A WASP in Geology: Elizabeth A. Watson (1915-2000)*

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General Comments

The early 20th century is not known to have an excess of either female geoscientists or female aviators. In comes a remarkable woman embodying both, one Elizabeth A. Watson. Elizabeth is one of many spectacular pioneering women geologists from the 20th century. The AAPG **PRO**fessional **W**omen in **E**arth Science**S** (PROWESS) committee is uncovering more enigmas about the lives of these pioneering women and the impact they made to the petroleum industry.

The purpose of this presentation is to introduce the PROWESS committee, the work that we are doing on the Pioneer AAPG Women project, and to highlight just one of the fascinating profiles we have uncovered through our detective work.

The Mission of the AAPG PROWESS committee is:

> To make a positive difference in the professional careers of women in the Earth Sciences by interacting with them, their male peers, employers, students, and professional societies through committed volunteering, mentoring and leadership.

We consist of six sub-committees that are aimed at achieving this mission from multiple directions, one of which is the Pioneering AAPG Women Subcommittee.

A WASP in Geology: Elizabeth A. Watson (1915-2000)

AAPG PROWESS

Jessica Moore, Chevron, Bakersfield, CA
Amanda Haddad, Independent Consultant, Houston, TX

AAPG ACE – Houston, TX; April 6, 2014

Presenter's notes: The early 20th century is not known to have an excess of either female geoscientists or female aviators. In comes a remarkable woman embodying both, one Elizabeth A. Watson. Elizabeth is one of many spectacular pioneering women geologists from the 20th century. The AAPG **PRO**fessional **W**omen in **E**arth **S**cience**S** (PROWESS) committee is uncovering more enigmas about the lives of these pioneering women and the impact they made to the petroleum industry.

Outline

- What is PROWESS?
- What is the “Pioneer AAPG Women” project?
- Elizabeth Watson
  - Geologist
  - WASP
- Future direction of the “Pioneering Women” project

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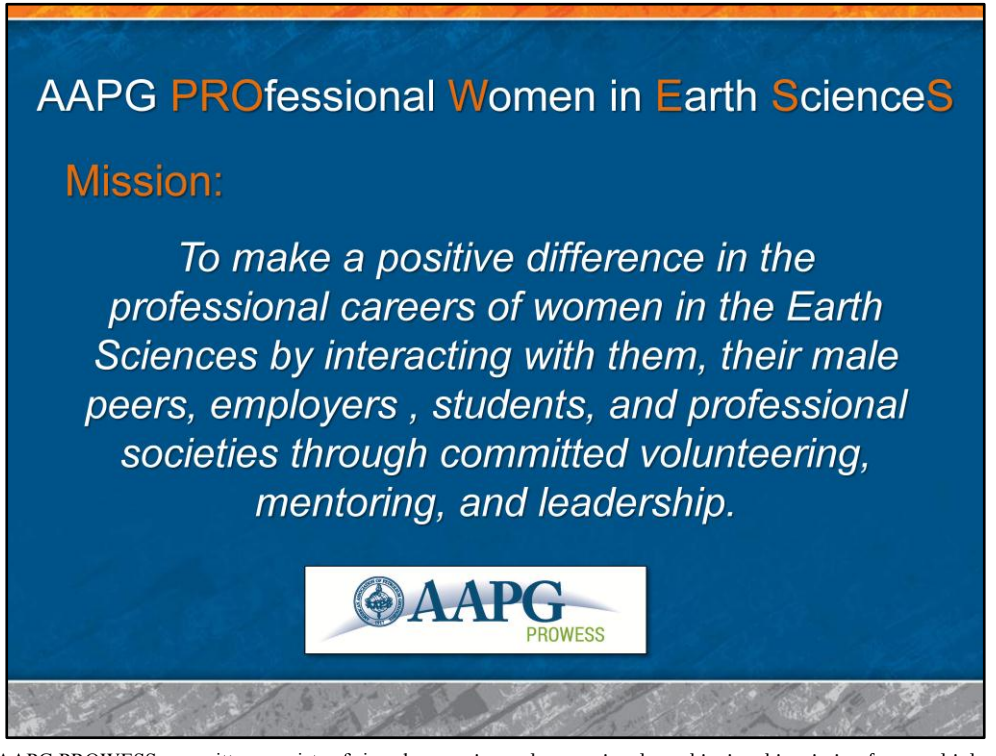

