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Thoughts on a Career in Geology

Part 1—Preparing For and Landing Your First Job

Gary D. Rogers, PG

I've been around long enough now to see a career in geology from several points of view—as a student wishing he had a job, to a series of short term jobs, to steady employment in a career. It's been a very rewarding experience, although very nerve wracking at times. I've recorded some thoughts on a career in geology with the goal of giving students and young professionals some observations to consider as you start and progress through your career. Who knows, some of you old professionals may pick up a good tip too.

My experience is in the consulting industry doing engineering geology and hydrogeology, so some ideas in this paper are more applicable to consulting than to, for instance, the oil industry. Nevertheless, most of them apply to any career.

Part 1 of this article addresses issues that are most relevant to students and those of you looking for your first job. Part 2, to be published in a later issue of *AEG NEWS*, is oriented towards those who have already started their career. Both parts include general insights that should be of use to anyone in the profession.

Follow your interests

You will be lucky if you can spend your days doing what raises your curiosity. But first you have to discover your interests. This may take some time, but as you learn more you will be drawn to certain subjects. Or maybe not, if you are interested in all of it you may find yourself being a generalist. If so, good for you, you'll need the versatility in your career. Or maybe you'll find that you are not really interested in any of it. In that case you need to go find another field of study.

Know your strengths

You will know your strengths by watching how successful you are in your pursuit of your interests. Don't worry if you are not strong in a particular area in which you have an interest. You have a good brain that can learn how to build strengths—you might just have to work harder on certain subjects or habits. Most geologists are very good at certain things. Sarah Andrews has written an excellent series of articles on how we geologist think that can help you to understand your strengths. Highly recommended reading and available at http://www.sarahandrews.net/whitepapers.htm.

Have a Plan

Your plan can be a few words. You don't have to stick to it—it's just to help you get to the top of the next hill so you can see far enough to set another goal. Once you have a plan, you'll need a set of actions that you will take, to go with your plan. Don't have a plan without the action list.

Differentiate Yourself

Start now and continue the habit of differentiating yourself through your career. Here are some ways that you can do this as a student:

- Write a senior thesis
- Go on summer field programs such as:
  Student Conservation Association (http://www.thesca.org/)
  Juneau Icefield Research Program (http://www.juneauicefield.com/)
  Keck Geology Consortium (http://keckgeology.org/)
  National Science Foundation Research Experiences for Undergraduates program (http://www.nsf.gov/crssprgm/reu/reu_search.cfm)
- Get a summer job or an internship with a company, government agency, or non-profit agency. This is a great way to see if your expectations of the profession match with reality. If they don't, you might want to adjust your career path (or expectations).
- Become an active officer of a student organization, preferably a student chapter of a professional organization. If your school does not have one, then start one.
- Take these core classes: geology field camp, stratigraphy, structural geology and hydrogeology. These courses (and their prerequisites) provide the fundamental foundation for a career in consulting in environmental or engineering geology.

See as Many Rocks as You Can

It does not matter what field of geology you enter. Those who have spent the most time in the field will have a much higher probability of helping the project team come to a successful result. Go to field camp, learn to produce a good geologic map, do an independent study in field geology, and spend every summer in the field. Get out from behind the computer screen now and go find some rocks.

Learn to Communicate Well

Very few in engineering and the sciences can communicate well, so you'll be at a huge advantage if you can write and speak well. Get as much practice in writing and public speaking as you can.

Write clearly, concisely, and accurately. Your writing will be reviewed and you can expect a lot of red ink in your early work. In the end, your company must stand behind any communication that goes out the door and so has a lot of interest in the quality and accuracy of your writing.

Learn to speak in front of people. This is a tough skill to learn for most of us scientist types. But learn it you must because sooner or later you're going to need it. And when you need it is a bad time to be starting the process of learning how. Presenting your work at technical meetings is a good way to learn. Many people swear by the benefits that they have gotten from involvement in Toastmasters.

Know the words that introduce liability for you and your employer and avoid them (for instance: prevent, any, all, every, never, assure, insure, determine). Remove these words from your professional vocabulary.

Find a Good Employment Partner

A good employer and a good employee are in a partnership. If both parties view the arrangement as a partnership then you are in the right place. If you think that you have a job then you are limiting your potential. If your employer thinks of you as a commodity then you need to move on. But do keep in mind that your first full time employment after college is an enormous change in lifestyle. It may be the first time that you are fully responsible for your own life. Don't blame your employment or employer for the changes that this brings (like just two weeks off each year, regular work hours, and being told when, how, and where to do something).

