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2011 Two-Week Intern

As I walked into the room, I was struck by how cold it was. The air stung my lungs as I breathed it through my air filter, especially after the nice July warmth outside. The stark contrast in climate gave me pause, but I shuffled further into the room towards the lone table, past the various machines and deadly sharp instruments that gleamed under the fluorescent lights. I could not take my eyes off the shape sprawled across the table in the center of the room. As I approached the dark outline of the creature, it became apparent that it was a seal. A baby seal no less, its life cut short by some as yet unknown force. In fact, that was why we were here. We were going to figure out what killed this animal: this was my first necropsy.

For my graduation challenge, I interned at the Woods Hole Science Aquarium in Woods Hole, Massachusetts. With twelve other interns, and under the tutelage of George Liles, my Community Consultant, I explored the world of oceanic aquariums and marine biology.

During my two weeks at Woods Hole, we interns assisted with, and performed, a variety of activities ranging from this seal necropsy to animal training to running the aquarium.

In this paper, I will describe my experience as a high school intern at the Woods Hole Aquarium. My description will include my participation in the daily upkeep of the physical plant of the aquarium, the lessons I learned about the fundamentals of the animal-training process, and a necropsy that I was fortunate enough to witness. In the midst of all that, if I learned anything, I learned that there really is no such thing as a “typical day” at an oceanographic aquarium. It’s a busy place.

As a high school intern, I did have a “typical day.” It consisted of waking up at seven o’clock in the morning in order to get to the aquarium by eight o’clock. Upon arrival at the aquarium I, and my fellow high school interns, received our instructions about the day’s

activities. These instructions came from college interns, who directed us to the daily seminars and/or oceanographic wildlife field trips we would attend. Once we were done with the internship for the day, all the interns would hang out as a group. I didn't get back to our house until around nine o'clock at night every day. Over the course of those two weeks, I did seventy hours of work at the aquarium, covering a wide variety of topics. These activities can be broken down into tending to the physical plant, caring for the animals, and public relations.

Woods Hole Aquarium was established in 1875 by Spencer Baird, the first U.S. Fish Commissioner. Baird's vision was that the aquarium would support "fisheries research and educating the public about marine life and marine science" (Woods). To this day, Baird's vision, and the tasks required to realize it, keep the staff of the aquarium very busy.

George Liles, the aquarium curator, is the person in charge of facilitating the education of the public.

"It depends on the time of the year, if it's summer time a typical day [includes] looks like I come in and launch right into activities with students; all day long, I do things with students...workshops, field trips, taking the public collecting, and just doing educational activities with students all day long. If it's a typical day in the winter it's different" (Liles).

The winter work at Wood's Hole is highly affected by the change in the local climate. There are fewer visitors, including school field trips. "Sometimes we have students here in the morning, so I teach during the morning and I do program planning in the afternoon. Other times I do program planning all day long" (Liles). George's focus is on educating the public; he enjoys this aspect of his job more than any other.

While George deals with the public, Kristi Owen maintains the aquarium's resident animals and their environments. Kristi is a marine biology major, with a Master's degree in Environmental Science and Policy, and a former Marine. While in the Marines, she became interested in sea turtle rescue and has stayed in the field of marine animal care. A typical day

for her at Woods Hole Aquarium begins at eight in the morning with a check on the main water systems for each tank housed in the aquarium. Each system has a different temperature requirement based on its inhabitants. “The Woods Hole Science Aquarium is lucky to have the ability run our systems ‘semi-closed’” (Owen). It draws water in from the harbor to be filtered, then heated or cooled, and finally pumped into the tanks. There are four different systems, each of which has its own specific temperature. The “cold-water system” must be kept between 43 degrees Fahrenheit and 53 degrees Fahrenheit. The “temperate system” is maintained at around 63 to 70 degrees Fahrenheit. The “tropical system” requires a steady temperature of 74 degrees all year. Finally, the last system is the “seal pool,” which is a closed system. Water is drawn in from the bay, filtered and pumped into the tank, but only enough to maintain the required level. As a two-week intern, I did not participate in the water temperature maintenance, although I did accompany Kristi on her rounds a couple of times.

