

WOMEN IN ZOOARCHEOLOGY

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I wonder -- are most of the "bone people" women?

Respondent #121: female PhD candidate anthropology-archeology

I ... will be curious to see if it's really such a "feminine" field as it appears to be among my colleagues.

Respondent #143: female MA anthropology-archeology, government agency employee

INTRODUCTION

Most archeologists would probably agree that women are not so well-represented as are men in professional archeological positions in North America. However, women are commonly believed to have greater numerical strength in such laboratory-based specialties as zooarcheology and paleoethnobotany. Gero's (1985, 1991) surveys of gender ratios among specialists in these and other areas support the widespread notion that women are differentially better represented in such specializations than in archeology as whole. She attributes the greater proportions of women in lab specialties to a long-standing reluctance of male mentors in North American archeology to permit female graduate students to engage in fieldwork, at home or overseas (for case study examples, see biographies in Williams 1981).

As Gero (1991) notes, greater numerical representation in a field does not necessarily imply higher status or greater influence in setting the terms of archeological research. Nor, as this study suggests, does greater proportional representation necessarily translate into equity in rank and income levels. This article reports statistical evidence for differences in women's and men's achieved degree status, work placement, and topical focus within zooarcheology, using two databases. The first is my survey of the subscribership of the *Zooarchaeology Research News* (Gifford-Gonzalez 1993), a quarterly newsletter published by Pam Crabtree and Douglas Campana of New York University. The second is a survey of self-identified zooarcheologists in the 1991 *Guide*, encompassing people employed by mainstream academic institutions, museums, government agencies, and larger Cultural Resource Management (CRM) companies (the *Guide*'s "Research Institutions").

In contrast with the *Guide* listing, the *Zooarchaeology Research News* subscribership includes zooarcheologists

who are self-employed subcontractors, those working in occupations outside anthropology and archeology, and graduate students not yet in the permanent employ of any organization which might be listed in the *Guide*. Contrasts between the two databases thus alert us to the occupational histories of those people who are often simply described as the "attrition" from mainstream work "pipelines" in science (see Brush 1991; Barinaga 1992). As well, they provide insights on the next cohort of zooarcheologists: graduate students in advanced degree programs.

Analysis reveals that women have significantly lower achieved degree levels in zooarcheology, although gender proportions among graduate students surveyed suggest that the degree of this disparity may be in the process of changing. Findings hint at lower rates of access to funding for women during graduate study. Women display strikingly lower ranks of appointment for comparable degree levels in colleges and universities. Statistically significant differences exist between women and men in specialization in historic archeology, probably reflecting its lower valuation in comparison with prehistoric archeology. Likewise, striking differences exist between men and women zooarcheologists in their degrees of specialization in major taxonomic groups, with women being more likely to be generalists and men specialists, a trend most statistically significant at the highest degree levels and in mainstream institutional settings.

In this article, I have generally attempted to interpret these results cautiously, as I am aware of the limitations of the surveys and their data. At the same time, I have occasionally taken the liberty of suggesting possible causal linkages that the data cannot in truth support. I have done so in part to provoke further research on the role that gender has in determining the career paths in archeology, and in part to highlight likely linkages with the results in other scientific fields in which in-depth surveys have revealed substantial differences in the

careers of women and men.

Those of us who teach should have a special interest in these differences, since we train future archeologists of both genders. Most of us would like to believe that we, our colleagues, and our institutions deal impartially with our students, regardless of gender. Most of us in academic institutions would like to believe that we are above the cruder forms of sexual discrimination, and that these are more likely to be expressed in the marketplace. However, this study and others indicate that divergences in women's and men's career paths show up most strikingly in academic settings. Whether they result from overt, chauvinistic discrimination or milder, often unconscious devaluation of women and their work, the result is that the centers for training of future cohorts and those enjoying the greatest prestige as research institutions may have the most work to do in the area of supporting equity for women in archeology.

The ZRN Survey Database

The *Zooarchaeology Research News* survey was based on the 1989 ZRN subscriber mailing list, kindly provided by the editors. My original aim in undertaking the ZRN survey was to obtain a clearer picture of who was actually practicing archeological faunal analysis in the United States and Canada. Because of my own experience in zooarcheology, I suspected that a good number of practicing zooarcheologists were not showing up in the *Guide*, used in a number of recent surveys of gender equity archeology (e.g. Gero 1985, 1991; Kramer and Stark 1988). I reasoned that the ZRN subscription list might more accurately reflect the range of researchers than would a survey of the *Guide*'s listings of departments, museums, government offices, and consulting firms. I was especially interested in how results of this survey might shed light on the sociology of the field, including the institutional bases, research areas, and gender proportions within the field.

