and worked within 150 miles of his birth place and near the power centers and commuter trains of the Eastern Seaboard. Once he entered the Eldridge Reeves Johnson Foundation for Medical Physics in 1935 for his doctoral work, Brink came into the intellectual circle of Detlev Wulf Bronk (1897-1975; NAS, 1939; NAS President, 1950-1962) a charismatic, dynamic, forceful, and ambitious leader of American science, biophysics, and Universities. Founded in 1929, the Johnson Foundation still describes itself as the world's first institute dedicated to research into physical principles fundamental to medicine and its clinical practice. Johnson, the donor, had developed the disk-playing phonograph and his Victor Talking Machine Company became RCA Victor. The current self-description emphasizes the Foundation's dedication to the development of appropriate technology. This fit well with Frank Brink's background in technology. Several of his papers present details of designs of equipment.

When Brink joined Bronk at the Johnson Foundation, the world of science was taking on a larger role in the economy, politics, and culture of the west. Developments in physics, chemistry, and the translational research coming from basic discoveries had led to a more evidence-based Euro-American economy, as well as new avenues for support of scientific research, the existence of the Johnson Foundation being one of these avenues. Brink as a young physicist believed in the value of science to the larger world, and must have been very happy to return to the land he knew best to join an effort where his quiet competence would be appreciated and supported. At the same time, the 30-year-old Detlev Bronk was on his way to becoming one of the pre-eminent statesman of American science, projecting a belief in science as the basis for future human progress (Greenberg, 1999).

Detlev Bronk, earned his PhD (physics) in 1926 at the time Frank Brink was graduating from high school. In 1928, Bronk spent a year of research in England with E. D. Adrian (NAS, 1941; Nobel, 1932), who was studying the electrical responses of neural

tissue, and also A. V. Hill (NAS, 1941; Nobel, 1922). At the Physiological Laboratory in Cambridge, Adrian had developed new systems of electrical amplification and display that were to lead to the oscilloscope and a way of visualizing and quantifying electrical activity in biological material. Bronk evidently delighted in his time working in Cambridge, where his physics and optics background fit well into the ongoing projects. He was also drawn to the English system of University tutors and the one-on-one relationship of student to teacher that he saw in place in Cambridge. Bronk was also very enthusiastic about the possibility of a physics of biology. By 1925, he considered himself one of the first medical-school-based biophysicists. In each of his successive appointments, Bronk negotiated institutional commitments to biophysics, and he took with him his team of biophysical investigators. This is meticulously chronicled by Frank Brink, Jr., in his NAS biographical memoir of Bronk (Brink, 1979).

As told by Brink, Detlev Bronk corresponded and negotiated widely, and clearly envisioned the role in the realpolitik of science that he was growing into. Perhaps no surprise, then, that Bronk was selected as the Director of the nascent Johnson Foundation in April of 1929. And that Frank Brink, Jr., was attracted to the dynamic young institute bent on melding physics and biology and based in his home state. Thus began the collaboration that extended through several academic homes (Johnson Foundation, Cornell, Hopkins, Rockefeller), produced many publications in the emerging field of neurobiophysics, and launched the Graduate education program at Rockefeller that we (A.B.S and B.H.) were fortunate enough to be selected for.

The Johnson Foundation group was dynamic, congenial, and smart. Ragnar Granit (1900-1991; NAS, 1968; Nobel, 1967) and William A. H. Rushton made long visits. Harry Grundfest (1904-1983; NAS, 1976) and Haldane Keffer Hartline (1903-1983; NAS, 1948; Nobel, 1967) had joined by 1931. Hartline remained with Bronk for 44 years. Martin G. Larrabee (1910-2003; NAS 1969) entered as a graduate student at the same time as Brink and writes (Larrabee, 1998), "Bronk adopted me as his personal research assistant." Larrabee wrote of his 14 years at the Johnson Foundation:

> *... I cannot leave [the Johnson Foundation years] without reflecting on what a wonderful experience it was. Det Bronk took care of finances before the days of federal largesse, frugally spending the income from the endowment .... Det also obtained grants from various sources, including the Supreme Council of the Scottish Rites Masons, the National Foundation for Infantile Paralysis, and the American Philosophical Society.*

> *We were a close-knit, highly cooperative group, with few responsibilities other than the conduct of the best research of which we were capable. We lunched together in the department library, where we were joined by several research-oriented physicians from the medical hospital, in which we were located. Lunch conversations ranged from serious discussions of each other's research problems and triumphs to trivial pursuits, such as calculating the time required for a nerve impulse to reach the moon.*

Larrabee reminisces, "I was sustained by Det Bronk's paternalism early in my career," as were the rest of the group.