A good employer will have several of the following qualities. It is unlikely that any employer will have them all.

Has a good reputation with their clients (This leads to steady work.)

Does quality work (This also leads to steady work.)

Has work that matches your interests

Provides good benefits (For entry level staff this is currently about nine holiday days, ten vacation days, a defined professional development program, decent medical benefits, and some level of life, dental, eye, and disability insurance.)

Has an existing staff of interesting, motivated, and courteous people

Is savvy about how to run a successful business This means that they will earn consistent profits year to year (without profit the company simply cannot be stable), actively train their staff in loss-prevention and project management. Most companies in this category will be a member of ASFE (www.ASFE.org).

Is employee-owned (or headed that way)

Actively supports both professional and client-based professional organizations

A good employee (this is you) will have these qualities:

You need to contribute to the organization. Remember that a paycheck, trust, promotions, attendance at professional seminars, and your reputation are all earned. Contribute.

Stay after 5:00 PM. You will learn more from 5:00 to 7:00 PM about how a business really works than you ever will during regular hours.

Take on the work of the position to which you will be promoted. If you are assigned to compile appendices, volunteer to write part of the report. If you are assigned the job of compiling resumes for a proposal, offer to write part of the proposal. Write letters and reports for your boss. That's how you learn how to do your next job.

Produce quality work. Your work should be thorough, complete, and accurate. Your work should have minimal corrections during review and you should learn from every review.

When in the field, one of your main tasks is to keep the project moving forward. This often takes more people skills and psychology than technical skills.

Know your limitations and ask questions when you're not sure.

How to Find Employment

Find a company that you want to work for. If you have done this, then you'll know why you want to work there. Then go and apply. Many companies need people before they advertise. If you walk in at the right time then you'll have no competition.

Employers are looking for smart, motivated, hard working, and interested people who are educated in the appropriate area. That's all. Keep your interview goal simple and differentiate yourself by discussing concrete examples of these qualities. Smile. Show some spark and gumption—otherwise you are just another applicant.

Come to the interview prepared. Bring a copy of your transcripts, letters of recommendation, a list of references, and any training certificates (OSHA Hazwoper 40-hour training, most recent 8-hour refresher, etc.). Get all the interviewing practice that you can, such as by having a friend in the profession ask you questions that they have been asked during interviews.

Always call or write a thank you note to follow-up on an interview. Use this as an opportunity to restate why you think you will be a great asset to the organization. Only one out of maybe fifty applicants does this. They are the ones who get the job. Not because they can write thank you notes, but because it is an indicator of a thoughtful, organized person with a plan that they are implementing.

Typical fatal errors made by applicants:

Typos and grammatical errors in a resume, email, or other correspondence The presence of these flaws indicates that the applicant is uneducated, sloppy, without good writing or proofreading habits, and/or unmotivated. These resumes go in the trash can.

Sending only a resume We want to know more about you than a resume can show. We want to know who you are—which is impossible, but a cover letter at least gives you the chance to show us that you can write, have something to say about yourself, and discuss your uniqueness. If there is something different about you, such as wanting a job in a different state or a period of unemployment or underemployment, you might want to discuss it (because the reader will be wondering about it).

Listing a person as a reference without asking them for permission to do so or not having been in contact with them recently Make sure that the contact information that you list is current.

Dressing poorly You don't have to wear a tuxedo, but nice, freshly pressed, business professional clothing sends the signal that you care about your appearance and how people perceive you.

Not following up You should always follow up on an application by making a telephone call. Your goal is to make it easy for the responsible person to hire you. Your resume tends to work its way down toward the bottom of the pile over time if you don't have regular contact with the responsible person. I've known managers who will only hire people who follow up with a phone call or personal note after an interview.

Not showing a commitment It is astoundingly expensive to train people to perform work for which clients will pay. So employers are looking for solid investments—people who can be trained quickly, are self motivated, and who will stay with the company. Believe it or not, we're looking for people who can be promoted as quickly as possible to positions of responsibility. This responsibility may be making technical decisions, or managing projects or people.

In Part 2 of this series I'll explore some of the qualities that can help you excel in your career once you get started in the working world. For additional thoughts on how to get your first job, see Jim Jacobs' article at http://www.grac.org/Jacobs_jobhunt.PDF.