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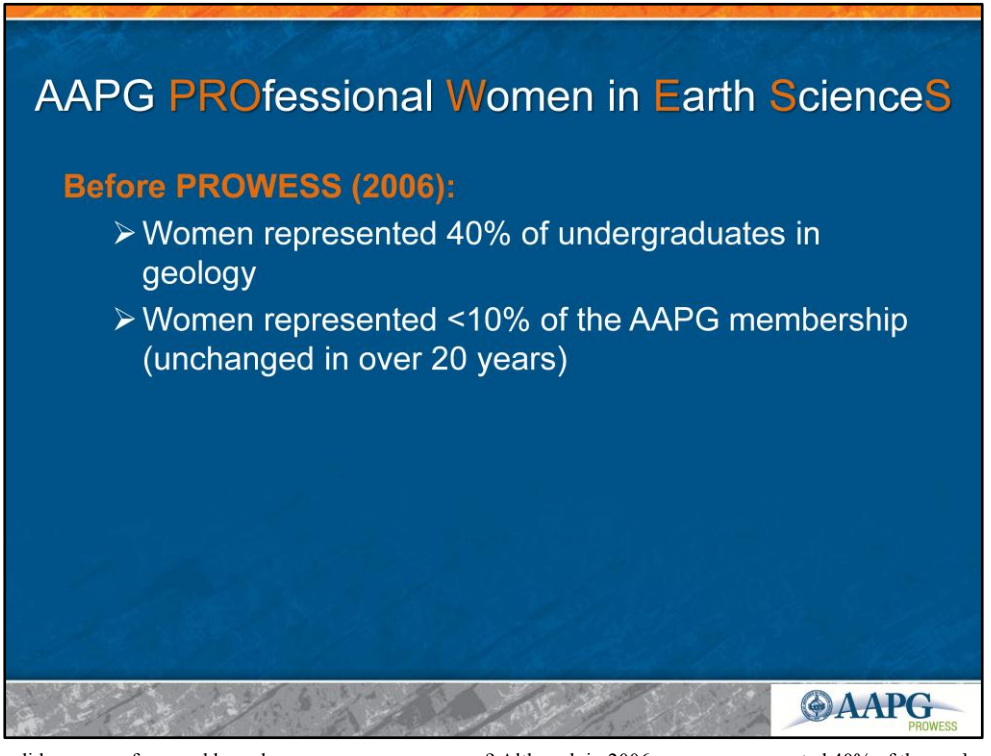
