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THE VAGARIES OF CONSULTING

How to Find a Consulting Job

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The really important goal I have is teaching everyone how to make the most money possible while still warming an academic chair. It is known as consulting. The academic goes to a company with problems, listens carefully to their woes, and casts his pearls—providing the perfect solution to their troubles. The reward is the best; two to ten times his normal hourly rate, plus, of course, travel and luxurious living expenses.

The obvious question is, "How do you find such plums?" The answer is simple: Present forefront research at some conference that is in a company's field, and their people will flock around you. Just let it be known that you and your clever ideas can be had for a modicum, and that those ideas will be enough to put them far, far ahead of their competition. Or, just knowing the right person is a big help when you submit government-funded proposals. It does not hurt a single bit to be a close personal friend of a Company Big Shot when you want some consulting. Or local companies may call your department head looking for an expert in your field. If he does not grab it himself, he may refer them to you. Or your phone may just ring and some total stranger may invite you to help his poor floundering company with its problem.

One point that may be important is the detailed subject. You cannot be expected to know any details of top-secret work that goes on at your client's facilities. But it does not matter, because you are a professor and can learn as well as teach. Industrial types are usually too busy to do either.

A REAL CONSULTING PROBLEM

In this true example, which will teach you everything you need to know about consulting, you will glean from actual incidents what your consulting future might be. I got an interesting job from my (beloved) department head, who felt that the work being requested was too disgusting in nature and too low-paying for him to be bothered with. I shall first explain the problem, changing all names to protect the culprits.

The problem has to do with manufacture of gelatin—an old, old process. Pig- and cow-skin scraps and trimmings are treated with lime and boiled up in giant vats. A broth results on the first boil-up. From this, photographic gelatin is recovered, using some clever chemical engineering techniques. A second boil-up produces pharmaceutical gelatin, a third food-grade gelatin, *etc., etc.*—until finally gelatin that is only suitable for glue results. There is a sludge that is left in the bottom of the cooking vat after all this. It is a gray, amorphous, blobby, quivering mass, quite smelly and hairy. It is not of any value, since it contains more than 90% water. But analyses showed that the sludge contains small percentages of calcium, fat, and protein.

Someone in a position of great power in the company had come up with a wonderful idea. Perhaps this nasty sludge could be dried and then sold as chicken feed. The calcium, fat, and protein—while admittedly not tasty—might be good for nutrition.

The reason for this sudden interest in such nasty stuff is its disposal. Tons are produced daily at all gelatin plants, and the sludge is too wet and smelly to be incinerated in civilized neighborhoods. The practice at my client's plant was to truck the stuff out to the local municipal landfill and to dump it there. This was done for years and years, and great piles of sludge resulted. We all know that landfills are anaerobic. Air

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does not penetrate down into them and things do not decay aerobically. For example, landfills are a good source of old sneakers and of legible fifty-year-old newspapers—if you take the trouble to dig for them.

So, in the course of the years these great quivery piles accumulated, without any particular interest from the public. But one day, as the city's bulldozer was busy smoothing rubbish piles, it suddenly went bloop, bloop, bloop and disappeared below the surface of some ancient sludge. This prompted the city's decision to disallow continued landfill disposal of sludge. And this is what really provided the catalyst to accelerate research on drying sludge for chicken feed.

SOLVING THE PROBLEM

I was invited to visit the gelatin plant, where a significant amount of time was spent both on describing the problem and on its proposed solution. We also spent a modest amount of time haggling over grant funds with which to do this. It was clear to me that we actually had to dry some of the stuff back in my laboratory. We could then have it analyzed and, if everything was okay, arrange to give some to a few lucky chickens. Note that at this point, both you and I have assimilated enough of the technology to equal that held by the plant engineers. I was indeed as highly qualified as anyone to pursue the project.

I was presented with a few wide-mouth jars of sludge for use at my laboratory. Only one spilled while driving back to school. My first goal was to find a senior chemical engineering student who would be willing to work on this project, both for his senior thesis and for a few extra bucks. I sat a jar on the lecture podium in front of my class, removed the lid, and allowed the vapors to permeate through the lecture hall. The reader must understand that these students were aspiring chemical engineers who do not like revolting organic things (otherwise, they would become MD's, and make a lot more money). The class, as a body, uttered all sorts of expletives of disgust—except for one young man, who apparently was scatologically oriented. He came to the podium, sniffed and fondled the jar, stirred it with his hand, and volunteered. I was in!

A research grant usually includes funding for the school, which is politely known as "overhead"—typically an unreasonable percentage of salaries. So the school was absolutely delighted at the prospect of the great research I was about to pursue and which I indicated was in the extremely important and topical area of "environmental protection." I was free to use their facilities, which included pilot plant-sized tray and rotary driers.

Our first drying experiments produced sticky stuff that had to be chiseled off any surfaces that the partially dried sludge touched. But, after a certain amount of diligence and adjustment of temperatures and drying air flows, we managed to make a nice dry material with about 2% to 5% moisture content. The next step was to dry enough to make about 200 grams. We did—and the following day, my student reported to me that it caught on fire and stunk up the lab. He would confess to nothing. He said it just happened.

So the experiment had to be repeated. Which we did—over and over. With always the same result: Open containers or piles of the dried material would get hotter and hotter just sitting—and then they would burst into flame! But I figured it out. The dried material had an enormous surface area, due to microscale pores and capillaries that appeared during the drying process. One handful had the surface area of a football field. The fat content of the sludge spread itself over the surface of these tiny pores and oxidized very slowly in the presence of air. The dried sludge was a wonderful insulator, and the heat generated just accumulated. Eventually, the temperature in the interior of a pile rose to the ignition point and fire resulted. The behavior is known as "autothermal." Oily rags in a garage do the same thing.

The obvious conclusion was that the sludge should not be dried. It became a dangerous material that could spontaneously ignite. This conclusion, however, was what is known as "unhappy data." No company wants negative data. They want to know how successful their ideas are and how much money they will make. And no executive wants to have his suggestions negated. So a good consultant only reports "happy data." After all, the company paid money and expects only useful information from its expensive consultants, information that will make it lots of money.

But I felt that I had to ignore this first law of successful consulting. I could only report the truth about what we had found, and when I did this, there was considerable displeasure. They were far from happy that simple drying could not make great chicken feed. I did have other suggestions to approach the problem, but they felt the only suitable punishment for me was to dispense with my services

THE INDUSTRIAL SOLUTION

Work on this project proceeded after my demise. My spies told me, after I had been sent away, that a new 36-foot-long, four-foot-diameter rotary drier was purchased and installed in the company yard. Wet sludge from the plant was fed to this drier, dried, and discharged into a dumpster at the drier outlet. By the end of the first day, the dumpster contents ignited and made a wondrous stink throughout the city. The next production experiment was to collect the dried sludge from the drier into 55-gallon drums under a nitrogen blanket. This excluded air, eliminating the possibility of the dry sludge igniting. The sealed drums were then shipped to a poultry farmer to feed to his hens. The poor soul's three chicken houses burned down.

But the problem was eventually solved without the help of my consulting. The company found a farmer to truck the wet sludge away on a daily basis for a rather noticeable fee. He spreads it over his fields as a soil conditioner. I am not sure if that is his only crop. ❐