

Division of Professional Relations
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FROM THE EDITOR . . .

The "Spring" ACS National meeting is very late this year, in June rather than early April. Hence, there is no report on Council or committee activities for this issue of the *Bulletin*.

I would like to use some of the space available, then, to comment on the results of the DPR membership survey, as published in the last issue of the *Bulletin*. The first two questions dealt with perceptions of image. By six to one, our members indicated that they were dissatisfied with the public image of *chemistry*, but the vote was much more even when asked about the image of *chemists* (three to two).

I believe that the general thrust of these replies is correct. Chemists, as professionals working in a complex, challenging field that requires years of study in esoteric areas, are still held in some respect. Chemistry, on the other hand, is identified with the chemical industry, and industry does, indeed, have a terrible image.

The implications of this result, to me, are that ACS has a legitimate role to play

in educating the public about chemistry as a science, and perhaps to some extent, about the kinds of products that have resulted from chemical research. In doing this, the society should seek to lessen any identification with industry, because while that approach may marginally help industry, it may do much more harm to the image of ACS and of chemistry.

It is the primary responsibility of industry to deal with its own problems. Part of that is a matter of advertizing, of which they do a lot. Another part is to really clean up their act, and deal appropriately with the bad apples who do not conform to accepted modes of behavior.

Our survey also asked about changes brought about by the new tax laws. As expected (and hoped), most replies indicated that membership in ACS and in DPR will be affected only slightly by the fact that the dues are not as easily deductible as they once were. However, other major expenses—subscriptions and travel to regional ACS meetings—probably would be cut back. This should be of

great concern to ACS as potential revenue sources. It should also be of concern to chemists that opportunities for keeping current may be getting too expensive. You might want to contact your Congressman about that.

The last question asked about the necessity of "whistle-blower" legislation to encourage the reporting of safety or environmental violations. It's a bit discouraging, but not surprising, that 73% of the respondents answered in the affirmative.

Commercial

I believe in truth in advertizing, so this section is clearly labeled. It is very nice to have doubled our Councilor count (from one to two!) in recent times. It would be even nicer to double again, to the maximum allowed for *large* divisions. Join up some friends. And while you are at it, consider getting more active in your division.

—Dennis Chamot

DPR Membership Application

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CHANGING CAREERS: A REENTRY PROGRAM REVISITED

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In the late 1970s, the National Science Foundation sponsored a series of career facilitation programs designed to retrain women with scientific degrees who had spent several years out of the laboratory while raising families. As the coordinator of the American University program, I recently undertook a follow-up study of 75 women who participated in our program—a year of special intensified course work in chemistry or toxicology.

The chemistry program at American was a traditional one, consisting of four courses in physical chemistry, organic chemistry, analytical chemistry and biochemistry. The courses were specially designed for the program and met four hours a day, five days a week for seven weeks each encompassing a total academic year. The toxicology program followed the same model with courses in analytical chemistry, biological technology of toxicology, forensic toxicology and toxicological testing. The projects focussed on women with degrees in chemistry and biology who were not working. The aim was to provide enough scientific knowledge to enable them to enter graduate school or the job market.

The participants in the programs averaged 40 years of age with a minimum age of 29 and a maximum of 56. They had been out of school an average of 15 years with an average of 10.8 years out of science. In one case it had been 26 years since she had been in science. The majority had worked after college, with an average of 6.3 years of work experience with 5.5 years of work experience in chemistry. Some had no work experience while one of the participants had 20 years of chemical work experience.

Before the program two-thirds had only a bachelor's degree while four had PhD's in chemistry. As of March 1986, nine had doctor's degrees, 25 had master's degrees and eight were currently enrolled in graduate programs.

Almost 80% of the women replied to the follow-up survey, with five questionnaires returned with no forwarding address. The current activities include two

who are now retired and three who are full-time students. Nine are working as teachers and three are doing volunteer work that is scientifically related. Thirty are working full-time and eleven are working part-time in scientifically related work.

Probably the primary difficulty for individuals participating in projects of this type are outdated skills. In some ways, in order to reenter the job market, scientists must have their present skills updated and often need to learn new skills. Certainly an individual who is working as an underemployed scientist faces slightly different problems, but the skills question is often key for these individuals as well.

Employers need to recognize that women who are untrained or unemployed and have a desire to return to the job market, will generally, given the opportunity, be extremely good workers. A reentry woman has made certain decisions about the job market. She may be motivated by a need for additional income with a family, by a desire for a better job, by a desire to work in a degree related field, but in any case, her return to the job market does not occur without a great deal of thought and motivation. Unfortunately, many women have outdated knowledge of the job market and often do not recognize the opportunities that exist for them. If it has been 10 or 15 years since they have been working, they may not be aware of the changes that have occurred in their field, the new opportunities that exist because of new technologies, and generally some of the possibilities that they might explore. They are often very hesitant and unclear about their career goals because of this lack of knowledge.