John Pappenheimer (1915-2007; NAS, 1965) joined the Johnson Foundation group for World War II military research efforts and wrote (Pappenheimer, 1987):

> *My own experience with applied research during the War was immensely enriched by close association with Detlev Bronk and the small group of biophysicists in his entourage, including Keffer Hartline, Frank Brink, Martin Larrabee, John Hervey, Glenn Millikan, and John Lilly. They were all experts in instrumentation, especially electronics. We were a close-knit family, and one would have to be very impermeable indeed not to learn by osmosis from daily association with such alert and knowledgeable minds.*

If World War I had stimulated the growth of evidence based science, World War II further engaged scientists and engineers throughout the world in the science of winning war. Everyone in the Bronk entourage became involved in some way, and the war effort must have been a major consideration in Bronk's movements and research work. During those years, 1941-44, Frank Brink served as special counsel to the Air Surgeon, but we could not determine what he did in that post.

This whole biophysical team had been moved by Bronk from the Johnson Foundation, briefly to Cornell University Medical College (1941-1942), and back again because Bronk concluded that a medical campus without the other natural sciences was not suited for the advancement of his biophysics. Then, when Bronk became the President of Johns Hopkins University in 1949, they all moved there. Hartline was appointed the Chair of the new biophysics department at Hopkins. A group of graduate students came along: Francis D. Carlson, Lloyd M. Beidler (NAS, 1974), Edward F. MacNichol, Clarence M. Connelly, W. Paul Hurlbut, and Paul Greengard (NAS, 1978; Nobel,

2000), the most famous PhD student of Brink's career. In his Nobel autobiography, Greengard (2000) writes:

> *In thinking about various options, I settled on the then nascent field of biophysics. At that time, there were two groups of academic biophysicists. One, at the University of California, was engaged in biological and medical applications of radioisotopes. The other, at the University of Pennsylvania, headed by Detlev W. Bronk, used electrophysiological techniques to study nerve function. I chose the latter. Shortly after I arrived in Philadelphia, Bronk announced that he was accepting the Presidency of The Johns Hopkins University and invited a group of us to move there with him and form a new department of biophysics. The most senior member of the group was H. Keffer Hartline ... I did my first laboratory research under the supervision of Hartline. ... Since, at that time, neuroscience as a field had not yet been created, my Ph.D. thesis was carried out under the joint supervision of Frank Brink, a distinguished biophysicist in our Department of Biophysics, and Sidney Colowick, a prominent biochemist who was a Professor in the Department of Biology - I remain to this day very grateful for their nurture and support.*

In this environment, Brink engaged in biophysical research and became the trusted deputy and facilitator for Bronk's laboratory, and his day-to-day link to emerging biophysical experimentation. Brink (1979) wrote, "He [Bronk] expected me to relate to him any unusual experiment that I came across in my reading." He also wrote, "[Bronk] liked to perform experiments with a potential for discovery but disclaimed interest in systematic, goal-directed research." This was the style that Brink maintained as well. Brink's published scientific output, listed in the bibliography, was thin by modern standards. It reflected the thinking of a physicist working with peripheral nerves and other tissues as he facilitated a group of investigators. It was exploratory rather than hypothesis driven. The group thrived on new recording instruments, and Brink's name was on several papers describing instrumentation to follow oxygen consumption and "energy transactions" of nerve in real time. In an era that preceded the ionic hypothesis of Hodgkin and Huxley and that did not commonly use the word "membrane," Brink and Bronk turned their attention to "chemical stimulation" of nerve by bath solutions containing, e.g. lowered calcium, elevated potassium, or added acetylcholine. A good fraction of Brink's papers were reviews of literature or of the work of the biophysics group. The writing was elegantly clear and precise. Thus, with a chemical thermodynamic

perspective, he showed that the Overton-Meyer rule of anesthetic potency correlating with oil-water partition coefficient was better described by saying that anesthesia always occurred when the chemical activity (or chemical potential) of the anesthetic was increased to a certain level (Brink and Posternak, 1948). For cell respiration, cell division, luminescence in bacteria, beating of hearts, or movements of tadpoles, the critical narcotic thermodynamic activity was around 0.02—0.2, taking the pure narcotic as the standard state. Several series of projects concerned respiration of excitable tissue. Brink, Davies, and Bronk implanted platinum electrodes in tissues to study oxygen supply or availability, from about 1940. Consumption rose during periods of stimulation. This work was eventually taken over by Connelly and by Hurlbut and the extra respiration could be attributed to ion pumping. Asano and Hurlbut (1958) write, "The authors are indebted to Dr. Frank Brink, Jr., for suggesting this problem, and we wish to thank him and Dr. C. M. Connelly for reading the manuscript and for the valuable advice they offered during the course of the work."