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Thoughts on a Career in Geology

Part 2—Excelling in Your Career

Gary D. Rogers, PG

This article continues my thoughts on a career in geology, expanding beyond the Part 1 discussion on preparing for and landing your first job presented in the December 2008 issue of *AEG NEWS*. In Part 2, I present my thoughts on how to excel in your career. I'll continue posting my thoughts on various aspects of the profession on my website at http://sites.google.com/site/garyrogerspg/, so check in occasionally.

How to Keep Your Job and Get Promoted

Specialize in something that businesses with money must do for financial or regulatory reasons. It's best to have more than one specialty—times change and clients may not need a particular specialty anymore.

Do everything in your power to keep clients happy (this includes companies that you have contracts with, project managers in your office, contacts in other company offices, and your boss). You should deliver quality work products on-time and on-budget, be courteous and friendly, and bring value to the project. If you do these things, then you will have a loyal customer.

Meet financial expectations. If your company sets a goal for the number of hours that you should bill a client (otherwise known as billable, chargeable, or utilization goal) you should do all you can to meet that goal. If you fall below the goal for too many weeks in a row someone will notice and you may find yourself reviewing this document in preparation for another job search.

Never hoard work. This is a short-term solution for people who have advanced in their profession as far as they are likely to go. The pie is big—share it. If you need a bigger pie (more work) go out and get it from your clients, not by keeping the work to yourself.

Differentiate Yourself

Being different can be a good thing. As a young professional, you can stand out by following some of these suggestions:

- Get involved in a professional organization. Actively involved. This means that you need to volunteer as a committee member or as an officer and be a real contributor to the organization.
- Be courteous and interested in everyone you meet. It's a very small world. Never burn bridges. Never. Your reputation will likely precede you—make sure that it's a good one.
- Write one technical paper or abstract each year and present it at a conference. Better yet, develop a presentation to educate potential clients about the services that you can provide and present it at a conference that they attend.
- Take the Fundamentals of Professional Practice course from ASFE (www.ASFE.org). This provides a structured program to learn all the things that your boss wants you to know, but does not have the time to teach you before you may need them.

Get your professional license as soon as you can. Honor it—it means that our society has deemed you qualified to make decisions that can affect someone's safety or health.

Get as Much Field Experience as You Can

It does not matter what field of geology you enter. Those who have spent the most time in the field will have a much higher probability of helping the project team come to a successful result. As a young professional, now is the time in your life where you can spend weeks to months on fieldwork. As you get older and have more responsibilities (kids to tuck in at night and a mortgage to pay) your opportunities to get out and see the rocks in the field will dwindle.

Maintain a Resume of Your Experience

Keep this in the style that your employer uses in proposals to clients, but you may want to include more detail than is required for your company resume. This well maintained resume should include at least a paragraph that describes every job that you have worked on. Include the date of the project work as a hidden text or comment. Your employer needs this to get work for you, and you need it in case your employer lets you down.

Be Pleasant, Courteous and Cooperative

Your boss, co-workers, and clients want to work with pleasant and courteous people. You can get promotions, get more done as a team, and get your firm hired for the next project by proving that you can reach the project goal with people that enjoy working with you. Practice good manners, encourage people, and give compliments. Having these qualities does not mean that you can be passive, submissive, or avoid working smart and hard. You must still assert yourself, make sure that management remembers your contributions, stand up for what is right, and get the job done. Just do it as courteously as you can.

I'm still learning how to do this myself, but much of what I learned came from long expedition-style research projects with small groups in polar regions. When you're dropped off on an arctic island for seven weeks with four other people you realize that your attitude, productivity and safety require the most harmonious situation that you can help create. When the going gets tough, I try to imagine myself back in that position to help me remember the importance of harmony.

Here are a few specific thoughts on this subject…

- Get Along—Sooner or later you will find someone who you find it very difficult to get along with. You may not believe this, but your relationship with that person is completely within your control. Once you adopt this understanding, you will actually have the power to change the relationship. Until then, you are being controlled by that person. It's probably not in your job description, but every employer expects that you will not let your personal feelings interfere with your work. Its part of your job, so get along and get the job done.

- Write Personal Notes to Associates and Those Who Help You—Get a box of high quality blank paper and envelopes and use them for thank you notes, condolences, invitations, acknowledgments of a job well done and other personal messages to colleagues and co-workers. Use real stamps for these notes so you don't dilute the personal touch with a postage meter imprint.

Build Your Technical Library

Buy or download these books. Read them. They will help you solve most of the problems that you will encounter in engineering and environmental geology.