In 1989, the ZRN had an overall subscribership of around 200, including individuals and institutions in North America and overseas. In the summer of 1991, I mailed survey forms to all 146 individuals with addresses in Canada and the USA, because my main interest was in North American practitioners. The mailing list comprised 67 women, 75 men, and six people whose use of a gender-neutral first name or initials only, combined with lack of stated institutional affiliation, made it impossible to determine their gender. I received a remarkable 84% response rate. Because of missing data in some response categories, the actual

number of responses tabulated varied from question to question. Excluding the six people whose gender could not be ascertained, the original mailing list included 47.2% women and 52.8% men, and the respondent pool included exactly 50% women and 50% men (61 each). The respondent sample thus very accurately reflects the gender composition of the targeted North American subscribership and is, as a comparison with the *Guide* reveals, remarkably gender-balanced.

The questionnaire itself was a compromise between obtaining relevant and interesting information and optimizing response rate, with a short, two-page form, brief questions, and simple response options (see Gifford-Gonzalez 1993). I avoided questions which might be interpreted as personally invasive and hence inhibit people from completing and returning the questionnaire. I therefore excluded a question on gross income, despite my hunch that this would have been the best index of practitioners' socioeconomic situations. I did not include any questions that would help me track career patterns, again because I believed this might reduce the response rate.

A space for optional comments was provided on the survey form, and 29 people offered extensive comments, the majority of which focused on career options. These deserve special notice, because I believe they reflect facets of ongoing problems in zooarcheology encountered by both men and women, but which may affect women more. They are discussed later in this article, and in Gifford-Gonzalez (1993).

Responses were tabulated and cross tabulation statistics were calculated for work placement against degree level, disciplinary background, and training in zooarcheology, and for gender against work placement, degree level, research interests, and other variables. Most of the statistically significant differences involved disparities between men and women, in their highest achieved degrees, enrollment in advanced degree programs, and topical or taxonomic specializations.

The *Guide* Database

The database consists of all individual scholars in the 1991 *Guide* who noted a variant of zooarcheology (archeozoology, faunal analysis, animal bones, etc.) as a scholarly interest. Colleges and universities, museums, research agencies (CRM agencies, in the broadest sense), and government agencies were reviewed. Information recorded for each entry included: gender (I was able to assign gender to all gender-ambiguous names on the basis of my knowledge

of people in the field); highest degree; type of institution; rank, and geographic interest. Institutions of higher education were further classified according to the highest degree awarded by their program (Bachelors, Masters, Doctorates).

Individual rank in different institutional settings was converted into three general appointment levels: "Low," "Medium," and "High," with the additional option of "Marginal," for people not in tenure-line positions. For example, in colleges, universities, and museums, Assistant Professors and Assistant Curators were ranked as "Low," Associate Professors and Associate Curators were ranked as "Medium," and Professors and Curators as "High," while part-time staff, adjunct faculty, lecturers, and research associates were classed as "Marginal." Levels of appointment were more difficult to ascertain for research agencies, but heads or directors of companies were ranked "High," and efforts were made to discern medium and low rankings as well.

A total of 136 people identified themselves as having a zooarcheological research specialty. Cross-tabulations of gender against degree, rank, institutional placement, and type of institution were undertaken in the same fashion as with the ZRN database and results of the two analyses were then compared.

The two databases have different advantages and limitations. Clearly, membership in the two databases overlaps. The *Guide*, because it is an exhaustive listing of all major institutions and agencies with anthropological staff, comes closer to reporting all zooarcheologists employed therein. The ZRN subscribership, by contrast, is a voluntary association of people wishing to keep up with new publications and other developments in their field and is thus less comprehensive for the contexts listed in the *Guide*. However, the ZRN database includes people working outside mainstream institutions.

The databases are not commensurate in another way which should be kept in mind when reviewing the statistics presented in this article. One-third of the ZRN database is comprised of people in training as zooarcheologists. It is thus biased toward emerging trends in the field. The AAA database can be seen as representing the outcomes of all prior historical trends in this subfield, as well as of the hiring and promotion practices of mainstream institutions. This difference is critical in any comparison which might cast the ZRN respondent population as a kind of candidate pool, and the AAA population as the result of institutional hiring and promotion practices "screening" such a pool.

Although some of the differences in the gender composition of these two populations may indeed involve such practices, the many intervening historical factors entailed in constituting the AAA sample lead me to urge interpretive caution in this area.

