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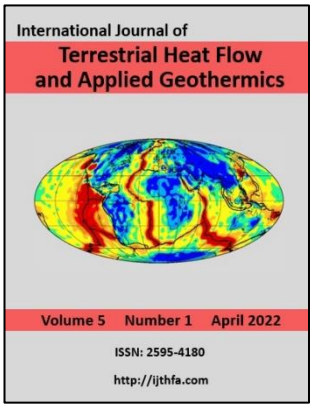

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Memories of Arthur Herold Lachenbruch (1925 –2021)

Barbara Lachenbruch

Oregon State University, USA.

Email address

barb.lachenbruch@oregonstate.edu (B. Lachenbruch)
Corresponding author

Abstract

This article provides a brief description of the life and scientific achievements of Arthur Herold Lachenbruch, emeritus Scientist of the US Geological Survey. He was born on December 7, 1925, in the USA and passed away on September 20, 2021. He was a founding member of the International Heat Flow Commission. Although retired in 1994, he continued to be active in research works geothermics. He will be remembered for his significant contributions in Geophysics, his participation in activities of the International Heat Flow Commission (IHFC), and his wise and thoughtful counsel to those around him.

1. Introduction

Dr. Arthur H. Lachenbruch, distinguished USGS Scientist, Fellow of the National Academy of Sciences, and medalist for both the American Geophysical Union and the Geological Society of America, passed away peacefully at the age of 95. His career spanned more than six decades. He was born December 7, 1925, in New York City. He grew up in New Rochelle, New York and Bethesda, Maryland, the youngest of four boys, to Milton Cleveland Lachenbruch and Leah Judith Herold Lachenbruch. He did not particularly thrive in the war-heated environment at his high school and was encouraged by the guidance counselor not to go to college.

Fortunately, before entering the Army Air Force (1943-1946) and during his summers as an undergrad, he worked on geological mapping projects as a camp cook, field hand, and backpacker in the Brooks Range and southwest and southeast Alaska. Some of his early colleagues, including his crew boss George Gryc, became life-long friends and went on to illustrious scientific careers. His notebooks show that he was already doing calculations to understand the mechanics of cracking and the phenomena of ice wedge polygons in his pre-college and pre-grad school years. In the Army, Art took a wide range of correspondence courses while working in a group tasked with improving the complex remote-control gun-turrets of B29 aircraft; this group became valuable mentors to him. These experiences may help explain how and why Art became such a wonderful mentor to those around him.

After returning from the Army, Art earned a bachelor's degree in geology from Johns Hopkins University (1950). He got a doctorate in geophysics from Harvard (1958), where he worked with Francis Birch and studied the thermal effects of the ocean, lakes, buildings, and drilling on permafrost.

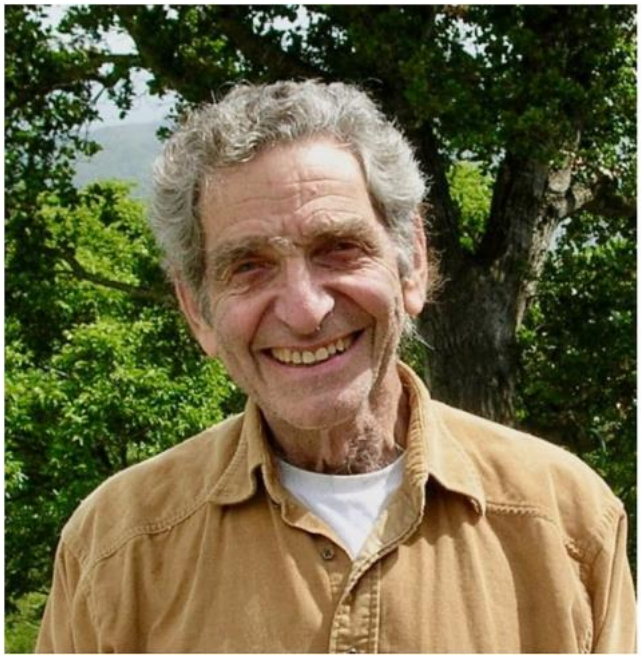

Figure 1 - Arthur Herold Lachenbruch (Family Album).