- *Environmental Geology and Site Characterization*
  - Site Assessment and Remediation Handbook, Martin Sara, Lewis Publishers
- *Hydrogeology*
  - Handbook of Groundwater Development, Roscoe Moss Company
  - Groundwater and Wells, Johnson Division (the 2nd edition covers much more than the recently released 3rd edition)
  - Basic Ground-water Hydrology, Ralph Heath, USGS (download from http://pubs.er.usgs.gov/djvu/WSP/wsp_2220.pdf). A great quick reference that is highly readable.
  - One or more of these general hydrogeology texts. I've found that reading a subject in two or more general hydrogeology texts is more likely to lead me to an understanding of the subject.
- *Applied Hydrogeology*, C.W. Fetter
- *Physical and Chemical Hydrogeology*, P.A. Domenico
- *Groundwater*, Freeze and Cherry
- *Engineering Geology*
- *Engineering Geology Field Manual*, US Bureau of Reclamation (Download from http://www.usbr.gov/pmts/geology/)
  - Manual on Subsurface Investigations, National Highway Institute, FHWA NHI-01-031. Download: http://www.sil.ucdavis.edu/downloads/NHI_SI_Manual.pdf
- *Rock Mechanics*
  - Practical Rock Engineering, Evert Hoek (download from the RocScience website at http://www.rocscience.com/hoek/Hoek.asp)
  - Foundations of Engineering Geology, 1994, Tony Waltham. Similar in format to Ralph Heath's very usable "Basic ground-water hydrology" (see above).
  - Rock Slope Engineering, Wyllie and Mah, 2004 (an update of Hoek and Bray)

A full bookcase in your office is an indication of the resources that you are familiar with and from which you can quickly glean useful information. Fill your bookcase and file cabinet with resources and know which one to look in to solve a problem. There is nothing more empty looking than a bookshelf without books in the office of a professional. The internet is a great resource, but it has not yet replaced the depth and quality of reference books.

You should also, of course, maintain a well organized digital library of pdf files, internet links, example reports, and other references that can help you solve problems.

Expand Your Network and Circle of Influence

Meeting new people in the profession will expose you to a lot of people who will influence you. Once you build up some experience, you will be influencing them. Find them by joining one or more professional organizations. As a professional you should strive to be known by other practioners in your area. They are sources of technical help, moral support, potential employment, and potential employees. Plus, you'll have a lot in common with them and will likely find some new friends.

The two key national organizations for engineering and environmental geologists are AEG and NGWA. There are also many regional organizations that are very good.

- AEG—Association of Environmental & Engineering Geologists www.aegweb.org
  - Local sections listed at http://www.aegweb.org/i4a/pages/index.cfm?pageid=3412
  - Membership Application at: https://www.aegweb.org/i4a/forms/form.cfm?id=17
- NGWA—National Ground Water Association www.ngwa.org

And for goodness sakes, don't just pay your dues—get involved.

Get a Graduate Degree, or an Engineering Degree

There is a difference between the capabilities of someone with a BS versus someone with an advanced degree. A Master's program provides more opportunity for specialized training and requires you to develop and complete your own project. Your employability and potential for promotion are enhanced with an MS. There are many notable individuals who have benefited from having a PhD, but in the practical and project oriented field of environmental and engineering geology you should carefully consider the return on the investment in a PhD before pursuing this option.

If you are interested in an advanced degree in engineering geology, your choices are limited. These are some of the few schools left that specialize in engineering geology, along with a key professor in the engineering geology or geological engineering department.

- Portland State University, Dr. Scott Burns, BurnsS@pdx.edu 503-725-3389 - http://web.pdx.edu/~burnss
- Colorado School of Mines, Dr. Paul Santi, psanti@mines.edu3 03-273-310 - http://www.mines.edu/~psanti/
- Missouri University of Science and Technology (Formerly University of Missouri-Rolla), Dr. J. David Rogers, rogersda@umr.edu
  - http://web.mst.edu/~rogersda/ 573-341-6198
- Kent State University, Dr. Abdul Shakoor, ashakoor@kent.edu 330-672-2968
  - http://dept.kent.edu/geology/people/shakoor.html
- Mississippi State University, Dr. Darrel Schmitz, schmitz@ra.msstate.edu 662-325-3915
  - http://www.msstate.edu/dept/GeoSciences/people/schmitz/index.htm
- Michigan Tech, http://www.geo.mtu.edu/

If you can't go to graduate school, consider taking on-line courses from these degree-granting institutions. Missouri University of Science and Technology has a program in Geological Engineering and geotechnics that includes rock or soil mechanics courses (http://web.mst.edu/~gtech/).