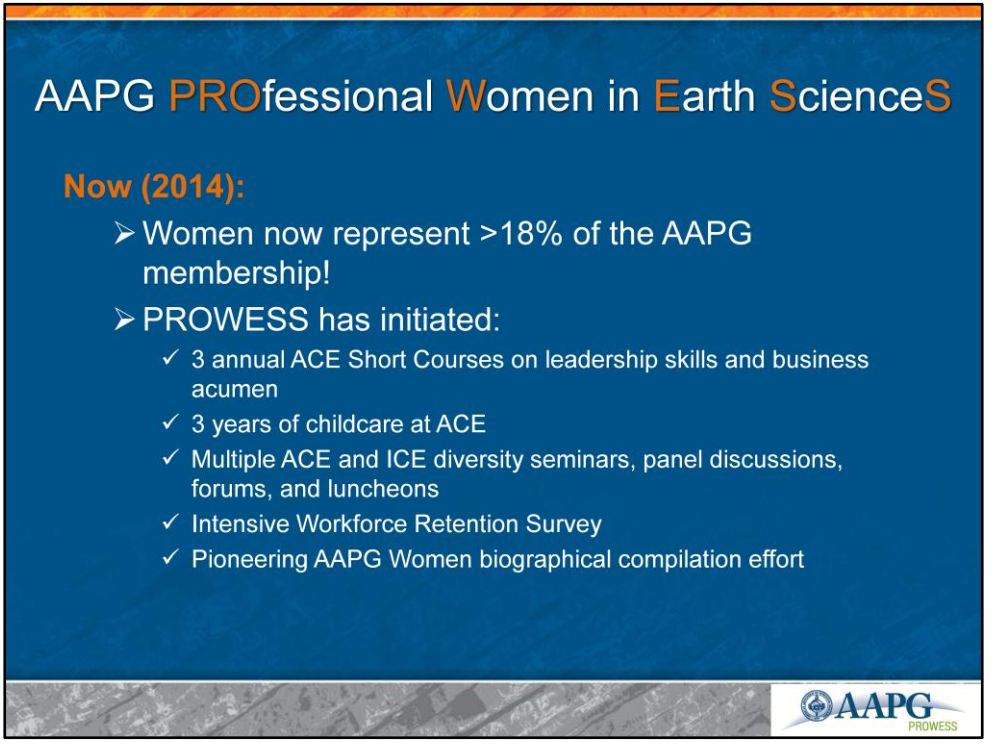
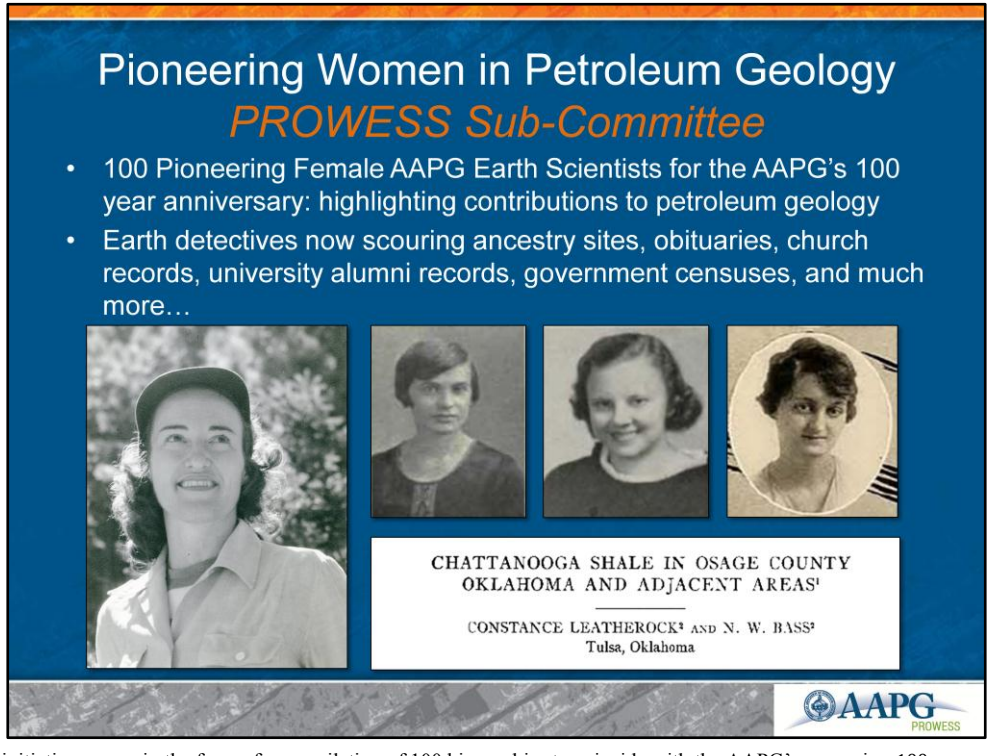


