

Personal Reminiscences of Robert (Bob) Emerson and Eugene Rabinowitch

by

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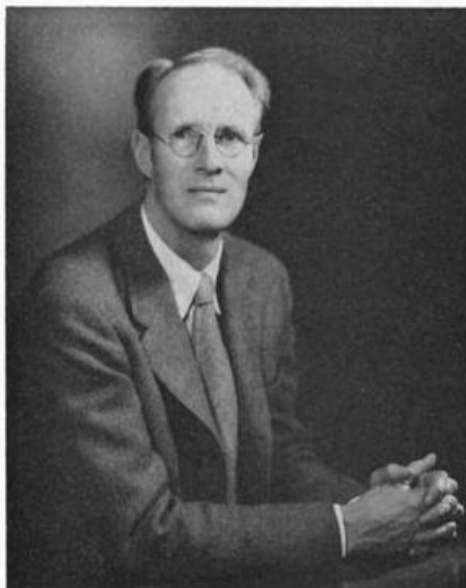
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We have divided these reminiscences into 2 periods: (1) September 1956—February 1959: During this period, one of us (Govindjee) was a graduate student of Robert Emerson (1903-1959) in “Physico-Chemical Biology” since 1956, whereas, Rajni was in Botany, since 1957; during this time, Eugene Rabinowitch (1901-1973) was a professor next door, but in the same “Photosynthesis Project”; (2) March 1959—onwards: both of us were under Rabinowitch, after Emerson’s death in a plane crash on February 4, 1959. Govindjee finished his PhD (in Biophysics) under Rabinowitch in September 1960, and then worked as a NIH Postdoctoral Fellow until he was appointed as an Assistant Professor in Botany in September 1961. After that Govindjee and Rabinowitch were faculty colleagues until the latter left Urbana to go to Albany, New York. Rajni finished her PhD in Botany in May 1961, and later did research under Rabinowitch for many years.

The Laboratories of Emerson and Rabinowitch were next door to each other located in 155—157 Natural History Building, on Matthews Avenue, in Urbana, Illinois. Emerson lived in his home on 806 West Main Street in Urbana, and Rabinowitch lived in his home on 1021 West Church Street in Champaign. Emerson walked to office, whereas, Rabinowitch came by car

1. September 1956—February 1959

We begin by stating that both Robert (Bob) Emerson and Eugene Rabinowitch were wonderful people, but very different in their training as well as in personalities. Bob (called Doc by many) was trained as a biologist (with an excellent background in physical sciences); he had obtained his PhD working on “Respiration in algae” under the Nobel laureate Otto Warburg. On the other hand, Eugene was a chemist in and out, and had done his post-doctoral research under the Nobel laureate James Franck. Thus, their background fully complemented each other, and it was good for us to have attended lectures by both.



Robert Emerson

Robert Emerson (the above photograph is from Rabinowitch, 1961): On the personal side, Doc (we always called him “Professor Emerson”) was a New Englander, tall, lanky, athletic, and walked very fast; he was a wonderful “figure skater”; and could even walk on “stilts” at parties – in his backyard. In addition, he was a great cook. He was very sincere—straight faced, very patient, and highly skilled. He taught Lab techniques with great patience; he was meticulous; a great glass blower; and taught his skills to his students in great details and with patience; he always had a smile when doing so. He was, however, very strict about protocols. In his research, he was highly focused and would not accept changes easily. On the political side, he was a Pacifist and cared a lot for those in the Japanese concentration camp. He worked to get “rubber” from Guayule shrubs because he felt that rubber was the reason the Japanese had attacked USA. His main research technique was “manometry”—which was perfected to be much better than that of Warburg.

One personal incident Govindjee could never forget was that on October 24, 1956, when he arrived in the Lab, he was surprised to see Prof. Emerson wearing apron, and with many plates full of various things: cut onions; cut spinach leaves; small bits of cut potatoes. He wished Govindjee “Happy Birthday” and then showed him how to cook and eat a healthy diet to survive in USA. He told Govindjee that he needs to cook and eat well in order to be able to do PhD!



Eugene Rabinowitch (the above photograph is from the Bulletin of Atomic Scientists & American Institute of Physics; taken from the internet) : Although Eugene was not our PhD advisor initially, he was the other professor on the “Photosynthesis Project”, and there was a common “Seminar” where both the research groups met once a week, and discussed photosynthesis-related research; Eugene had mostly students and postdocs from Physics and Chemistry, whereas, Emerson had two research assistants (one a technician and another trained in Physics) and students from Biology.