Brink, Bronk, and education

The year that Frank Brink, Jr., was born (1910), the Carnegie Foundation for the Advancement of Teaching sponsored the publication of a report "Medical Education in the United States and Canada." The report is more often referred to as 'The Flexner Report', and was researched and penned by Abraham Flexner, who had been selected by the President of the Foundation, Henry S Pritchett, based on Flexner's highly critical report on American undergraduate education. Also in that year, the Rockefeller Institute, founded nine years earlier, broke ground for the Hospital, now known as The Rockefeller University Hospital. The Hospital was to be devoted to research. Not incidentally, Rockefeller's President was Abraham's brother, Simon Flexner.

Central to Abraham's recommendations regarding medical education were better preparation, more rigorous teaching of science and research, and a system based on tenured, fully supported professors. This academic structure was based on European and specifically German ideas. Both Flexner brothers were highly influenced in their views regarding education by direct experience with the German model in the late 19th century. Tragically, in Germany itself, a personality-based rather than evidence-based version of the model was beginning to take form, and later became the Third Reich.

When The Flexner Report was published, there were 155 medical schools operating in the USA and Canada. The report recommended strong medicine: reducing this number to 35. A major revolution was launched. By 1935, there were only 66 schools still open; 57 were located within Universities.

During the years that Brink was growing up and earning his advanced degrees, the Flexnerian revolution opened up positions in University-based medical schools for academician-teachers. Concurrently, and intensifying in the years leading up to America's entrance into World War II, support for science expanded enormously to include mission-based programs in militarily applicable translational research (e.g., oceanography, aeronautics.) This was still the educational and research environment postwar when Detlev Bronk brought his group to what was then The Rockefeller Institute.

At Johns Hopkins University, Bronk initiated changes in graduate education, breaking down departmental boundaries and seeking interdisciplinarity. He had also become a member of the Board of Scientific Directors of The Rockefeller Institute in 1946 and, in 1951, was chairman of its committee to prescribe a future policy and recommend a new director for the Institute. The idea of converting the medical research institute into a graduate university developed, and Bronk was asked to become the successor of Herbert Spencer Gasser (1888-1963; NAS, 1934; Nobel, 1944). Bronk became the third President of The Rockefeller Institute in 1953, and his biophysics team came with him. Brink continued to participate in the biophysics field, but less in basic research as evidenced by the relatively few original published papers during the period at Rockefeller. Instead, he devoted himself to service functions such as editor of the *Biophysical Journal*, his work as Dean of Graduate Studies, and gradually, national and government committees. Bronk was certainly the charismatic driving force behind graduate education but was busy being President. As Dean, Frank Brink, Jr., took on the role of bringing Bronk's ideas into alignment with the practices of the existing Rockefeller leadership. He also had the usual thankless tasks of a Dean ('answerable to everyone, power over no-one,' according to Dr H. Burr Steinbach, (personal communication). At Rockefeller, already well established as a pre-eminent research institute, he would also wrangle the disparate needs and ideas of a faculty of brilliant researchers, who subscribed to no single philosophy of education.

Both authors were accepted to the graduate program as Ph.D. students in 1962 and finished in 1967. Dr. Brink was about 50 years old when each of us walked into his office in Welch Hall on the Rockefeller Institute campus to have our interviews with the Dean. He had a big desk that formed a peninsula in the large office, and an affable smile of greeting. There were copies of the *Biophysical Journal*. One large window looked out over the East River, another toward Cornell Medical College, now Weill Cornell Medical College. The system that Bronk and Brink developed to pick graduate students for their program was uncannily successful. Out of the first ten small classes there were eventually two Nobel Laureates, Gerald M. Edelman and David Baltimore. And from 22 students

in our entering class of 1962, seven were eventually elected to the National Academy of Sciences. We concluded our interview with Brink and by the time we had walked across campus to Bronk's office, he seemed already to know from Brink that we should be accepted, and Bronk spent a good part of the day persuading us to come. We were welcomed into their "community of scholars" and treated like independent scientists from the start. We were to develop our own program and send a report to Dean Brink once a year.