Presenter's notes: Where did we come from and how do we measure our success? Although in 2006, women represented 40% of the geology undergraduates, we represented less than 10% of the AAPG membership – a number that had remained unchanged for over 20 years.
The AAPG EC recognized the gap and wanted to better understand the root cause. Scott Tinker, then President Elect for AAPG, tasked a number of us to form an ad-hoc committee to understand and address the gap.



Presenter's notes: Jump to 2014 and PROWESS is now a full-fledged AAPG Committee, making significant contributions to the organization and the industry with a number of accomplishments. Women now represent greater than 18% of the AAPG membership - still too small – but the numbers continue to grow and break through the previous 20-year stagnation. PROWESS has initiated:

- 3 annual ACE Short courses on leadership skills and business acumen.
- Childcare sponsored by the AAPG for the ACE for the first time in the history of these meetings.
- We initiate and sponsor multiple ACE and ICE Diversity Seminars, Panel Discussions, Forums and Luncheons.
- In 2008-2009 we undertook a comprehensive Workforce Retention Survey of women in the Energy Industry. The results are helping to define industry practices that can be changed within the unique constraints of the petroleum industry.
- Now we have initiated a somewhat massive undertaking to uncover the AAPG Women Pioneers in the Energy Industry, going back to the turn of the 20th century, who have paved the way for geoscientists today.



Presenter's notes: This initiative comes in the form of a compilation of 100 biographies to coincide with the AAPG's upcoming 100-year anniversary. Biography at its best is a good read, and the older one gets, the more attractive and entertaining biography becomes. This is not hard to explain. It appeals not only to a natural human instinct for gossip; it also answers a real need within us to understand each other better, and to understand and appreciate the contributions of those paving the roads of science and social beginnings – such as women contributing to science.

E.H. Carr, a former diplomat who was also an accomplished biographer and historian said, "The historian, before he begins to write history, is the product of history." We, the Earth detectives, are now applying our Sherlockian skills in a new way - scouring ancestry sites, obituaries, church records, university alumni records, government censuses, and much more…

Elizabeth “Liz” Watson

- B.A. (1938) and M.A. (1941) in Geology from Stanford University
- 1 of only 3 women in Stanford’s Geological and Mining Society
- Received pilot’s license from Oxford while enrolled at Stanford

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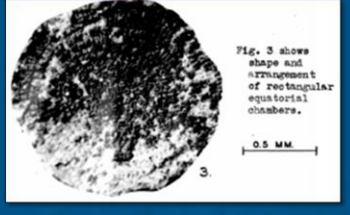
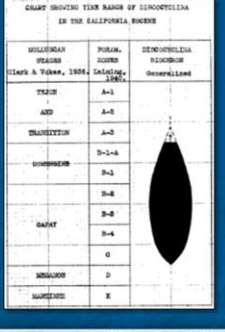
Presenter’s notes: Liz received both her B.A. (1938) and M.A. (1941) in Geology from Stanford University and was one of only 3 women in Stanford’s Geological and Mining Society. This is a nice photograph of her class where you can see the three women standing together on the right. As a student with many interests, she also pursued a hobby in aviation and obtained a pilot’s license in parallel with her geology studies at Stanford. Unbeknownst to Liz, this hobby ends up taking a more prominent role with an importance she surely could not have imagined she would be a part of when she first had the urge to fly.

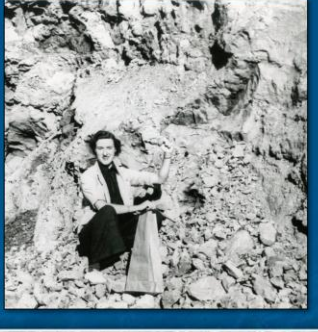
M.A. Thesis (1941)

"Stratigraphic Occurrences of *Discocyclina* in the Eocene of California"

