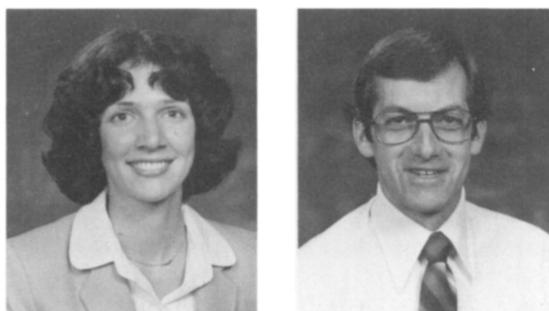


Employment Prospects For Biologists

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Biology graduates traditionally have been able to find jobs in college teaching (Dean 1978), in government, or in high school teaching. In recent years, however, these positions are less and less readily available due to declining enrollments in education and less government support of environmental programs. Conversations with college career planning personnel reveal placement in most areas of biology to be limited at best.

Yet the spectre of an apparently declining job market for biology students has been contradicted by predictions of growth potential in biology careers. For example, a brochure published by the American Institute of Biological Sciences (AIBS) says that many world problems such as aging, overcrowding in cities, disease, food supply, manmade environments, air, water and soil pollution, and others will require biological expertise (and we can assume many biologists) to solve them. "Biology's decade has begun," was how one author viewed the 1980s (Fox 1981). He continued by saying that Wall Street analysts "are convinced the new field of biotechnology is burgeoning and that it has only just started a dramatic growth phase." The whole new industry is "hungry for good people."

Even though recent events have demonstrated that biotechnology is not making the quick profit some had expected, as evidenced in the article "Biotechnology is Now Survival of the Fittest" in a recent issue of *Business Week* (1982), others still believe that "genetic engineering has a good long-range potential" (*Faded Genes* 1982).

If there exists this potential for employment possibilities, why is it not reflected in employers' current hiring practices? Why are many biology graduates under- or unemployed? What skills do employers need and expect from the biologists they do hire? To clarify the needs of the non-education job market, about which so many predictions are being made, and to gain a better understanding of the current and future career opportunities for biologists, the University of Wisconsin-La Crosse Biology Department and the Career Services Office conducted a study of the potential employers of biologists.

Methods

A questionnaire was developed to determine which organizations actually hire individuals with a biological background; future hiring plans of these organizations; the level of education they preferred; employment selection factors; positions for which biologists are typically hired; and with whom the organizations list biology vacancies.

Two hundred and nine organizations from across the country received the survey; these could be generally classified in the following categories: hospitals (6), consulting firms (13), pharmaceuticals (18), chemical com-

TABLE 1. Academic Skills or Training Required of Potential Employees by 124 Employers

Subject	Rank	Number	Percentage
Microbiology	1	66	53%
Laboratory biology	2	54	44%
Toxicology	3	44	36%
Genetics	4	42	34%
Immunology	5	38	31%
Cell physiology	6	35	28%
Electron microscopy	6	35	28%
Hematology	7	26	21%
Field biology	8	25	20%
Water quality	9	23	19%
Endocrinology	9	23	19%
General ecology	10	21	17%
General botany	11	20	16%
Zoology	12	19	15%
Radiation biology	12	19	15%
Vertebrate zoology	13	18	15%
Health and safety	13	18	15%
Marine biology	13	18	15%
Fishery biology	13	18	15%
Plant taxonomy	14	17	14%
Wildlife biology	14	17	14%
Mycology	14	17	14%
Advanced botanical background	15	14	11%
Limnology	15	14	11%
Entomology	16	13	11%
Invertebrate zoology	17	12	10%
Forestry	18	11	9%
Range conservation	19	9	7%
Ichthyology	19	9	7%
Other	20	8	7%
Ornithology	21	7	6%
Phycology	22	6	5%
Recreation	22	6	5%
Not applicable	23	5	4%

panies (18), oil companies (15), U. S. government agencies (37), utilities (4), food processing and distribution companies (22), zoos (4), state government (1), other manufacturing (26), research (24), and other services (21).

These potential employers were identified from the *College Placement Annual*, the *Career Opportunity Index*, and were also suggested by the Career Services staff and Biology Department faculty. Since the focus of this study was primarily to examine changes in employment opportunities for biologists in government, business, and industry, the majority of organizations sampled fell into those categories.

A total of 124 (59%) organizations responded to the inquiry and the breakdown of the respondents was as follows: hospitals (4), consulting firms (6), pharmaceuticals (12), chemical companies (15), oil companies (7), U.S. government agencies (22), utilities (3), food processing and distribution (6), zoos (2), state government (1), other manufacturing (15), research (17), and other services (14).

Results and Discussion

Most organizations (17%) indicated they hired individuals with a biological background; however, only 59% anticipated definitely hiring such employees in the future. An additional 12% were uncertain whether or not they would hire biologists in the future, and 28% indicated they would *not* be hiring in the future.