The following discussion of results is divided into four major sections: the first provides some general background on North American zooarcheologists, including data on gender representation in the two samples and on topical concentrations drawn from the ZRN sample; the second summarizes information pertaining to people in mainstream institutions listed in the *Guide*, with relevant materials drawn from both databases; the third provides information on people working in other placements; the fourth deals with aspects of graduate training. A final section discusses the implications of the survey results with reference to equity issues for women in archeology.

GENERAL BACKGROUND INFORMATION

Gender Representation in the Samples

The most notable difference between the two surveys is that the ZRN sample contained proportionately more women than did the *Guide* database. ZRN respondents who were practicing zooarcheologists were evenly divided according to gender, with 61 women and 61 men. The *Guide* zooarcheologists database contained 50 women (36%) and 89 men (64%) for people in academic departments, museums, government agencies, and consulting firms (Table 1). The gender proportion in the *Guide* sample exactly matches the 36:64 female-to-male average proportions of PhD recipients in archeology for the decade 1976-1986 (Kramer and Stark 1986), even though some *Guide* zooarcheologists received their degrees prior to 1976.

Although the 36% female representation among zooarcheologists in the *Guide* is lower than that in the ZRN sample, it is higher than that for women archeologists as a whole. Gero's (1991) survey of archeologists in the 1989 *Guide* reports that women comprise only about 20% of those listed. Her survey further showed that 31.6% of zooarcheologists and 33.3% of paleoethnobotanists were female. My own total of 36% for zooarcheologists in the 1991 *Guide* differs only slightly from Gero's. Thus, the common perception that women tend to be more strongly represented among archeological faunal analysts is borne out by the statistics.

We are faced, however, with explaining the very much

greater representation of women in the ZRN sample. The difference results from the influence of two populations present in the ZRN sample and absent from the AAA sample: graduate students and people employed outside mainstream institutions and agencies, where women are more strongly represented than they are in institutions reporting in the *Guide*. Of ZRN respondents currently in a graduate degree program, 67% were women; about 56% of the people identifying themselves as self-employed or work unrelated to archeology were women. One must remember to contextualize these differences by recalling that the ZRN subscribership is voluntary, and that the real populations of zooarcheologists in the latter categories may contain more men. A colleague has only half-jokingly suggested that women may be more likely than men to subscribe to a newsletter like ZRN, thus introducing a gender-related effect into the subscriber as well as the respondent pool.

Table 1. Breakdown by institution and gender of people identifying themselves as zooarcheologists in the 1991 *Guide*.

INSTITUTION	WOMEN %	MEN %
ZRN: Government Agencies	4 50.0	4 50.0
ZRN: Research Agencies	5 50.0	5 50.0
ZRN: Colleges & Universities	21 47.7	23 52.3
ZRN: Museums	13 46.4	15 53.6
ZRN: Self-Employed Analysts	13 56.5	10 43.5
ZRN: Unrelated Situations	5 55.6	4 44.4
Total	61 50.0	61 50.0
AAA: Government Agencies	10 41.7	14 58.3
AAA: Research Agencies	7 50.0	7 50.0
AAA: Colleges & Universities	24 30.4	56 69.6
AAA: Museums	9 42.9	12 57.1
Total	50 36.0	89 64.0

These and other gender differences the ZRN and AAA databases are revealed by data on work placement, training, and degree levels. However, before exploring these areas, it is helpful to introduce the activities and specializations of the zooarcheologists polled in the ZRN survey.

ZRN: Activity, Regional, Economic, and Temporal Concentrations

Men and women ZRN respondents reported engaging in faunal analysis and writing reports at the same frequencies and noted similar amounts of their work time devoted to zooarcheology. About two-thirds of the respondents said they analyzed fauna often, just under

one-third said they did so seldom, and around 5% stated they never did, but read ZRN to keep informed. The amount of work time devoted by respondents to faunal analysis was roughly evenly broken down among full-time, part-time, and "intermittent," with a slight majority (39%) reporting their work was "intermittent."

In questions regarding geographic, temporal, and topical specializations, respondents could name more than one area. Thus, the percentages of respondents discussed below sometimes total over 100% for a given question. Over 86% of ZRN respondents said they worked with North American faunas. Next most strongly represented (13.1% of respondents) was Europe, with all other areas of the world named by fewer than 6% of respondents. Women and men were evenly divided according to geographic interest in North America (52:53), South America (3:3), Africa (3:2), Southwest/South Asia (4:3), and Oceania (3:3), respectively (Figure 1). Given the very small number of responses identifying specializations outside the Americas, the overall picture reveals no strong gender differentiation by regional specialization.