Kristi also has the vital job of feeding the tanks’ inhabitants. “Each species in the aquarium requires a special diet, and the animals are fed on a particular schedule” (Higgins). Different animals have different feeding habits; some require more human care than others. For example, I was occasionally given the responsibility of ensuring that the less aggressive fish and lobsters received their meals. This entailed holding that species’ food-stuff directly in front of their mouth on the end of a tool that resembles a long, thin fork. Patience is required, as sometimes it doesn’t dawn on the fish that it should eat. Additionally, if the food falls off the fork, it must be retrieved, for if it is left in the tank, the food will simply rot and become a pollutant to the tank environment.

There is an ongoing interrelationship between feeding the animals and maintaining the environments in which they live. The tasks that comprise an aquarium employee’s day are defined by this interrelationship. For example, the seals are never fed until all the water-systems (cold, temperate, and tropical) are checked in the morning. They are fed again at four

in the afternoon, just before the afternoon check of these same systems. All the animals are fed on Tuesdays and Fridays. On Mondays, Thursdays, and Saturdays, the smaller fish are fed again while the larger fish are not.

From Monday through Friday, the touch tanks must be attended to by aquarium staff during the hours it is open to the public. This job was one that I enjoyed greatly. It was satisfying for me to see the way the little kids love to touch the sea creatures (especially the feet of the star-fish, which have a suction effect on the kids' fingers). I also enjoyed having expertise to share with the public when they would ask me questions about the various sea creatures in the tank. While at the touch tanks, I felt like I was living out Spencer Baird's vision for one of the main purposes of the aquarium: "Educating the public about marine life and marine science" (Woods). One of my favorite questions from the kids at the touch tanks was, "What's that little orange dot on the starfish for?" I had been prepared in advance by college interns who had fielded the question before me: the orange dot is the organ called the madreporite; its function is to draw in water, and pump it throughout the sea star's body, creating suction in each of its hundreds of feet. The touch tanks also contained two tautogs (an easy going bottom-feeder fish that lay still enough for the kids to touch it), horse shoe crabs, sea urchins, and whelks (commonly known as sea snails). There are two species of whelks, both of which grow as large as a football. Whelks are edible, and are a regular food item in many places throughout the world, from Australia to Hawaii. Their shells are favorites of sea shell collectors, but also can be used to identify the type of snail that lives within. I was ready to provide this type of information from the education we got in the many seminars we attended and the readings that were our "homework" each day.

While attending to the tourists at the touch tanks was fun, my favorite part of the entire internship was working with the two harbor seals, named Bumper and Luseal, that live at the aquarium. Getting to know these creatures, and learning about the techniques used in

training them, was amazing. Rachel Metz, who was the animal trainer during my time at the aquarium, taught us about some of the basics of animal training. The first (and most important) aspect was positive reinforcement. Positive reinforcement is “a way of teaching that uses a positive stimulus to strengthen or increase the probability of a specific response” (Metz). In the case of seals, the positive reinforcement was the fresh fish and verbal praise the seals received after successfully completing a task.

To help us understand how and why positive reinforcement is successful, Rachel had us do an activity where she walked a high school intern through the same process that she uses with the seals to teach them a new behavior. She selected one of the interns and had him kneel next to her, and then touched his hand with a stick that had a red ball on the end. After she touched his hand, she rewarded him, using M&Ms instead of fish (a more appropriate reward for this particular species). By providing positive reinforcement, the trainer solidifies the idea that touching the red ball is good to both the seals and the interns. This process was repeated several times, and then she held the stick a few inches from the intern’s hand. Instinctively, the intern moved his hand to the red ball so that he would be rewarded. Now that the intern (or seal) knows that touching the red ball results in a reward, it will seek to do this. Once Rachel cemented the connection between “touch the ball” and “get a reward” in the intern’s (or seal’s) mind, she began to pull the ball beyond his reach in repeated small increments. Soon Rachel was able to get the intern to raise his arm and wave. That is the exact process a trainer uses to teach an animal an action. However, there is a difference between the interns and the animals: with the intern, this process took several minutes to accomplish; with the animals, it is a whole different and much more time consuming story.