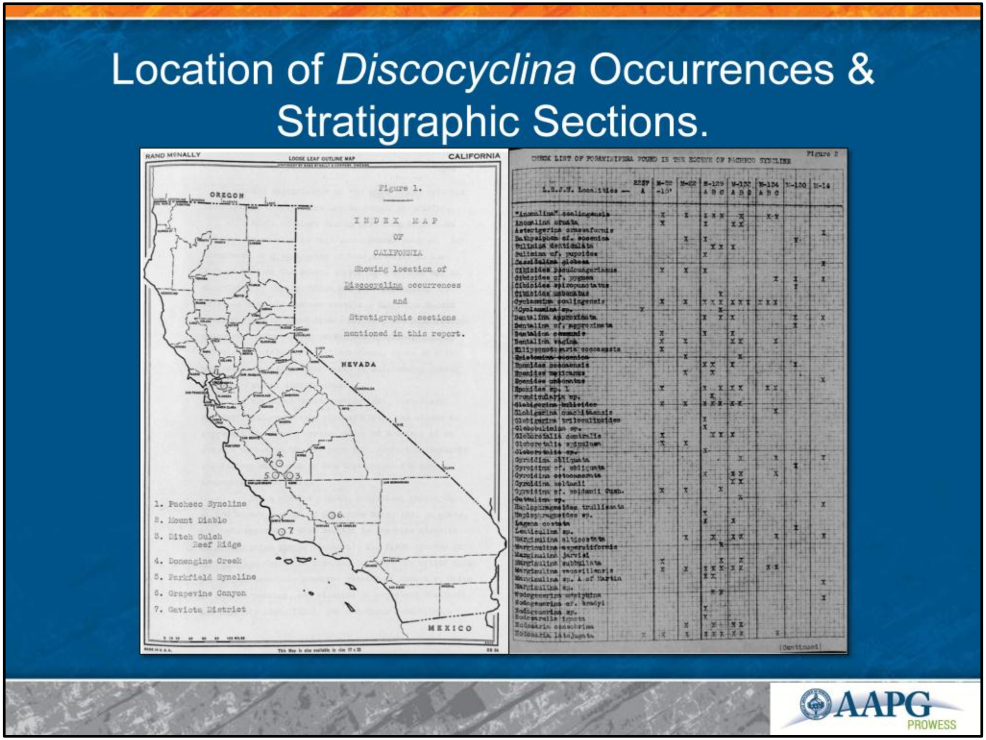
- Identified and described, *Discocyclina (Pseudophragmina) clarki* (Cushman) new var.





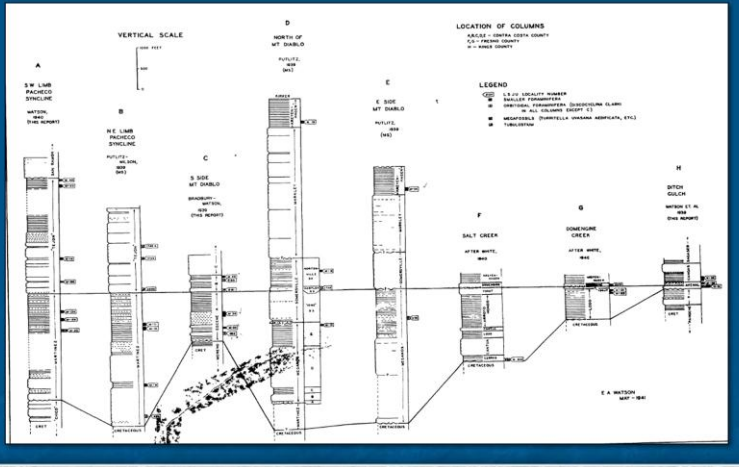


Presenter's notes: In Liz's thesis, she identified and described, for the first time, a new species she named *Discocyclina (Pseudophragmina) clarki* (Cushman) new variety.