In contrast to Emerson, Eugene was short, sort of big in the middle, highly sociable, with a great smile; he seemed to be involved in many things—related to the “Bulletin of Atomic Scientists”; his 2,000 page 3 Volume book on “Photosynthesis” was already there; the last one had just come in 1956 when Govindjee had arrived there. It was clear to both of us that Eugene was a very versatile scientist, and we learnt that he was even a poet (wrote in Russian). Clearly, he was an “all-rounder”. He was indeed a highly versatile person. He seemed to give his students total freedom to choose research topics and even “change” – whenever they felt that something else had more potential or was more exciting. This was quite different from Emerson -who was much more rigid. That is: Eugene was much more open to exploring new things and changing when they wanted. In addition, he was spending a lot of time in finding ways for US and Russia to come together and have Peace. However, he was a very practical person.

His students and postdocs (and even those in Emerson’s Lab) were invited to his home for parties – where “home-made” vodka was served, and Govindjee was trusted to be the “bartender” -- may be in 1958! Further, Mrs. Rabinowitch (Anya) taught one of us (Rajni) how to make good vodka at home – starting with bison grass, “Zubrowka” and grain alcohol! Anyhow, he gave us the impression that we were really a part of his own family.

2. After Emerson's death (March 1959—onwards): further memories of Rabinowitch

When Emerson died, and we were sort of “orphans”, we were very fortunate that Eugene Rabinowitch accepted us as his graduate students. Each of us then learned everything that was known then in the area of “Photobiology and Photochemistry” directly from him and from the courses he taught. Govindjee finished his PhD in 1960 (in Biophysics), and Rajni in 1961 (in Botany).

During our PhD days, we were given full freedom to choose whatever we wanted to do: Govindjee discovered that both the photosystems are run by two different spectral forms of chlorophyll a, and Rajni discovered that the Emerson Enhancement Effect was in photosynthesis, not in respiration. Both our papers were accepted in *Science*. We are sure that Eugene's skill in editing our papers was the key; further, our detailed papers were also immediately accepted in “*Biophysical Journal*”.

We owe our future academic achievements to the training Emerson gave in doing “solid and thorough experiments” – repeating and repeating our experiments, and the training Rabinowitch gave in writing and re-writing papers until all the commas and semicolons were properly placed.

Eugene's comradery is well known to both of us – whenever we were together at conferences starting from 1961. Both of us remember Eugene as the most wonderful mentor and friend. As mentioned above, we had parties at their home; we really enjoyed these memorable parties, where wonderful Russian food was served, and we were family to them. In addition, Anya and Eugene Rabinowitch were wonderful hosts to us at their summer home in Vermont; it was there that a wonderful 1965 *Scientific American* article, as well as our 1969 highly successful book on photosynthesis, were written. We remember Eugene vividly and have very fond memories; he was the most wonderful human being that we have known in our lives

A highly personal incident that Govindjee cannot forget is: While he was already on the Faculty at UIUC, and was leading his own research group, supported heavily by grants from the National Science Foundation, one of his research assistants went to Eugene's office complaining to him that Govindjee was not re-appointing her because of her religious preference. Eugene knew very well that it was a totally false accusation—and, instead of even bothering to tell Govindjee about it, he told her “to leave his office immediately” and never to make such “false” statements. The only reason Govindjee knows this story is because his office was next-door and he could hear all this! Clearly, we know and respect the man Eugene was.

We end this write up with two photographs followed by references to further reading. The first photo (Figure 4 in Govindjee et al.,2019a), shown below, was taken in Stockholm, Sweden, in 1961: Right to left (in the photo): Govindjee; Rajni; and Eugene, the person on the extreme left in the photo is unidentified. The second photo (provided to us by Rohit Joshi), which is below the first one, was taken in India in a bus, in 2019, where Govindjee and Rajni were relating their early life in USA, with their professors Emerson and Rabinowitch, to graduate students and postdocs of Drs. Ashwani Pareek and Sneha Lata Singla- Pareek of New Delhi, India.



Further reading

Govindjee [G] (2004) Robert Emerson, and Eugene Rabinowitch: Understanding Photosynthesis. Lillian Hoddeson (editor). "No Boundaries: University of Illinois Vignettes", Chapter 12, pp. 181-194. University of Illinois Press, Urbana and Chicago.

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Govindjee [G], Papageorgiou GC and Govindjee R (2019) Eugene I. Rabinowitch: A prophet of photosynthesis and of peace in the world. *Photosynthesis Research* **141** (2): 143-150; DOI 10.1007/s11120-019-00641-w

Rabinowitch E (1961) Robert Emerson—November 4, 1903—February 4, 1959. *Biographical Memoirs of the National Academy of Science*. USA, Washington, DC; see pp. 111-131.