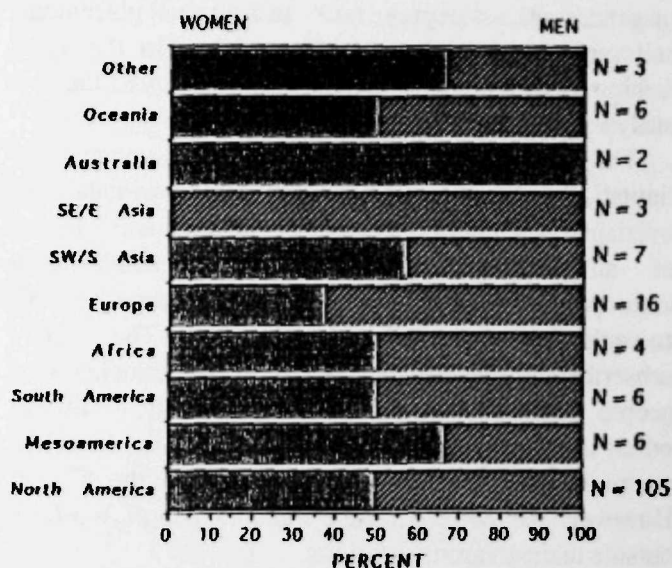


Figure 1. ZRN sample: regional interest, by gender.

A range of economic and temporal specializations were represented in the responses. Anatomically modern mobile hunter-gatherers were the most frequently identified as a research focus (54.1% of respondents), with more sedentary hunter-gatherers a close second (41.8% of respondents). These responses accord with the predominantly North American concentrations of most subscribers, as does a strong focus on prehistoric cultivators (26.2% of respondents). Nearly as great a proportion (23.8%) of people identified historic economies as a major focus.

Gender differences did emerge in some of these topical categories (Figure 2). More or less even divisions between women and men exist for the mobile hunter-gatherer specialization (32:34), for specialists in sedentary hunter-gatherers (26:25), specialists in prehistoric cultivators (15:17), as well as for specialists on prehistoric pastoralists (5:4). There is a strong tendency for women to predominate in the historic category; 62% of respondents noting historic economies are female and 38% are male (Appendix 1.1). Disproportionately high representation of women in historic archeology has been noted by Gero (1991) in her work on sociology of archeology. She construes this pattern as reflecting the relatively lower status of historical archeology, with women being tracked out of prehistoric archeology and into historic studies during their training.

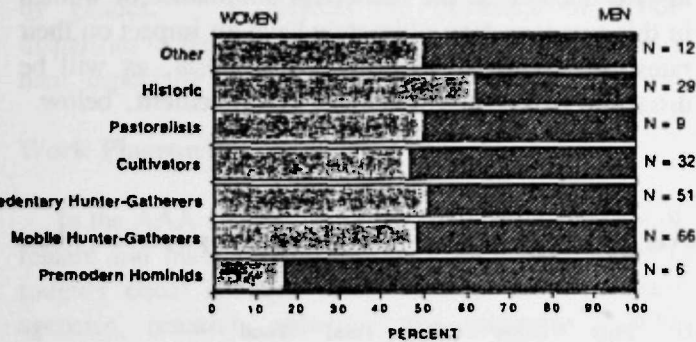


Figure 2. ZRN sample: economic and temporal specializations, by gender.

Another gender difference was expressed in a sample size too small to subject to meaningful statistical tests: of six respondents who identified pre-modern hominids as a specialization, five were male. My hunch is that this 5:1 ratio reflects a "real" bias, resulting from the male-dominant culture of paleoanthropology (e.g. Haraway 1986).

ZRN: Gender Differences in Taxonomic Specialization

About half (51.2%) of respondents said they worked with combinations of taxa, nearly 41% said they worked primarily with mammal remains, about 6% with fish, and about 1% concentrating on birds, reptiles, or amphibians, respectively. No respondent reported a dominant specialization in mollusks.

A statistically significant gender difference emerges in the ZRN sample between the proportion of women to men (22:35) identifying themselves as specialists in a

major vertebrate class. Thirty-six women versus 24 men said they worked with combinations of fauna (see Appendix 1.2 for Chi2 values). The generalist-specialist gender difference is very highly significant among people working in mainstream institutions (Appendix 1.3), and among holders of doctorates (Appendix 1.4). As might be expected of people independently subcontracting faunal analyses, there was much less of a tendency toward specialization among men who were self-employed or worked in unrelated settings, although, as in other employment settings, proportionately more women in the same situations were generalists (Appendix 1.5).

These results indicate that women are not as likely as men to develop a taxonomic specialty, regardless of their job placements, but especially in academic settings and at higher degree levels. It is unclear, on the basis of the data in hand, whether these differences are caused by disparities in mentoring, work histories, and other factors. Because specializations imply a level of expertise in a taxonomic group, this gender difference may serve to characterize women as less competent or advanced researchers than men. This issue will be discussed in the last section of this article.