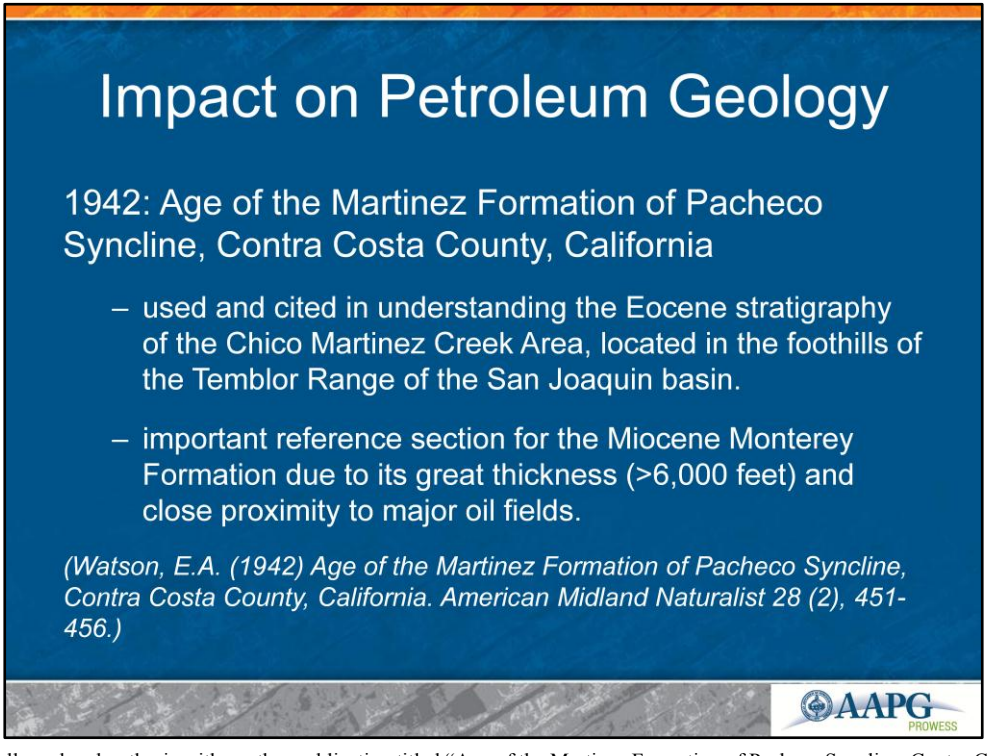


Presenter's notes: Liz painstakingly cataloged the occurrences of *Discocyclina* at several sites in Western California. The image on the right contains her compilation of data from seven sites over six counties including: Contra Costa, Fresno, Monterey, Kings, Kern, and Santa Barbara.

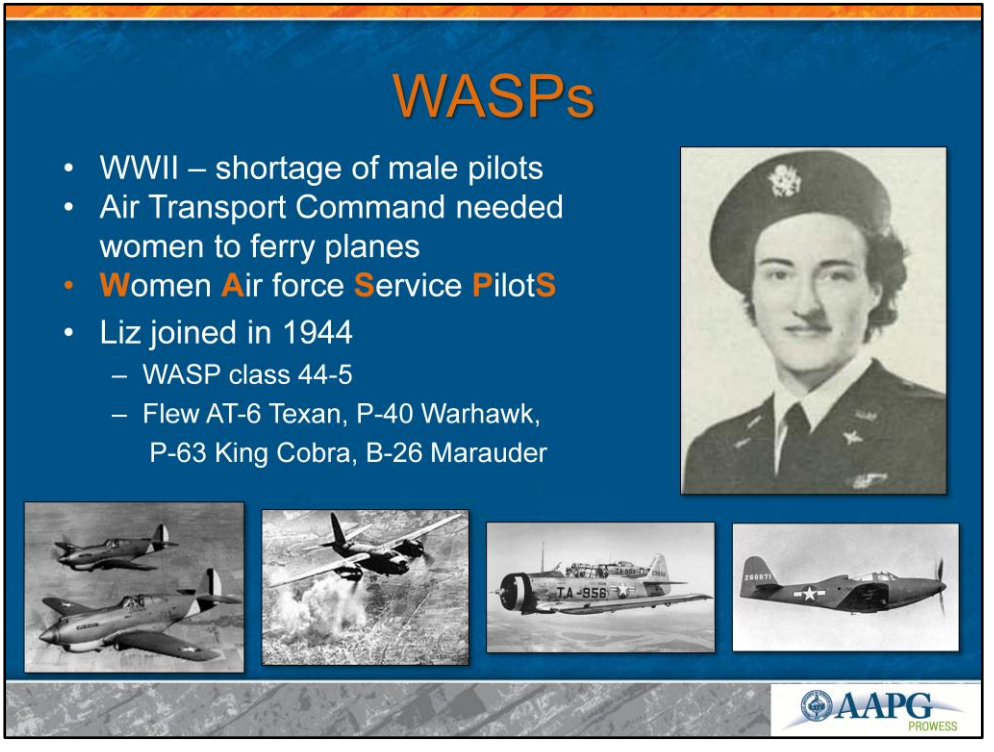
Correlation of California Eocene Sections Showing Stratigraphic Relations of Strata with *Discocyclina*



