

Her Head in the Clouds: As a young girl, Joanne Simpson was fascinated by clouds. As a young adult she became the first woman to earn a Ph.D. in meteorology. But not so fast. Because she was a woman, she was unable to pursue her doctoral studies or perform her meteorological research as planned.

In 1939 as a 16-year old student-pilot Joanne was required to complete a course in meteorology. She did so at the University of Chicago and, because of her interest in clouds, she also took a course in astrophysics. Simpson was instantly hooked on meteorology and inquired about other such courses. She was told that Carl-Gustaf Rossby, considered by many to be the greatest meteorologist ever, had just arrived at the university to establish an institute of meteorology. Simpson interviewed with him and within minutes was in his World War II nine-month meteorology-training program. It consisted of teacher-in-training weather instruction to fifty women who would then teach weather to Aviation Cadets. At New York University and the University of Chicago, Simpson taught weather to cadets, many older than herself, all men, and she prepared weather maps.

After the war, women were expected, many told, to return home. But Simpson returned to college with the intent to complete her master's degree and enter a Ph.D. program. Simpson recalled some reactions to her scholarly plans by some Chicago professors as follows: "They told me it was totally inappropriate for a woman to be a meteorologist. You would have to work night shifts, leaving the airport in the middle of the night. You would have to fly in airplanes to do research. You'd have to do all kinds of things women can't do." She remembered how: "Every possible obstacle was put in our way, ranging from refusal of scholarships to downright hostility from the wives as well as the men." She and two other women students were told by Rossby that no woman ever got a Ph.D. in meteorology, none ever would. And, if any of them did, she would never be given a job. The year was 1945.

About two years later, after Rossby had left the department, Simpson who had attended a lecture on aircraft observations of wind flow and cloud structure in the tropics given by Herbert Reihl (highly regarded as the father of tropical meteorology), contacted Reihl. Intrigued by this new field of tropical meteorology coupled with her interest in clouds, now cumulus clouds, she asked Reihl if he would agree to be her advisor in this area of study. Reihl agreed. Rossby also agreed commenting that it (clouds) was a good subject for "a little girl" to study.

No man had devoted serious scientific research to clouds nor their role in weather. It was accepted that clouds were the result of weather not a cause. Despite Rossby's demeaning gender remark and the gender disparate atmosphere in the department from the all-male faculty, Simpson began studying tropical convection clouds in relation to tropical wind systems, completed her doctoral work, and in 1949 became the first woman to receive a Ph.D. in meteorology. Her first major contribution to atmospheric science was the astounding hypothesis that tropical clouds weren't just the passive *result* of atmospheric circulation but were in fact the *cause*.

Drs. Simpson and Reihl went on to write landmark meteorological papers. In 1958, they proposed the "Hot Tower" hypothesis that clouds carry undiluted warm moist air from the ocean 50,000 ft. into the air. Their findings shook the skeptical meteorological

community and revolutionized meteorology itself.

Meteorologists knew the eye of a hurricane was made of a ring of towering clouds but did not know how the heat engine inside this tower of clouds worked to sustain its tremendous power while traveling great distances. They lacked empirical evidence to explain hurricane structures, their energetics and the thermodynamics of tropical weather, quote/unquote “cumulous clouds” seemingly considered too girly a subject to research and study. Little was known about clouds.

But the cumulonimbus clouds (hot towers) hypothesis that scientifically suggested they provide the energy needed to keep circulation and the trade winds running, proved to be ground breaking data. Data that would be empirically verified twenty years hence. Dr. Simpson’s reputed stature in meteorological scientific research that provided such data was significant. She developed the first cloud model, discovered what makes hurricanes run, and revealed what drives the atmospheric currents in the tropics.

To create the first cloud model that was either an analytic equation or a computer model had been a long time dream of hers. She developed such a cloud model using a slide rule to do her calculations because computers had not been invented yet. Thus, her first model was a one-dimensional depiction of a buoyant cloud plume growing vertically. Her data and her cloud model ignited a field of cloud studies that grew from two or three meteorologists to a field of about 350 within two years.

Her career in meteorology was just beginning. But not so fast. One of Rossby’s remarks, about women not being accepted to work in the field of meteorology, proved to be true. No one would hire Dr. Simpson as a meteorologist. But undaunted, she knew her meteorological work lay ahead, for her head still was up in the clouds.

Sources: http://geogain.org/?page_id=52

<http://www.islandnet.com/~see/weather/history/joannesimpson.htm>

<http://earthobservatory.nasa.gov/IOTD/view.php?id=43027>

Next month: Dr. Simpson and her research work defining hurricanes.