The Nucleus

Official Quarterly Newsletter of the Texas Association of Biology Teachers

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President's Message:

Greetings! As you will read on the next two pages of this newsletter, Dr. Marla Stone sent her report detailing how the support of TABT for the Kenyan Science Teachers Conference made it possible for 44 participants to have an experience similar to what we take for granted at CAST. Marla did an amazing thing—she provided a two-day conference for 44 participants and 2 facilitators with a budget of less than $1400. (TABT contributed $500 of this amount.) This included lodging, food, and workshop supplies!

Marla provided the kinds of experiences for the teachers that we want all teachers to provide for students. The teachers were very grateful for the support from Texas educators. Here are a few of the comments from their letters—

> "The course that I undertook has surely helped me to fathom much of what I am required to do to help my pupils think, behave and reason scientifically, not just along the line of their academic performance but greatly on their scientific living."
>
> "Sincerely speaking the group benefited from a highly organized, well prepared lessons, involving teachers."
>
> "It is with respect and honour, and with a leaping heart, a smiling face that I say thanks to the American association of biology teachers for deep thought and light they shed on Kenyan teachers through the seminar….thanks to the facilitator-Dr Marla Stone- whose modest and professionalism shall never cease to tire the brains of those she trained. Above all, the seminar not only scratched off the misconceptions held about the study of science but also left many well grounded to teach scientific knowledges and skills …, something that will undoubtedly propel Kenya to meet her long lasting dream of being industrialized by the year 2020."

The 2005 TABT Summer Drive-in Conference for San Antonio will not take place in June as originally planned. Stay tuned for a revised plan to be unveiled soon for a San Antonio conference. We will alert you with the new plan via E-mail.

Speaking of E-mail, if you received this document by snail mail it means that Alton Biggs, our Computer Records Clerk, does not have a working E-mail address for you. Please help Alton by sending an E-mail to ***altonb@ix.netcom.com***.

Also you will be sent a notice when it is time to renew your membership in TABT. We ask that you please send your renewal directly to TABT rather than wait and renew at CAST or with STAT. This makes the process much easier for us in TABT and for STAT.

TABT is encouraging members to attend the TAEE 2005 Fall Conference at CAST (Conference for the Advancement of Science Teaching) September 30-October 2, 2005 in lieu of the TABT Summer Drive-in Conference. It will be returning to far West Texas, in the heart of the beautiful Fort Davis Mountains. During the conference you will have the opportunity to enjoy hands-on workshops in astronomy, archeology, wildlife, geology, birds and native plants and their uses. Check the TAEE website for additional information.

We are always looking for people to help move our organization forward. Please contact me with ideas (or to volunteer!).

Anita Gordon, TABT President
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In this issue ...

TABT Cosponsors Conference in Kilimambogo, Kenya

The Texas Association of Biology Teachers cosponsored a workshop in Kilimambogo, Kenya on March 15-17. The event took place at a vocational school in a semi-arid region about 70 km northwest of Nairobi. Dr. Marla Stone, Conference Director, happened upon the location while on an outing over Christmas. She thought this would be a perfect location for the conference of her dreams. Dr. Stone chose this location because the grounds are lovely and safe, there is a large conference room, and the school could easily accommodate the group and provide 3 meals a day - all for 900 shillings ($12 per person per night).

The participants included 44 elementary and middle school teachers. The topics, handouts, and materials all matched the Kenyan curriculum. The Kenyan curriculum is completely devoid of any mention of the process skills, so Stone focused on the science processes of classifying, inferring, predicting, controlling variables, etc. The content of the curriculum is very heavy into health (particularly HIV/AIDS) and agriculture (i.e. plant topics are weeds and crop pests), but she managed to find activities for every level that would meet their legitimate science topics. In addition Marla dealt with some instructional strategies like group management, questioning skills, using graphic organizers, and a tiny bit on alternative assessment.