Presenter's notes: Elizabeth then used the relationships she observed and documented in the field to correlate the Martinez Formation from several important Eocene sections to determine the relative age of the discocycline-bearing beds. She was able to confirm the lithostratigrapic interpretations of previous studies and bring to light some additional localities for potential stratigraphic revision.



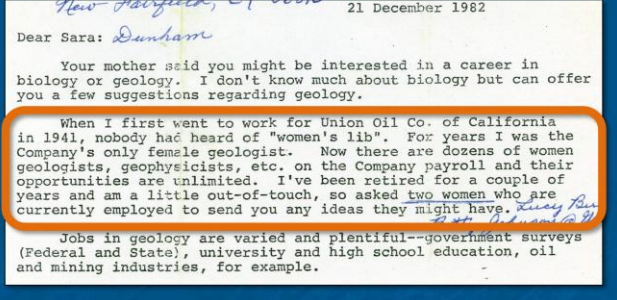
Presenter's notes: Liz followed up her thesis with another publication titled "Age of the Martinez Formation of Pacheco Syncline, Contra Costa County, California." This work was used and cited in understanding the Eocene stratigraphy of the Chico Martinez Creek area, located in the foothills of the Temblor Range of the San Joaquin basin, and it is an important reference section for the Miocene Monterey Formation (that the first author works in) due to its great thickness (>6,000 feet) and close proximity to major oil fields.



Presenter's notes: As WWII was amplifying, there was a growing demand for male combat pilots and warplanes; this left the Air Transport Command (ATC) stretched to fill a shortage of experienced pilots to ferry planes from factories to points of embarkation. As a result, for the first time, women were recruited and trained as qualified pilots to ferry military aircraft. These outstanding women pilots ultimately became known as the Women Air force Service Pilots (WASP). Fearless Elizabeth heard the call of duty, taking a sabbatical from her petroleum career and joined these ranks in early 1944. These are photos of some of the planes Liz was responsible for flying.

Post WWII

- 1945 – Returned to Union Oil
- Late 1970's – Retired from Union Oil
- Mentor to young, aspiring women geologists



21 December 1982

Dear Sara: Dunham

Your mother said you might be interested in a career in biology or geology. I don't know much about biology but can offer you a few suggestions regarding geology.

When I first went to work for Union Oil Co. of California in 1941, nobody had heard of "women's lib". For years I was the Company's only female geologist. Now there are dozens of women geologists, geophysicists, etc. on the Company payroll and their opportunities are unlimited. I've been retired for a couple of years and am a little out-of-touch, so asked two women who are currently employed to send you any ideas they might have.

Jobs in geology are varied and plentiful--government surveys (Federal and State), university and high school education, oil and mining industries, for example.

Presenter's notes: The WASP was decommissioned in December of 1944, as the war wound down and the need for pilots had decreased, moving Elizabeth into the next phase of her life as a Petroleum Geologist. She returned to work for Union Oil Company of California, which was a likely commission for a geologist with a thorough understanding of the rich California oil-bearing stratigraphy.

We uncovered this wonderful letter she wrote. Still mentoring even after retiring. Liz writes to a young woman who has expressed an interest in geology and says: "When I first went to work for Union Oil Co. of California in 1941, nobody had heard of "women's lib." For years I was the Company's only female geologist. Now there are dozens of women geologists, geophysicists, etc. on the Company payroll and their opportunities are unlimited…."