Rachel described her experience with training sea creatures as similar to a classroom teacher’s experience, since it takes longer for some lessons to sink in than others:

“I will say that being an animal trainer takes a lot of patience. With sea lions, I’ve seen behaviors, for example a head shake ‘no,’ learned in a matter

of days. I've also seen behaviors learned over the course of a year or more. These include more complex behaviors such as swimming to a rock, retrieving a specified object, taking the object to a specific location and then returning to the trainer" (Metz).

Training is a long and difficult process that varies from animal to animal and from trainer to trainer. I was allowed to learn about animal training with one of the aquarium's star pupils, Bumper. I'm not sure who was teaching whom, but by the end of our time together, Bumper would jump through a hoop that I was holding, and would bump his nose against my closed hand as if he were 'giving me a kiss.' Bumper has mastered many tricks over her years at the aquarium, and is a terrific showman. Training the animals requires patience and skill to accomplish, but it is well worth it in the end. The look on the crowd's faces when Bumper and Luseal perform at shows, as they jump through hoops and splash water onto the front two rows of the audience, was priceless.

Although learning about training the seals was interesting and fun, it did not teach me much about the physiology of the animals themselves; that would come with what we did next, a necropsy. A necropsy is the same as an autopsy, "the examination of the exterior and interior of a body after death" (McQuillen). However, the term "necropsy" specifies that this procedure is being performed on a dead animal rather than on a human corpse. The purpose of a necropsy is the same as an autopsy, to "determine the cause and manner of death, to observe changes produced by disease and therapy, to confirm or deny clinical diagnoses, and to advance medical knowledge" (McQuillen). I was fortunate to be located at one of the most advanced facilities in the United States to witness this event.

On that day, we examined a seal that a fisherman had found in his net. Our guide, a veteran at necropsies, informed us that the cause of death was most likely the seal had drowned in the fishermen's nets. Yet the purpose of a necropsy is to be certain, so with a practiced hand and a methodical process, our guide cut the seal apart, examining every major organ for signs of damage or hints about the cause of death. He immediately found it when he

cut open the lungs, for they still contained sea water. The technician had been correct, the seal had drowned. To this day, I can still feel the knot in my stomach and I still cringe when I imagine the sound of the seal's cheeks being cut away, and the crunch of its jaw being torn open, by the marine biologist who performed the necropsy. As discomforting as that was, it is important to determine the cause of death, natural or unnatural, of animals that are found dead in the Woods Hole oceanic environment. These necropsies allow scientists to keep tabs on the health of the various populations, and to identify problems in the environment such as pollution, infectious diseases, or the intrusiveness of humankind.

As a senior in high school, the time for decisions has come. What will be the nature of my participation in my own environments as I go out into the world? Is marine biology a path I want to pursue? If so, which of the many jobs that I witnessed at Woods Hole would I want to take on as my own career? These decisions will greatly affect the rest of my life. I have always been interested in marine life, and this internship gave me an amazing preview of what it takes to become a marine biologist, as well as what it takes to cope with doing that work. If I had to choose now, I would say that being an animal trainer is what I find to be most appealing: it is the sort of job that would make me look forward to getting up and going to work every day of the week. Kristi's job, taking care of the animals and their environments, would also be something that I would enjoy. Though I found the necropsy interesting, it was not something I can see myself doing. Overall, I learned a great deal, and most importantly, I gained the knowledge that this was something in which I am truly interested. With this new found certainty, I can be pretty sure that choosing a marine biology major in college is the right path for me and for my future.

Overall the internship was one of the most worthwhile things I have ever done in my entire life. Working with the seals and taking care of the marine life was amazing. During my Graduation Challenge project, I learned a great deal about marine life and how it's cared for

in an environment such as Woods Hole. Even more, I learned a great deal about myself and how I respond to the different kinds of jobs that are available at an oceanic aquarium. It gave me a perfect window through which to see one path of the many that my future may contain. If I become a Marine Biology major, I am excited for the new experiences and opportunities that college will bring, whether they are as joy filled as training seals or as otherworldly as a necropsy.