2. Studies in Permafrost and Terrestrial Heat Flow

At the USGS, Art led a team of scientific, technical, and clerical people he respected greatly. Although he was a research scientist, he was never afraid to advocate for what science showed to be the safest course for the environment and local communities. Early on, his team used the tools of heat flow to advance engineering practices in permafrost zones, which ultimately helped avert the environmental disaster of a buried hot-oil pipeline across Alaska. He was involved in Project Chariot, an arm of Operation Plowshare, a controversial program seeking to find peaceful uses of nuclear explosives. His role was as a member of a small interdisciplinary team that evaluated potential environmental effects of blasting a harbor near Cape Thompson, Alaska. This team served as an example from which the process of creating US Environmental Impact Statements was modeled.

Several years later, from 1963 to 1973, Art's team measured heat flow from the drifting T3 (Fletcher's) Ice Island in the western Arctic Ocean. Some of these data were not initially published because Art's efforts were redirected, by necessity, to the analysis of the potential effects of the proposed buried hot-oil pipeline across Alaska. In 2019, however, Art contributed to his last publication, which presented these data in the context of more recent geological and heat-flow perspectives.

In the 1960s and 1970s, his project turned much of its attention to terrestrial heat flow. The team measured how much heat escaped from the earth's crust, estimated how much of that was generated by friction or magma chambers, and made conclusions that contributed to plate tectonics, seismology, geomorphology, and the discovery of geothermal resources. One project used inactive oil exploration boreholes in permafrost in Alaska. Art calculated that the deep temperatures were out of sync with surface temperatures. This 1986 work was the first to show that the solid earth is heating up and contributed early evidence for climate change. He retired from the USGS in 1994, after almost 47 years of public service, but continued his involvement for another decade.

3. Family Life

In May of 1950, when Art was finishing his undergraduate work, a fellow geologist, Bill Perkins, introduced him to Mary Edith Bennett (Edie), a nurse. Art had to go off to the field a couple of weeks after meeting her, but they married several days after he returned in September. Art's urban upbringing contrasted with Edie's early life on a farm in West Virginia. Together, they embarked on original adventures and developed their own traditions, borrowing from both of their families and places of origin. While Art worked on his PhD, Edie worked as a hospital nurse. When his studies took him to Dillingham, Alaska, for several months and then to the far northern village of Utqiagvik (Barrow) for two years, Edie went along and found fulfilling employment at Native healthcare facilities and as Art's field hand.

In 1954, they left Alaska for Massachusetts, where their first child, Roger, was born. That same year, they moved to Palo Alto, California, for Art's job with the USGS. Charles (1955-2019) and Barbara (1956) were born soon after. In 1963, the family moved to nearby Los Altos Hills for a more rural life. Art and Edie loved gardening and entertaining neighbors, friends, and family there. Two generations of children grew up playing in the chaparral, taking runs, and jumping in the pool. Eventually, Art and Edie bought eighty acres in the redwoods, where they and their dog spent weekends for thirty years. Art was a planning commissioner for Los Altos Hills for more than a decade. In that capacity, he helped the town develop one of the earliest ordinances to tie the minimum lot size to a property's slope.

They moved to Corvallis in 2011 to be near Rog and Barb. He kept a piece of basalt in his room, and as he got older, he was quick but patient in explaining its fracture patterns to his caregivers. Although Art was deeply saddened by the deaths of Edie (2016) and their son Charlie (2018), he continued to see the positive sides to life. His gratitude extended to the people he had such luck to live and work with, the beauty of nature, and his good fortune for being able to participate in this world.

Art used his interpersonal skills and creativity to pull disparate fields and techniques together and shaped our understanding of frozen lands and terrestrial earth processes. He was a true role model for Survey scientists who aim to live up to the old motto of "Earth Science in the Public Service." His positive outlook, deep thinking from first principles, interest in others, kindness, and generosity of spirit had an enormous influence on the people around him.

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