Petroleum Geologist and A True Pioneer

- 1938 – B.A. Geology, Stanford
- 1940 – Oil Co. Stenographer, Bartlesville, OK
- 1941 – M.A. Geology, Stanford
  - 1 of 3 women in Stanford Geology & Mining Society
- 1941 - Union Oil Company of California
  - First woman geologist at Union
  - Paved the way for more women
- 1942 – Published paper on Martinez Formation
- 1944 – Leave of absence to join WASPs during WWII
- 1945 – Returned to Union Oil
- 1985 – died at age of 84 in Fillmore, CA

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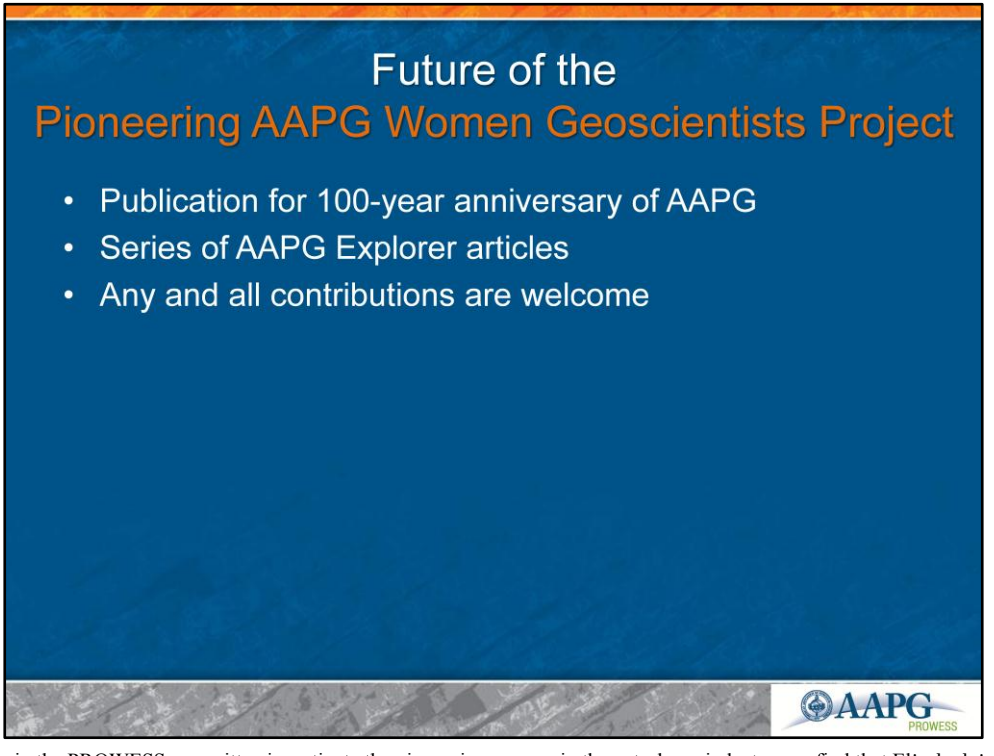
Presenter's notes: Just 3 short years after she wrote the letter we just read, Liz passed away, leaving behind quite a legacy and a treasure for us to discover and unearth, joining the ranks of what we consider to be the Pioneer AAPG Women Geoscientists.



Presenter's notes: As we in the PROWESS committee investigate the pioneering women in the petroleum industry, we find that Elizabeth is joined by dozens of incredible women geologists. Each woman has her own inspiring story and important impact on the science we know today.
You may have come across a few articles written by PROWESS members and published in the AAPG Explorer (such as the first author's article on Emma Summer's, the "Oil Queen" of California who was one of the most significant contributors to the oil boom in Southern California at the turn of the century). We hope for a larger publication of the full set of biographies in time for the 100-year anniversary of AAPG, but in the meantime, keep your eyes peeled for future articles. If you are interested in contributing or participating in this endeavor, we welcome fellow historians.

Thank you


AMERICAN ASSOCIATION OF PETROLEUM GEOLOGISTS
1917
AAPG
PROWESS