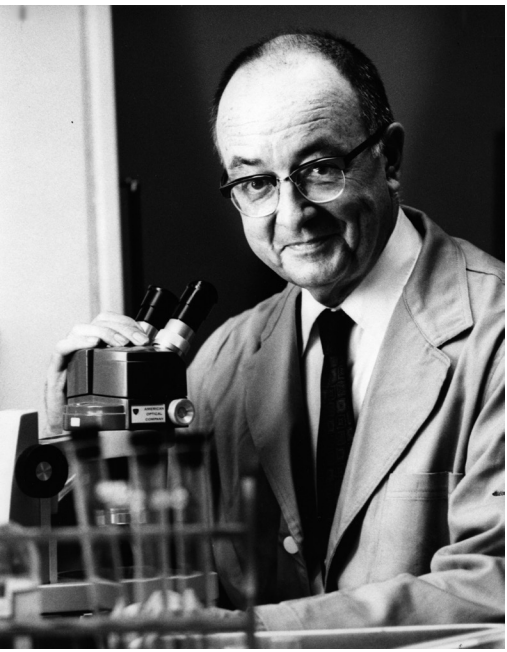
John G. Hildebrand (NAS 2007, For. Sec. NAS) gives a similar report about his student interview of two years later (personal communication, e-mail message, March 5, 2017, from J. G. Hildebrand):

> *Frank Brink was about as different as he could have been [from Bronk]: a quiet, seemingly modest man of rather few words who remained seated while we were together. But he certainly did interview me! He asked about details of my academic record – what courses I had taken, who had taught them, what grades I had received, and what had been the most important things I had learned in those courses. He asked me about the origins of my interests at the time, my career aspirations, and my research experience. And he quizzed me about the history of science. It was quite a session. Throughout he was cordial and unthreatening yet serious and rather distant.... On my way home to Boston, I thought about those interviews, of course, and concluded that it was the one with Brink that was decisive. I'm pretty sure that was the case. If Bronk had a favorable (or at least not unfavorable) impression of a candidate, it was up to Brink to evaluate her/him thoroughly.*

It would be a dis-service to history not to mention the third 'B' of Rockefeller University's development in the 1960's. Ms. Mabel Bright worked in many capacities at Rockefeller, and for 14 years as Detlev Bronk's Executive Assistant during the birth of the University. Professor Bruce McEwen (RU 1962, NAS 1997) recalled her as 'smoothing the way when the going got rough'. Professor Emeritus Maclyn McCarty (NAS 1963) eulogized her with "Her awesome efficiency was leavened with a personal charm…". To us, as students, she was the powerful den mother. Ms. Bright received an honorary Doctor of Laws degree from Rockefeller University in 1984 and died in 2000 at the age of 89.

By the second year, we returned to the rooms around Brink's office, the "President's lab" of biophysics to do our research. The President's lab still included from Bronk's original biophysics group, Brink, Connelly, and Hurlbut and in addition Alexander Mauro, all in a suite of rooms. Bronk did not come there, and Brink was the de facto director although rarely directly involved, He walked quietly to and from his office with a smile. In addition to being Dean of Graduate studies, Brink, was the editor of the *Biophysical Journal*. Connelly was the Associate Dean and the Editor of the *Journal of General Physiology*. They worked in their offices and were not involved with experiments. Mauro, trained in electronics and instrumentation, had eclectic interests and a lively, vigorous, and vociferous style of engagement. He had discovered the satellite cells of muscle and worked with the theories of electrodiffusion and osmosis, planar lipid bilayers, the lateral eye of the Limulus, and the actions of black widow spider venom at synapses. He was strongly against segregation and the Vietnam war. Hurlbut was low-key, studying energetics of nerve conduction, and later joined with Mauro and eventually in fine studies with Bruno Ceccarelli on the spider venom and synaptic vesicle release. Graduate students in the lab during our time included Frederick A. Dodge, Jr., Alan Finkelstein, Albert Cass, Herbert E. Longenecker, Jr., and Ronald Millechia. Down the hall were the labs of Keffer Hartline and Floyd Ratliff, studying the light responses of the Limulus eye, as well as the Laboratory of Electronics developing scientific instruments. As they were during Johnson Foundation and Johns Hopkins days, Hartline and Brink were still near neighbors in Pennsylvania, commuting every day on the train to New York City. Arthur Karlin (NAS 1999) comments about Brink (personal communication, e-mail, March 5, 2017, from A. Karlin), "When I asked him, he told me that he read the literature during his daily commute [on the train]. How did he decide what to read? He said he selected papers by author rather than by subject."