In many cases the absence of part-time employment in their geographic area has precluded their keeping up with the field or what is occurring. Often women with school-age children would be happy to work in a nine to three time frame, but find it difficult to cope with a 40-hour week because of a lack of any adequate child-care in their area. Employers often fail to recognize the contributions that can

be made by part-time employees. Since they are only working for a limited number of hours a day, they are often much more work oriented for the time they are on the job than the individual who works eight to five.

Several women used the program as a way to show that they could do graduate work and went on to earn graduate degrees, including masters' degrees in computer science and nutrition, and five doctorates in chemistry, biochemistry and nutritional science. The PhDs are now working primarily in research in the Washington area, in institutions such as the National Bureau of Standards (NBS) and the National Institutes of Health.

To get a better picture of what happened to these individuals anecdotal evidence is provided about their experiences after the program was over. Their current activities are a reflection of the varied career options in chemistry.

Research and Development

One of the participants, who had a master's degree, had spent nine years out of the field before entering the retraining program in 1978. She took a job in the Radiation Physics Division at the National Bureau of Standards. Shortly thereafter she joined the graduate Co-op Program at the Bureau. She indicated the Co-op Program gave her the chance to finish her education, to have her courses paid for, and to get paid on top of that. She completed her doctorate in 1983 at the age of 55 and continues to work at NBS. Since completing her doctorate she has been coauthor of nine published papers and has been an active participant in seven scientific meetings including Amstcrsdam, Holland and Toronto, Canada, as well as meetings in this country.

One of the BS chemists, who was 38 when she entered the program, took a position in technical support for a local contracting firm after she completed the program. After that contractor lost the contract she kept the same job with the new contractor. Now she is a full-time

(GS-9) chemist with the National Cancer Institute in the Experimental Pathology Laboratory in the Division of Cancer Cause and Prevention. She describes her job as multifaceted, since she is the only chemist in the group. She has a primary research problem which she concentrates on most of the time. However she indicates she does small problems as they come up in the work of the group, including separating metabolites by HPLC, electrophoresis or other chromatography, oxidation/reduction reactions, determining dose concentration and degradation products, etc.

One of the older BS chemists who was 56 when she completed the program in 1978 used the experience to obtain a part-time job (32 hours per week) at NIH. She worked at the Heart Institute until her retirement at age 65 doing research in the Molecular Disease Branch. She was joint author of three papers during her years there and was presented a Certificate of Merit by NIH when she retired.

Research was the primary love of one of the participants in the 1979-80 program. Therefore after she completed the program she applied to the biochemistry department at the University of Maryland for their graduate program. They provided her with research support and she completed her doctorate in 1987. She continues to work with them as a research associate and loves what she is doing. As the mother of four children, all of whom were at home during this period, she found the flexibility of graduate student life worked well for her, with the stipends providing sufficient support for child care.

Working part-time for 32 hours per week to review products used in federally inspected meat and poultry plants insuring that sanitary and non-hazardous conditions prevail led ultimately to a full time position as a GS-11 with the Department of Agriculture for one of the BS chemists in the first program.

A former participant with a BS degree and limited work experience, after the intensive three month summer program, took a job as a GS-7 at Fort Belvoir with the U.S. Army, working as a chemist in an engineering group. She took short courses and other training opportunities and received continuing promotions. About a year ago she was selected for a 12 month OPM Women's Executive Leadership Program. She is now a GS-12 and stands a good chance for promotion when she completes the program as well as moving into exciting new areas using her management training. Her husband, who had a doctorate in chemistry, had taken a dead-end job outside of chemistry

when he returned from Vietnam in the early 1970's. Once she landed her full time job he found first, a temporary post-doctoral position, and ultimately a position with the Patent Office as a Patent Examiner in Chemistry.

Forensics

Spending half of her time in court is not what one of the participants had in mind when she decided to return to work at 38. After completing the reentry program in toxicology she wanted a full-time job, but the only thing available was a six month temporary position as a blood alcohol chemist with the Maryland State Police Crime laboratories. After five months she was made a permanent employee and moved to the drug analysis laboratory where Controlled Dangerous Substances are received. She uses IR, UV-Visible, GC and Mass Spectrometry on a regular basis. She is now supervisor of the Toxicology Unit and has been sent for further training to the FBI Academy in Quantico, the Drug Enforcement Agency Laboratory in Virginia, and Instrumental Schools in Connecticut for advanced training in various analytical techniques. She has used this expertise in hundreds of criminal trials in every courthouse in the state of Maryland. It makes for an interesting job, but sometimes a very stressful one.

Teaching

Several of the participants who used the program to go back into teaching initially took part-time positions in private schools where their chemistry credits were valuable, but the education courses were not necessary. The majority now teach full time in chemistry. Depending on the school and the location, they either moved to full-time in the same school or took education courses and took positions in the public school systems.

