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The Golden Age of the Geoscientist

Exploration for energy and minerals has followed a cyclic pattern of feast or famine. Post–World War II exploration programs led to a rapid expansion of undergraduate and graduate training in the geosciences, and a large cadre of professional geoscientists subsequently entered industry. But in the mid-1950's, the situation abruptly changed. In the spring of 1956, a colleague in a southwestern university confided to me that, although his department was training 300 undergraduate majors, only two microscopes were available to students. In the fall of 1957, I asked this same colleague how many undergraduate majors had enrolled in his department. His answer: two. What was the reason for such a drastic decline in enrollment? In early 1957, famine had replaced feast in the exploration business. Companies closed exploration offices and laid off geoscientists.

In the 1960's, the employment pendulum swung less dramatically, but in 1973 we entered a new age: exploration efforts in the United States became extremely active, and demand for geoscientists and petroleum engineers climbed steeply.

Ordinarily, a master's degree is considered essential by industry, except for those with bachelor's degrees who are well trained in mathematics and physics and entered the field of geophysics. However, with the steeply increasing demand, even poor students with only a bachelor's degree have found first-rate employment. Good students with master's degrees, especially women and members of minority groups, have special opportunities. They are likely to receive more than five job offers from major oil corporations at salaries ranging from $17,000 to $21,000 per year.

With this frenetic hiring one would think that these corporations could quietly put their geoscientists to work in a creative effort to find more reserves. But the truth is that most geoscientists on the staff of major companies are inexperienced. In one major corporation I know of, almost 80 percent of the geoscientists have less than 2 years of experience. Small exploration companies, known as independents, woo geoscientists away from the major corporations with excellent salaries, bonuses, and fringe benefits. Body snatching is hardly new in the exploration business, but in the past young scientists needed 5 years of experience before they became attractive to independents. Today that period is commonly only $1^1/_2$ years. Thus the major corporations have become the training ground for the independents. Among my students, it is not unusual for 25- to 27-year-olds with recent master's degrees to earn salaries of $30,000 per year plus a free car, gas, repairs, and insurance. No wonder this is considered the golden age of the geoscientist.

The needs for graduate training in the earth sciences, however, are selective. The fields most required include geophysics, stratigraphy, sedimentology, and tectonics. Basic supporting training in physics, chemistry, and mathematics is important. Departments that are strong in the four fields of geology named above have bulging graduate enrollments. Ph.D. training is commonly considered a luxury today because industry wants and needs trained scientists *now*.

In other countries geoscience is still sleepy, but activities are increasing. In the United Kingdom and Western Europe, the fate of trained geoscientists used to be emigration. Today the job market is expanding, and geoscientists may find employment at home. A new breed of geoscientist is the government-company scientist of OPEC countries. In these countries, and in those aspiring to OPEC stature, new opportunities in geoscience are opening up.

Geoscientists will be in demand for the foreseeable future as the world seeks to meet its needs for energy and minerals. But the lessons of the past should not be forgotten. The feast of today may once again be followed by famine.—GERALD M. FRIEDMAN, *Chairman, Section E, AAAS, and Department of Geology, Rensselaer Polytechnic Institute, Troy, New York 12181*