

Palmer LTER: Teacher Experiencing Antarctica, January 1998

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Getting a teacher to Antarctica is not an easy task. After all, most expeditions to Antarctica occur during the school year when a teacher is active in the classroom. Moreover, why would anyone want to send a teacher there in the first place? Two National Science Foundation (NSF) organizations—the Office of Polar Programs (OPP) and the Directorate for Education and Human Resources (EHR)—committed to integrating science education and research by joining to send teachers to Antarctica as part of a research team. Since 1992, four to eight teachers, who are intensely interested in developing and using classroom activities based on polar research, have been chosen each year to be a TEA — Teacher Experiencing Antarctica or Arctic (<http://tea.rice.edu/>). Taking into account the teacher's expertise and interests, each TEA is matched with a research scientist. A one- to two-week internship at the researcher's home institution prepares participants for a subsequent field experience.



Figure 1. Besse Dawson adjusting oxygen sample bottles in water baths on the deck of the *Laurence M. Gould* (NSF/USAP photo by D. Karl, University of Hawaii).

Because of Besse Dawson's training in biology and teaching of high school biology and aquatic science, Dr. David Karl in the Department of Oceanography at the University of Hawaii was selected as her scientific mentor. Dr. Karl sent an assortment of abstracts and texts on studies of microbial activities in a variety of ocean regions were sent to give a solid content background in his particular studies. Subsequently, a two-week internship to Karl's laboratory provided the opportunity to discuss the group's research, observe and learn laboratory techniques, participate in design of an experiment and sail on a short research cruise. From this cruise, Ms. Dawson learned not only just how easy it is to get sea-sick but also about the ship-board environment and routine in preparation for an antarctic research cruise.

Dr. Karl is a member of the Palmer Long-Term Ecological Research (LTER) Program. The Palmer LTER conducts annual cruises west of the Antarctic Peninsula as part of a multi-component team effort to understand and document interannual change in the Southern Ocean ecosystem (Smith et al, 1995). The cruises are held during the austral spring to sample the polar system at a time of high water-column activity that coincides with penguin colony reproduction.

During the Palmer LTER January 1998 cruise (Karl and Baker 1998) aboard the research ship *Laurence M. Gould*. Ms. Dawson worked closely with Chris Carrillo, a doctoral candidate working with D. Karl. Dissolved oxygen was measured as an indicator of the productivity of the photosynthetic bacteria in the water. This year was a

low-ice year. Corresponding low levels of dissolved oxygen were found in the water column, except in Marguerite Bay where levels were closer to those found in previous years.

Besides functioning as laboratory technicians, TEAs also perform a variety of teacher duties. Each day a journal entry is sent by electronic mail using the ship's satellite communications so students have rapid access to field news. The messages are sent to an email account from which they are posted routinely to a web page. Digital pictures frequently accompany these transmissions to visually describe the teacher's experience. They are posted in the journal entry as a low-resolution jpeg file to meet file size requirements (<30Kb) imposed because of the restricted time window of satellite communications from Palmer Station. The pictures are also assembled as a separate slide show.