Organizations preferred to hire individuals having a bachelor's degree (52%) or master's degree (47%) in biology. A doctorate was preferred by 39% of the respondents, next was some college biology work (19%), and finally, "other" (11%). Since some employers indicated more than one preference, these totals exceed 100%. Those preferring a doctorate over the other degree categories were chemical companies, research organizations, and other services.

TABLE 2. Ranking of Qualifications Required by 124 Employers When Hiring Potential Employees

Qualification	Rank	Number	Percentage
Relevant work experience	1	79	64%
Communication skills	2	70	57%
Grade point average	3	61	49%
Degree from recognized school or program	4	51	41%
Interpersonal skills	5	50	40%
Chemistry background	6	45	36%
Highly focused biological expertise	7	41	33%
Personal recommendation	8	39	32%
Mathematics/Computer Science	9	34	27%
Broad biological background	10	32	26%
Business background	11	9	7%

Employers preferred individuals with microbiology and laboratory biology skills (table 1). The qualifications which employers considered most when hiring biologists were relevant work experience, communication skills, grade point average, and a degree from a recognized program or school (table 2). Employers typically hired biologists for laboratory work and research positions (table 3) and they filled most openings with individuals who applied directly to them or through listing the position in professional journals and publications (table 4).

In summary, a profile of the successful job applicant in biology today would be an individual with a bachelor's degree in microbiology who has had relevant work experience and who applied directly to the employer. This applicant, once employed, would be doing laboratory work and research.

The responses of the employers surveyed corroborated predictions made earlier (Goldschmidt and Whitt 1978; Lamb and Shaw 1978) about the strong need for microbiologists and geneticists. Concomitantly, the

TABLE 3. Positions for Which 124 Employers Typically Hire Biologists

Method	Rank	Number	Percentage
Laboratory work	1	61	49%
Research	2	59	48%
Field work	3	24	19%
Health and safety	4	13	11%
Other	5	9	7%
Not applicable	6	2	2%

employers' responses also appear to indicate less of a need for biologists with a general biological background.

The fact that employers did not express a stronger interest in doctorate-level employees was surprising, especially in view of their apparent research and development needs. This result, however, may have been due to the demand for biological technicians to perform work which does not require advanced degrees. This result should be reexamined in additional research.

Conclusions

The employment prospects, while not as good as in earlier years, are certainly not bleak for biologists. Well-educated biologists will continue to be needed, especially if they heed the criteria employers indicate to be important in selecting employees. Relevant work experience, for example, is extremely important in obtaining employment. Summer jobs or internship experiences can provide this experience and all students should be encouraged to explore these opportunities. Communication skills, too, should be developed by taking a number of courses in English and speech, and grade point average should be maintained at the highest level possible.

Employers hire primarily individuals who contact them directly (or were known to them previously). This reinforces the need for students to become acquainted with potential employers (possibly through work experience), to identify employer needs, and to demonstrate to the employer their abilities to meet those needs. Those students of biology who understand they must do more than simply obtain a degree

TABLE 4. Rank of Methods Used by 124 Employers to Fill Biology Job Openings

Method	Rank	Number	Percentage
Hire from direct applicants	1	57	46%
Professional journals and publications	2	50	40%
University placement offices	3	46	37%
Circulated within organization	4	31	25%
University and college academic departments	5	26	21%
Local newspapers	6	24	19%
Other	7	17	14%
National newspapers	8	11	9%
Not applicable	9	6	5%

in biology to find relevant employment will be the people who help make this "biology's decade."

In conclusion, this study is viewed as the first step to a systematic examination of current and future employment prospects for biologists. It is recommended this effort be repeated in the near future to explore even more closely the needs of different types of employers, including those in education, and to determine if the employment prospects for biologists identified here continue.

References

- Biotechnology is now survival of the fittest. 1982. *Business Week* (April 12):36-37.
- Career opportunity index. 1981. Huntington Beach, Calif.: Career Research Systems, Inc.
- Careers in biology. (undated) Arlington, Va.: American Institute of Biological Sciences.
- College placement annual. 1981. Bethlehem, Pa.: College Placement Council, Inc.
- DEAN, D. S. 1978. College biology teaching. *American Biology Teacher* 40(3):150.
- Faded genes. 1982. *Time* (April 19):64-65.
- FOX, J. L. 1981. Age of biotechnology is here. *Minneapolis Tribune* (October 4):19.
- GOLDSCHMIDT, M. C., and WHITT, D. 1978. Careers in microbiology: Horizons unlimited. *American Biology Teacher* 40(3):205.
- LAMB, D. A., and SHAW, M. W. 1978. Careers in medical genetics. *American Biology Teacher* 40(3):212.