During our years, Brink was also busy serving on national committees including the President's Committee for the National Medal of Sciences, which he also chaired for several years. Under Presidents John F. Kennedy and Lyndon Johnson, his committee chose as awardees, 1962: Theodore von Kármán; 1963: Cornelius Van Niel, Luis W. Alvarez, Norbert Wiener, Vannevar Bush, John Robinson Pierce; 1964: Neal Elgar Miller, Roger Adams, Julian Schwinger, Harold Clayton Urey, Robert Burns Woodward, Othmar H. Ammann, Charles S. Draper, Solomon Lefschetz, H. Marston Morse, Theodosius Dobzhansky, Marshall W. Nirenberg; 1965: Francis Peyton Rous, George G. Simpson, Donald D. Van Slyke, Hugh L. Dryden, Clarence L. Johnson, Warren K. Lewis, John Bardeen, Peter Debye, Leon M. Lederman, William Rubey, Oscar Zariski. Four of these scientists were or became faculty of The Rockefeller University.



Brink posed at the microscope perhaps in the early 1960s but after the time that he was active in the lab.
(Courtesy of Rockefeller Archive Center, http://rockarch.org/)

Those who recollect Frank Brink, Jr., uniformly remember him as a man of modest manners, and borne by a great interest in helping others succeed. He was taciturn, kind, gentle, warm, and reserved but always available if needed.

This was fortunate for all of us students at Rockefeller. De facto, Dr. Brink was the overseer and defender of a unique graduate program in biological and medical science at the time. With a new President (Bronk) and Dean (Brink) of the newly chartered Rockefeller University, as it is now known, the academic tug of war known as 'curriculum' was set in motion. Frank Brink, Jr., was thus in charge of a curriculum that Detlev Bronk lovingly modeled on his own wonderful experiences with Professor Adrian, and his days in Cambridge, England, and that followed the precepts of the Flexner program.

Dr. Brink's low-key style of academic leadership must have been challenging for him to maintain. The founding dean of a division, not to mention an entire University, finds themself in a smaller boat, with only oars for motive power, than they might have expected. On the job, he kept his personal concerns firmly out of sight. On the other hand, he was informed and timely on the topic he loved most, biophysics. With students, he wasn't much for inquiries or explanations about personal matters, but conversing about science was a different matter.

Any day of any year of human history is the starting point of some great endeavor. So it is a bit of a truism to say that Brink's work and career began with the Big News that the living cell, could be understood using the tools of chemistry and physics. He was one of the pioneers in developing and using tools of physics in biology. And that career stretched into the birth of genetic manipulation, an accomplishment directly related to the work of students who had come under Frank Brink's aegis. Since Brink did not

choose to promote himself in writing and lived far away from where he worked, much of this biography relies on understanding the times that he lived in, the scientific company that he kept, and the students who came under his stewardship in the role of founding Dean at The Rockefeller University.

Members of the Rockefeller community who responded to our queries uniformly recalled Dr. Frank Brink, Jr., as a friendly man whose door was open and who saw the role of Dean as coordinator and facilitator, rather than as commander. As students, we were not privy to the details of faculty process. But those who were recall Brink as someone who preferred to work behind the scene and to strive for consensus. The changes that occurred, the solidification of experiences into courses, and courses into a curriculum were probably inevitable for the 1960's and 70's. Interestingly, recent recommendations about medical education, expressed in a Carnegie Foundation report issued 100 years after Abraham Flexner, recommend a program with multiple pathways and a single summative assessment process--quite like what Rockefeller has evolved from the original ideas of Bronk and Brink.

Sometimes, specific anecdotal memories can illuminate an individual's accomplishments in a way that highlights the way the individual worked his magic.

F.A. Dodge, Jr., who greatly influenced both of our careers and provided 'at your elbow' teaching at the interface of electronics and physiology, recalls that it was Frank who threw a reprint on his desk from the Bernhard Frankenhaeuser lab, describing a method of recording electrical signals from a single node of Ranvier of frog nerve. That led to a period of study in that lab, mastery of the method, and later to the studies that one of us (B.H.) used to launch a career in the study of membrane ion channels.

Dodge was also involved in A.B.S's choice of thesis topic; Fred suggested looking at the effect of local anesthetics on synaptic transmission, based on a paper from Brink. He thought it would be simple enough to help me focus. In fact, it turned out to be complex enough to form the basis of a thesis.

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