An engineering degree with a geology degree is a powerful combination. I hate to admit it, but the reality is that you will have a lot more opportunities if you have an engineering degree. You may actually be doing the same work, but you will be more versatile and have greater potential for project management and leadership roles.

Become Business Savvy

Learn how a business operates. Learn about business accounting, legal issues of starting and running a business, and marketing. Then if you can't find a good employer partner you can start your own business. Or if you have a good employer, you can help them grow the business and you can expect to reap some rewards from this. You will almost certainly need to be licensed to do either of these. So earn your license and take the ASBOG exam as early as you can.

Live on Less Than You Earn

I have had some great opportunities in my life. I would not have had the chance to take advantage of them if I had not had some cash in reserve. One of the most important of these opportunities for me was the chance to spend a summer season on the Juneau Icefield in southeast Alaska. At the time I had a summer job offer as a geologist with the US Forest Service, $1,000 in the bank that I'd earned from seasonal jobs, a position offer with the Juneau Icefield Research Program and a difficult choice to make. I got some of the best advice of my life from Dr. Don Palmer as we were talking through my options for the summer and my reluctance to spend my savings to go to the Icefield. He asked me "What did you save that money for?". I immediately knew that I had saved it so that I could do what I wanted to do and to take advantage of the opportunity to spend a season on the ice. In part, this led to subsequent work in Antarctica, a research assistantship at UW-Madison and more research in the Arctic, and second season on the Juneau Icefield. Much later, having money in the bank allowed me take advantage of the opportunity to become a partner in a new geosciences consulting company, an investment that has grown quite nicely. Avoid debt, drive old cars, learn how to get by with less stuff and fix the things that you do need to own, invest in your 401k or IRA to the maximum allowable, live modestly and watch your money grow.

Other Sources of Thoughts

I'm certainly not the only one to have written about how to excel in our profession. **Allen Hatheway**'s thoughts and encouragement in his Perspectives column in *AEG NEWS* have helped me through my career. Originally published over the course of several years in *AEG NEWS*, they have been compiled onto a CD. This is a critical component of your digital library and is one of the great bargains for an engineering/environmental geologist. Available for only $20 at http://www.aegweb.org/i4a/ams/amsstore/category.cfm?category_id=10. Of special interest are the columns and No. 35—Your Professional Identity, No. 37—Making it in Professional Practice, and No. 51—Survival as an Engineering Geologist.

Jim Jacobs wrote a nice piece titled "Catch 22—Getting That First Good Job in the California Environmental Industry," published in *Groundwater Resources Association of California* newsletter at http://www.grac.org/Jacobs_jobhunt.PDF.

Jeff Keaton's recent article "Do a Good Job: Professional-Practice Guidelines and Competition" was published in the August 2008 issue of *Environmental and Engineering Geoscience*, the joint publication of AEG and GSA. Join AEG at www.aegweb.org and you can get free on-line access to this article and other EEG articles.

You've likely suspected this for some time—geologists really do think differently than mere mortals. Sarah Andrews' and Bob Dott wrote an excellent article on how we think. Highly recommended reading.

- *Spatial Thinking with a Difference—An Unorthodox Treatise on the Mind of the Geologist*, by Sarah Andrews. At http://www.sarahandrews.net/whitepapers.htm
- *What is Unique About Geological Reasoning?*, by Robert H. Dott, Jr., *GSA Today*, (1998) October, p. 15-18. (Sorry, not available on line).

Best Wishes

With hard work and some luck you'll be able to get some dirt on your boots every week of your career. Have fun, work hard, and enjoy the journey.

AEG NEWS
Call for Submissions

AEG is always looking for committee/working group reports, news of the profession, technical papers, and Section reports to publish in the *NEWS*. Please send submissions for consideration, to *AEG* Communications Director **Allen Shaw** at avshaw@bechtel.com.

Deadlines for upcoming issues are as follows:

June 2009 Issue — April 30

September 2009 Issue — July 31

December 2009 Issue — October 31

March 2010 Issue — January 31

Photos and figures should be submitted as separate attachments rather than embedded in a word document. Digital images must be at least 300 dpi at the size to be printed: 7.5" wide for cover photos and at least 3.75" for interior images. If using a digital camera, minimum quality is 3.2 megapixels shot with the camera on its "highest quality" setting.

For questions concerning production, contact Production Manager Andrea Ptak via email at aptak5118@aol.com.