



# IMPRINTS FROM THE PAST: STUDYING PALEOBIOLOGY AT CTY by Theo Faugeres

I have always marveled at the Earth's ancient beings and phenomenon, from mass extinctions to the giant invertebrates that temporarily ruled the Earth hundreds of millions of years ago. My paternal grandfather encouraged my interest by bringing me fossils from his travels, including ammonites and small fossilized fish. He also introduced me to lesser-known points of interest in the Earth's history, such as the Devonian period with its colossal armored fish.

In addition to earth science, I was also interested in biology and, in middle school, in geology. Thus, it was no surprise to my parents when, after reading through the CTY Summer Programs catalog as a rising ninth-grader, I chose paleobiology as my top pick. The course focused on the study of ancient life, the process of fossilization, and the relationship between past and present as demonstrated by ancient life.

A couple weeks before the program started, my family and I traveled from Brazil to California. Eager to get a jump start on the subject matter, I bought a dinosaur encyclopedia from the California Academy of Sciences in San Francisco. Of course, I had read books about dinosaurs before, but most of those were when I was a child,

and then it was to view the pictures of dinosaurs and the impressive statistics. I would look at the sauropods' huge height and squeal in delight, or at an image of a predatory theropod such as the *Carnotaurus* and then lie blissfully awake in bed, unable to sleep. This time, I managed to promptly consume the 300-page book, analyzing every word, taking notes, and developing parallel theories—all prompted by my anticipation for the upcoming course.

## **In With the Old**

At Loyola Marymount University, CTY classes were held morning and evening. The materials we covered in class came to life through labs. During a functional morphology lab, we evaluated the efficiency of the morphology of an organism relative to the function of its traits. For example, we evaluated the running capacity of a *Tyrannosaurus rex* by learning the proportionality of its leg muscles to its bulk. In a mammal lab, we observed mammalian skulls, including their tooth structures and jaw muscle attachments, for clues to their dietary adaptations. For example, the anteater has no teeth, and its oral opening is only large enough for its tongue to flick out to collect

insects. In contrast, the bobcat's powerful jaws and teeth would be good for tearing and gnawing meat.

During evening classes, the teachers chose a single organism, such as the dodo bird, to introduce in depth. While all of the classes proved extremely fun and informative, these individual cases deepened our understanding of the larger themes we were learning about.

Project-based work allowed us to explore topics in greater depth. My favorite project was when, given data about an isotope of oxygen and a global temperature range, we had to deduce many other facts about the Earth, including the time period in which these conditions were likely to have occurred. For example, a particular oxygen isotope would be found in greater quantities in seas during colder periods on Earth because reduced precipitation during these periods made it less likely to evaporate. The project, which had the appeal of a puzzle, helped us understand the relationships between particular isotopes and environmental conditions.

For our final project, we were paired off with a partner, given a box with thousands of miniscule teeth, shells, and other tiny fossilized remains, and instructed to organize them in any order or by any criteria we deemed appropriate. Now, seeing as I was content just to look at those tiny serrated teeth, I was delighted to be able to organize them in an order of my pleasing.

My partner and I embarked on an hour-and-a-half-long journey to organize them by type—such as ray teeth, shark teeth, and assorted shells—and then further organize the teeth by size. To determine whether we were looking at multiple teeth or multiple pieces of the same tooth, we carefully observed the symmetry of the teeth. On paper, the final result was a few columns listing shark and other teeth, as well as lists of items such as shells that fit in other categories. Some simply hadn't been sorted yet, as the time was up (and, in my opinion, I may have been too meticulous in my categorizing!). Even if it was incomplete, however, my partner and I had been able to apply some of the knowledge we gained from our lessons on taxonomy (the classification of beings) in this hands-on project.

### Science at Work

In addition to classwork and project-based work, we also went on field trips. At the La Brea tar pits, we visited sites where mammoth and saber-tooth cat specimens had been extracted. We also witnessed scientists at work removing the matrix (the “non-fossil” stone) from around a fossil. This provided us with a firsthand glimpse of the potential bounty hidden within the matrix block and hinted at the



Earth's bigger bounty. When we visited the Raymond M. Alf Museum of Paleontology, it was interesting to see the extensive collection of fossils and the degree to which students were involved in research. It showed me that anyone can pursue research, honing their skills progressively.

**T**he instructors' enthusiasm for the subject matter, the peers I met from all over the world (China!), and the jolly class environment made the whole program interesting, and the occasional well-placed joke by both students and teachers made it fun.

I left the program having obtained a greater respect for the Earth and a new appreciation for the vastness of geologic time, along with an immensely bolstered interest in the world around me. The variability of the Earth over time left me thinking how lucky we are to be living in this period—where we as humans were able to successfully settle into an ecologic niche and, within the short expanse of our species' existence, prosper.

I don't yet know whether I will pursue further systematic study of the Earth and its inhabitants, but I do know that the doors of the world are wide open if I choose to do so. ■



**Theo Faugeres** is a ninth-grader at Graded, the American school of São Paulo in Brazil. He is an avid water polo player and enjoys writing poetry and reading non-fiction in his spare time. He also loves to study languages and hopes to learn the classical tongues in the future.

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