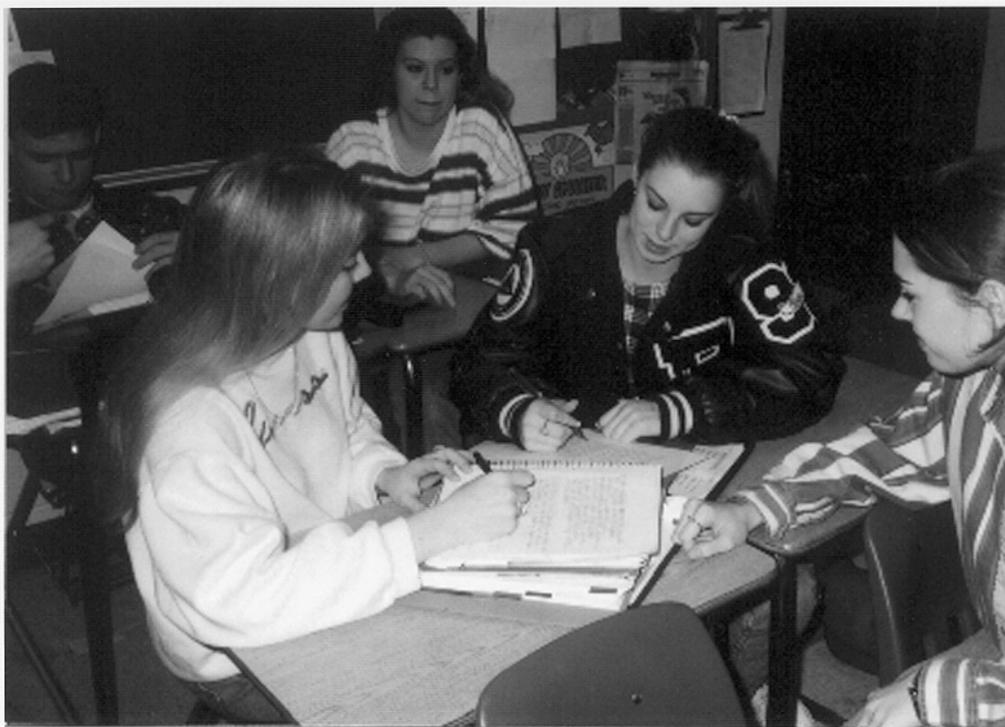


Figure 2: Pearland High School students engaged in Antarctic cooperative group activity (NSF/USAP photo by B. Dawson).

Responses to email questions from students and other inquirers are additional TEA responsibilities. Preparations for these communications often include interviewing research participants from principal investigators to support staff to volunteer undergraduates to better describe what is being studied and why. Interviews with the captain and crew were included to provide alternative perspectives on a research cruise and on how the ship functioned so independently.

Thus, TEAs are lab technicians, journalists, photographers, long-distance support staff for in-class substitutes, and typing encyclopedias for anyone with a question about Antarctica. Long days were not unusual so the extended sunlight in the polar summer is

valuable in sustaining energy. The TEA experience does not end with the return to the classroom. Classroom activities continue to reflect Antarctic research currently being done in the field. Education activities, such as Dawson's "Secret Agent of Dissolved Oxygen" done in conjunction with the LTER researchers, are later developed and incorporate hands-on and inquiry-based approaches backed by strong scientific content. Presenting at conferences such as the National Science Teacher Association (Dawson, 1999) and developing curriculum materials in conjunction with GLACIER (<http://www.glacier.rice.edu/>) extends the awareness to others of studies currently taking place in Antarctica and of how teachers can bring such experience into their classrooms. Students, eager to study about science from such an exotic place, are better able to understand the relevance of polar studies even from this remote area.

The Palmer LTER continues to collaborate with Dawson through TEA teacher involvement in design of future LTER educational outreach activities. Thanks are extended to Dr. Stephanie Shipp who developed Besse Dawson's interest in Antarctic Science through collaborations on educational Antarctic research and to Dr. Wayne Sukow for his advocacy for the TEA program. Specific recognition goes to Dr. David Karl's research team for all their time and training. Thanks go to the entire LTER team, Antarctic Support Associates and ship Captain and crew who supported education as a part of the LTER January research cruise.

Finally, without the continual support from home, both by the Pearland Independent School District in general and by Robert Dawson in particular, this experience and subsequent outreach activities would not be possible.

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References

- Karl, D., L. Quetin and K.S. Baker. This issue. Palmer LTER: Annual January Cruise for 1998 (LMGR98-8; LMG98-1), *Antarctic Journal of the United States*.
- Dawson, B. 1998. On the Ice and Into the Classroom, National Science Teacher Association Meeting, 25-28 March 1999, Boston, Mass.
- Smith, R.C., K.S. Baker, W.R. Fraser, E.E. Hofmann, D.M. Karl, J.M. Klinck, L.B. Quetin, B.B. Prezelin, R.M. Ross, W. Trivelpiece and M. Vernet, 1995. The Palmer LTER: A Long-Term Ecological Research Program at Palmer Station, Antarctica. *Oceanography*, 8(3):77-86.