

## Preface to Cloud Tales

I'm approaching eighty years of age and have already had four distinct careers. I've been a cloud seeder, a college professor, a researcher, and a writer. Each of these careers has been enjoyable and thoroughly fulfilling. However, I must admit that being a rainmaker provided some of the most enjoyable challenges and adventures in my life. The purpose of this book is partially to allow me to wander down memory lane and indulge in remembering the past before I forget it completely. However, this book is also intended to offer a unique window on the era of rainmaking in the 1960s and 1970s when optimism ran high that technology could solve any problem. I have many friends and associates who have had similar experiences. But, they have chosen to maintain a more professional approach to their careers and not share their personal lives in such an open manner.

For fifteen years during my career as a cloud seeder, I carried the mistaken impression that I could tinker with the atmosphere and cause clouds to precipitate at will. I was never so arrogant as to literally test God's statement in Job 38:34 where he said, "Canst thou lift up thy voice to the clouds that abundance of waters may cover thee?" But, the joy I experienced when conducting field experiments in cloud seeding gave me a god-like sense of control over nature which is difficult to describe. Flying through clouds and creating streamers of snow or rain on the ground below can go to one's head.

I used God's challenge in Job 38:22 as the motivation for completing graduate school: "Hast thou entered into the treasures of the snow? Or hast thou seen the treasures of the hail?" I am still challenged by this statement today and enjoy studying the beauty of ice crystals and the amazing intricacies of their shapes and growth patterns. But, I am no longer involved in field experiments where life-threatening dangers on icy roads and in airplanes compete with the intellectual challenge and the beauty of nature to quicken my pulse.

At this point in my life I am content to simply rehearse the experiences I had and remember some of the people I worked with in my career as a rainmaker. I consider all the people mentioned as friends. Of course, after they read this book,

they may no longer consider me a friend. I relate these stories, not out of spite, but in the spirit of humor and sincerity. I hope the reader will gain as much enjoyment from reading these stories as I had in writing them. The stories are all true, although I may have spiced them up a little here and there.

Before launching into the subject at hand, I should probably clarify my view on the effectiveness of cloud seeding. By the time the reader gets to the end of the book, he may be somewhat confused about my position on this rather controversial subject. First, I believe cloud seeding works under some conditions. However, the right conditions occur only under special situations and at limited locations. Second, the delivery of seeding materials in the correct concentrations and at the correct locations in clouds is a very difficult problem and has not been generally solved yet. Third, although seeding effects can be easily documented in clouds by changes in ice crystal characteristics, the measurement of statistically significant changes in precipitation on the ground is a much more difficult problem. It has only been accomplished consistently at a few locations.

The name of this book, “Cloud Tales,” is intended to emphasize the difficulty in locating clouds with the correct conditions for seeding. The correct conditions would be in clouds with high concentrations of supercooled water and low concentrations of ice crystals. Proxy variables like cloud-top temperature are often used to estimate these conditions. However, nature does a fairly good job of extracting water from most clouds, so most clouds have little additional water which can be removed by cloud seeding.