The Geologist: Past, Present, Future

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Introduction

I had never seen a well log before the day I walked in the door at Amoco. Although I grew up in the middle of a major oil field, my education had not included a course in petroleum geology. The petroleum industry has frequently expected trained petroleum geologists to be ready for hire from the university when the company needed one. That is not a practical expectation nor is it necessary. As cycles occur in the industries that employ geologists, there is a need for flexibility on the part of the student, academic institution, and employer. What should a graduate in geology know to be prepared for a career? What will that career be?

Predicting future trends in the geological profession is easy; trends will be erratic. Historic trends in employment, in enrollment, and in numbers of degrees granted document cyclicity. The question is how do we, geologists, companies, academic institutions, effectively manage the cyclicity of our profession? Several sources were used to develop this background information including the AAPG Annual Survey of University Geology Departments, the American Geological Institute, and various meetings on geological education and careers. Many of the conclusions in these comments are my personal opinions.

Our profession, geology, is subjected to the cyclicity of several industries that employ us and, to a degree, industries that support research and education in geological sciences. The traditional employers (petroleum, mining, environment/hydrology/engineering, academia, and government) experience changes in hiring levels relative to markets and politics. Opportunities in petroleum and mining geology are driven by markets and policies that are usually impacted by global issues, environmental geology is driven by government regulations, and other areas by diverse issues. Through time, through, new graduates with degrees in geology will be necessary in all of these areas. The big questions are:

1. How many graduates and at what degree level will be adequate?
2. What kind of education should these graduates receive?

Observations and Recommendations

Undergraduate Education

My opinion is that there can never be too many undergraduates in geology. An undergraduate degree in geology, especially from a liberal arts institution, should be considered as an excellent background for a broad spectrum of careers beyond geology. This is no different than many other areas of study (like English or history). Individuals receiving a degree in geology with a sound education, ability to communicate, an understanding of the scientific method, and an appreciation for the earth and its process, will be able to pursue a variety of career options ranging from attorney, member of the diplomatic corps, law officer, congressman, rancher, primary or secondary school teacher, insurance agent, mystery writer — to name a few. At the very least, the result is an educated voter. (I recently visited with a guy who had graduated from college with me. He had a double major in geology and music and is now a doctor and avid fossil collector!) Therefore, our society should continue to encourage young people to study geology and other sciences at the undergraduate level. Care will be needed for realistic career counseling as these undergraduate students contemplate their future.

If a student does plan to pursue a career in geology, the best possible curriculum would be one that provides a strong, well-balanced foundation in the principles of geology. Specialization is not appropriate at the undergraduate level. An incoming college student generally has a minimum of six years of college-level studies, i.e., a Master’s degree, before contemplating a career position.

Graduate Education

A Master’s degree will continue to be the degree of preference for most of industry. I strongly feel that the major value of this degree is the thesis. It is an opportunity to practice what will be expected of the student once employed: figuring out the problem, what you need to address the problem, doing the integration, and communicating the results of your work.

What should that student learn while working for a Master’s degree? First of all, the student should continue to gain a sound, comprehensive geological education that began at the undergraduate level. The student should not become so limited in scope as to prevent flexibility in career opportunities in geology. A student should be encouraged to work on a thesis topic that is of personal interest because the student will learn more in the process and probably do a better job.
We have many successful geologists in the petroleum industry who have completed thesis topics ranging from planetary geology to metamorphic geology to environmental controls on coral growth rates. Murray Hitzman, Head of the Geology and Geological Engineering Department at the Colorado School of Mines, recently told me that oil companies were hiring graduates from the Economic Geology program because of their success with the companies. This is at a time when mining companies have dramatically cut their own hiring programs. It is not mandatory for a student to do a subsurface thesis to be qualified for a position in the petroleum industry. These same concepts apply (or should apply) to other industries and the students they hire. The important lesson is to gain the ability to identify a problem, conduct research, and document the results of the work – practice for real life.

A PhD will continue to be required for academia and most research positions. This is, of course, a level at which specialization is important. This also is the degree that is the subject of much of the controversy regarding the appropriate number of degrees that our universities should be granting in most areas of study. At times a significant number of new PhD graduates end up in post-doctoral positions with only modest hope of a meaningful long-term, career position as new PhD’s continue to increase competition for the limited number of positions.

How the system can balance the number of advanced degrees granted with the number of opportunities for employment is beyond the scope of these comments but should continue to be of concern for our profession.


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My Pathway to Geology - Exploration, Development and Production

By Richard Powers, CPG-06765, AIPG National President

Upon entering Boston University (BU) in the fall of 1970, the future was bright with the notion of pursuing a degree in biology and ultimately attending one of America’s great veterinary schools. After performing miserably in BU’s pre-med “weed out” course of inorganic chemistry and getting completely discouraged with the extremely dedicated and brilliant (they will tell you that) pre-med students a course correction was warranted. As an ocean-loving northeastern coastal kid, marine biology looked good and became the “new” focus of my second year in college.

Have you ever spent two weeks looking at the radiolarians and dinoflagellates of Narragansett Bay? Beautiful, but boring and of no economic interest. Next—zoology. The final exam – a laboratory filled with dead vertebrates that had been slit opened in various places. Each opening had a small, numbered pin stuck into a tiny organ and I was supposed to identify the “pinned” object. 100 pins – I passed but this was not my calling. (I have always wondered which TA was given the job of making all those little numbered pins). Lastly, genetics—taught by a German professor who was a remnant of the Third Reich. All this, plus the disturbing fact there was little work for marine biologists in the early “70s”, resulted in yet another course change.

Enter my buddy Bill, “Hey, you should check out this geology course I just took.” OK, I enrolled in physical geology 101, and Dr. C. Wroe Wolfe taught the course. A towering geologist in his early 60’s with a passion for the earth and its solids, liquids and gases that amazed and energized me. In addition to Dr. Wolfe’s motivational lectures, the people majoring in geology appeared to be normal human beings that appreciated deep discussions of life and earth at the local pub and loved to go on weekend field trips. This was just to good to be true—I was hooked.

Physical geology, mineralogy (taught by another amazing professor, Dr. Ed Geith), geochemistry, seismology, hydrology, sedimentation and stratigraphy, optical mineralogy, etc, and the best of all, six weeks of field camp in Maine mapping hard to find outcrops and fighting black flies and mosquitoes with Dr. Wolfe. Probably the best summer of my life—doubled hooked. Was it true that you could be paid to have this much fun? Was it possible to talk in three dimensions and have everyone know what your saying? The answer was a resounding—YES!

That was almost 30 years ago and I have never regretted my decision to be a geologist. During the course of my career I have worked in various capacities with uranium, coal, oil and gas, tar sands, heavy minerals, limestone, sand and gravel, phosphate, bauxite, etc. I have traveled to many interesting places and met numerous great people along the way. My work has always been and continues to be fun and rewarding.

I’m very fortunate that I didn’t end up taking stool samples from dogs and cats on a daily basis!