Marla Stone taught for 31 years in elementary, middle and high school, and university levels. She began as a Peace Corps Volunteer in Jamaica in the early 1970s. For 8 years, Marla was a teacher and science supervisor in Aldine ISD in Houston. She has done staff development for teachers for over 20 years, 7 of which were as Senior Science Consultant at Region 10. As a swan song to education and to prove to herself that she could do it, Marla spent her last two years in education teaching high school biology (10th grade and AP) and environmental science in an American system school in Nairobi for children of missionaries. For the last two years she has been a businesswoman, designing study abroad programs in Kenya for North American professors and their students.

story continued on page 3

This photo of one of the groups who participated in the workshop illustrates that the grounds of the vocational school were condusive to learning.

Teachers in the workshop paid close attention to the process skills and levels of questioning that were emphasized.

Dr. Stone arranged for matatus (public vans) to pick up the teachers at a central school and bring them to the event's location. The Standard 1-5 teachers arrived at 6:00 Tuesday evening. After settling in the dorms and having dinner, they did an evening session from 7:30-9:30. A Wednesday morning session started at 8:00 and went straight through till 4:00, at which time they boarded the matatus back to Nairobi. At 5:00 The Standard 6-8 teachers boarded the same matatus and the timetable started over again for them. In total each group had over 9 hours of professional development, thanks to you!

Of the event Marla said, "The participants were a dream audience. They were so excited to be getting a night out of Nairobi, and were even more excited when they learned that they weren't going to be sitting through hours and hours of lectures. On a whim at the close of the first evening, I asked the Standard 1-5 teachers if what they had experienced so far was what they thought they would be doing. Almost in unison they responded that they had expected to be sitting taking notes for a boring lecture, which is what professional development usually means here. Instead they were involved in hands-on, minds-on activities and were so grateful for the opportunity. I posed the same question the next night to Standard 6-8 teachers and go the exact same response. I would describe them as little birds with their mouths open, hungry for any morsels about science teaching that were offered. In the evening they stayed till 10:30 asking questions, during the morning tea break they went through books that I had brought, during lunch they compared notes with each other. It was truly the most receptive audience I have ever had! I have the distinct feeling that real changes will occur in their science classrooms. And, their headmasters are expecting them to share what they have learned with their colleagues, so the cascade effect could be substantial."

Stone went on to say, "For now I just want to let you know that what may be the first-ever MiniCAST outside Texas and the US has happened on the African continent! You have allowed me to fulfill a dream I have had since I worked here in Kenya in 1993 - that of offering to Kenyan teachers the kind of effective professional development like that I have been privileged to experience, and that has had so much influence on me as a teacher. Thank all of you in the Texas Association of Biology Teachers from the bottom of my heart!"

The photo above illustrates the working setup that the participants had in the workshop. You can be proud of the accomplishments of the group that your dues helped to provide.


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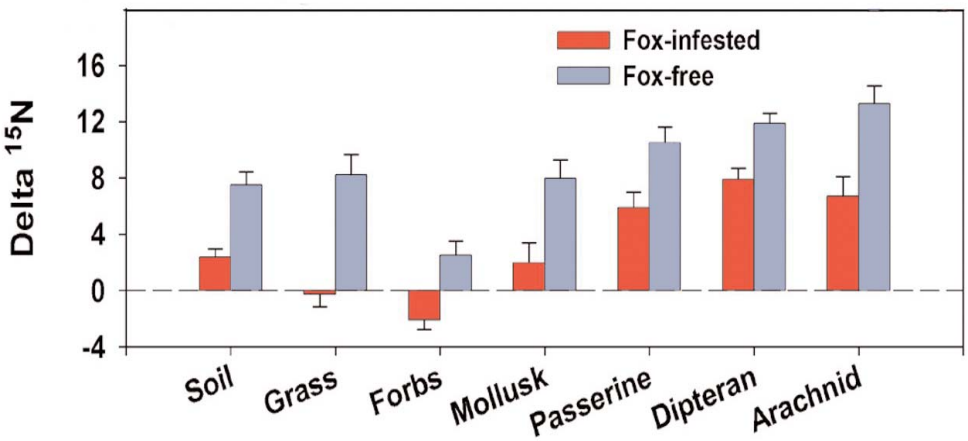
Read the excerpt below and answer the questions that follow.