George Mason University has a year-long program for scientists and engineers, primarily with advanced degrees, to provide the necessary training for Virginia Teaching Certification. One of the individuals who enrolled in the Career Switcher Program describes her reasons for going into teaching in this way: "I am thoroughly enjoying teaching and using and refreshing my chemistry once more. At times I think I miss the laboratory part of chemistry but I am a much more social being at this stage of my life and am enjoying the give and take of a contemporary high school with its many challenges. The diversity of the school where I practice teaching presents real chal-

lenges to clear presentation of chemistry to those who do not claim English as their native language."

One participant is now chair of the science department in a local high school. Another, who had worked for two years before staying at home with her four children for ten years, described the effect of the program on her return to the working world: "Although I don't qualify as 'successful' in terms of my present salary, I am very successful in doing exactly what I want to and doing it well and with confidence. This program made it possible."

Analytical Chemistry

A woman who returned to full-time work as a chemist at the Baltimore City Department of Water and Waste after 25 years at home raising nine children indicates the type of individual helped by the project. "When I retired for the first time, the research laboratories for which I worked had just designated one of its physical scientists as the Instrumentation Department, and the only thing resembling an instrument that I touched was the original Beckman titrator," she recalled. Since starting her new job in 1979, she has assisted her department in making several purchases of major instruments and in doing spectroscopy measurements such as inductively coupled argon plasma determinations.

Having a PhD, but staying home for several years, led one of the women to the reentry program as a way of getting back into the field. After completing the program she took a part-time position as a Research Associate/Visiting Assistant Professor at Howard University in their NMR laboratory. It ultimately became full-time when her supervisor left the university. She added to her training by taking the ACS Audio Course in Intermediate NMR and took a week course in "Electronics for NMR Spectroscopists." She described her position as teaching organic chemistry, NMR research on biochemical model compounds, and research on NMR of metabolites of odd strains of *E. coli*. She maintains and occasionally repairs the Super-Con NMR and trains others to use the instrument. She also swears at, casts spells upon, prays over and otherwise intimidates the instrument into working for her and anyone else who asks nicely.

Computers

One of the women who earned her bachelor's degree in the mid-60's, worked for a year in organic synthesis and then became a full-time homemaker. After

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completing the reentry program she took a part-time job evaluating reference standards. She moved into the position of technical coordinator, maintaining the files of the workload and status of each project. The organization moved into a computerized format and she had the job of setting up the system. She decided to take some computer programming courses and now works full time as a systems analyst for a local computing firm. She uses the skills she learned in college, those she learned in the PTA and League of Women Voters, as well as her more recent training and experience.

Participation in the program enabled one of the participants ultimately to move into an entirely new field. After completing the program at the age of 40 she went to the University of Maryland to begin graduate work in biochemistry. She indicates however the taste of the computers she got in the NSF program ultimately led to her new career. She saw an opportunity for training in the National Security Agency's Intern Program, applied, was accepted, and left chemistry for her new career. She completed the program over a three year period and became a data systems analyst/programmer. She decided to go back to school at night and earned a Masters Degree in Computer Science from Johns Hopkins. She is now a GS-12 with the Department of Defense, continuing to work as a systems analyst.

Technical Support

After working for five years after graduation in 1952, one of the participants stayed home for 21 years looking after her family. When she returned to work, she initially found work as a secretary for several years before she entered the reentry program. After completing the program she qualified as a Technical Information Specialist, which required up-to-date chemical knowledge, computer experience, and library skills. She joined the staff at the Smithsonian and is working with a bibliographic card file which is being converted into a computerized database. The database will become part of an international database available worldwide for museums and museum conservation scientists.

Holding a master's degree in chemistry, but not having worked for seven years made it difficult to return to the job market. The reentry program made it possible. After completing the program one of the women took a part-time job with a local consulting firm. After several years with that firm she was able to move into a part-time position with the EPA. She has permanent status, but continues to work only part-time (about 25 hours per week) and has moved to a GS-13 level. She is the initial Agency contact for technical and policy issues relating to the require-

ments for premanufacture notification of new chemical substances under Section 5 of the Toxic Substances Control Act.

Final Comments

A characteristic of the majority of the participants emerges as one reads about their experiences after making the major move to go back to school. Many of them took temporary jobs or part-time jobs after completing the program. Not all worked out as well as the individuals described here. More importantly however, those who did not go on with formal graduate training recognized the need for continuing education, whether in short courses, night courses, or industry sponsored training, and continued to explore training options after the program was over.

The general conclusion was that the intensified study was very successful in ensuring job placement. That result has obvious implications for retraining scientists at all levels. In particular, it provides hope for men and women who have moved from their original field into sales, marketing or areas of science no longer of interest to their company, and who would like to change their career paths. There are many opportunities for chemists in many areas, both in the laboratory and out.