Interpreting Graphic Data: ***What is the effect of the introduction of arctic foxes in Alaska's Aleutian Islands?***

Top predators often have powerful effects on prey populations, but whether these effects propagate to the base of terrestrial food webs has been debated. Few examples of trophic cascades strong enough to alter the abundance and composition of entire plant communities exist. The introduction of arctic foxes (*Alopex lagopus*) to the Aleutian archipelago has induced shifts in plant productivity and community structure via a previously unknown pathway. By preying on seabirds, foxes reduced nutrient transport from ocean to land, affecting soil fertility and transforming grasslands to dwarf shrub/forb-dominated ecosystems.

The figure below shows the stable nitrogen isotope (^{15}N mean ± SE) analyses of soils and a suite of common species across trophic levels on fox-infested (left bars) and fox-free (right bars) islands.



Breeding seabird densities were almost two orders of magnitude higher on fox-free than on fox-infested islands. The introduction of foxes to the Aleutian archipelago transformed the islands from grasslands to maritime tundra. Fox predation reduced seabird abundance and distribution, in turn reducing nutrient transport from sea to land. The more nutrient-impoverished ecosystem that resulted favored less productive forbs and shrubs over more productive grasses and sedges. This observation bolsters the view that the flow of nutrients, energy, and material from one ecosystem to another can subsidize populations and, importantly, influence the structure of food webs. From the observations, it is clear that predators, by affecting herbivore populations and altering the intensity of herbivory, can ultimately influence plant production at the base of food webs.

Source: D. A. Croll, J. L. Maron, J. A. Estes, E. M. Danner, and G. V. Byrd, "Introduced Predators Transform Subarctic Islands from Grassland to Tundra," *Science*, Volume 307:5717, 25 March 2005, pages 1959-1961.

Analysis

1. What was the approximate percentage decrease of ^{15}N in the soil on islands that were infested with foxes as opposed to those that remained fox free?
   A. 2%
   B. 25%
   C. 50%
   D. 75%

2. In which populations did ^{15}N isotopes show the greatest percentage decrease after the introduction of foxes?
   A. Arachnid
   B. Dipteran
   C. Grass
   D. Mollusk

3. What were the observed differences in vegetation populations?
   A. There were increased populations of grasses on islands with introduced foxes.
   B. There were decreased populations of forbs on islands with introduced foxes.
   C. Islands without foxes had higher sedge populations than those with introduced foxes.
   D. Sedges decreased as forbs increased on islands with introduced foxes.

4. Which of the following experiments might provide additional evidence that the predation by foxes was the primary cause of vegetation changes after their introduction?
   A. Experimentally add nutrients to a community representative of fox-infested islands to see if the original vegetation densities return to near normal.
   B. Experimentally remove foxes and seabirds on fox-infested islands to determine the effect on further vegetation densities and differences.
   C. Experimentally measure nutrient subsidies transported by seabirds onto islands infested by foxes and islands that are free of foxes.
   D. Experimentally grow vegetation common to both communities under a differing temperature and moisture regimen to observe changes in the community structure.

5. What indirect effect did the introduction of foxes have on vegetation?
   A. Fox populations were high enough to trample and kill the vegetation.
   B. Vegetation communities changed as foxes consumed seabird populations.
   C. Foxes decreased herbivory on islands eating nesting seabirds.
   D. Foxes indirectly increased the density of grasses on islands.

Answers: 1. D; 2. C; 3. D; 4. A; 5. B
Pages 5 and 6 is a “real world” (as if there was another kind of world) data based activity by Alton L. Biggs that can be used when studying the nitrogen cycle or for standardized testing.

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Texas Association of Biology Teachers

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7. I am also a member of (**Check all that apply**): ___National Association of Biology Teachers (NABT)

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