OVERVIEW OF GENDER AND CAREER PATTERNS

Viewed comparatively, the two databases permit insights into patterns of employment and achievement of degrees of zooarcheologists in mainstream and non-mainstream settings. This section deals with the overall patterns discernible in the two survey samples. The ensuing two sections deal in more detail with mainstream and non-mainstream practitioners, respectively.

Work Placement

Table 1 presents summary information drawn from both databases on the placement of zooarcheologists in all work settings. Slightly over half the ZRN respondents are based in traditional institutional settings: teaching institutions and museums; in the *Guide* listing, nearly three quarters of zooarcheologists work in such settings. In the ZRN sample, 6.6% reported placement in government agencies, compared with 17.2% in the AAA sample, while 8.2% of the ZRN sample and 10.1% of the AAA sample worked in research agencies (CRM firms). Over a quarter of ZRN respondents worked outside mainstream institutions, as

subcontractors in Cultural Resource Management, as temporary instructors, and in other positions, with 23 people (18.9% of the sample) reporting themselves as self-employed. An additional nine people reported working in unrelated occupations but still doing faunal analysis on a volunteer or subcontractor basis. With regard to gender differences in job placement, women and men in the ZRN respondent pool were close to parity in numbers in government positions, companies, teaching positions, museums, self-employed, and in unrelated work situations. The AAA sample showed rough gender parity in most of the foregoing categories, except in teaching positions, as will be discussed below.

Highest Achieved Degree

In the ZRN sample, a significant difference exists in the distribution of degrees by gender: two-thirds of respondents reporting a doctorate as their highest academic degree are male, and one-third are female, and the inverse holds both for the Bachelors and the Masters levels of certification (Table 2, see also Appendix 1.6 for Chi2 values).

The one-third proportion of females among ZRN respondents with PhDs closely parallels the last decade's rates of achievement of doctoral degrees by women in relation to men in archeology (around 36% for 1976-1984) noted earlier. It also matches the proportion of women among doctorate-holding zooarcheologists in the mainstream institutions listed in the *Guide* (Table 2, Appendix 1.7). However, in the AAA sample, the proportion of women versus men at the MA level deviates markedly ($\chi^2 = 6.905$, $p = .0009$) from that of the ZRN (Appendix 1.8), essentially replicating proportions of doctorates in the AAA sample.

Nearly half (47%) of the ZRN female Masters degree group reported themselves as currently in programs for more advanced degrees, a trend paralleled by Masters-only men (seven of 14 males). Despite the identical proportions of men and women progressing toward doctorates, the numerical dominance of women in this category may ultimately have an impact on their rates of placement in professional posts, as will be discussed in *Trends in Degree Achievement*, below.

Table 2. Proportions of highest achieved degrees of women and men in the ZRN and *Guide* samples. Percentages are proportions within each gender holding each degree.

	BA N	BA %	MA N	MA %	PhD N	PhD %	Other N	Other %	Total N	Total %
ZRN Women	9	64.2	30	68.1	20	33.9	2	40.0	61	50.0
ZRN Men	5	35.8	14	31.9	39	66.1	3	60.0	61	50.0
TOTAL	14	100.0	44	100.0	59	100.0	5	100.0	122	100.0
AAA Women	8	61.5	12	33.3	29	33.7	1	100.0	50	36.8
AAA Men	5	38.5	24	66.7	57	66.3	0	0	86	63.2
TOTAL	13	100.0	36	100.0	86	100.0	1	100.0	136	100.0

Table 3. Proportions of highest achieved degrees of women and men in the ZRN and *Guide* samples. Percentages are proportions of gender holding each degree within respective datasets.

	BA N	BA %	MA N	MA %	PhD N	PhD %	Other N	Other %	Total N	Total %	Missing N
ZRN Women	9	14.8	30	49.2	20	32.7	2	3.3	61	100.0	0
ZRN Men	5	8.2	14	23.0	39	63.9	3	4.9	61	100.0	0
TOTAL	14	11.5	44	36.0	59	48.4	5	4.1	122	100.0	0
AAA Women	8	16.0	12	24.0	29	58.0	1	2.0	50	100.0	0
AAA Men	5	5.8	24	27.9	57	66.3	0	0	86	100.0	3
TOTAL	13	9.6	36	26.5	86	63.2	1	.7	136	100.0	3

Table 4. Proportions of highest achieved degree, by gender, for people employed in museums in the ZRN and AAA samples. Percentage is proportion of gender holding each degree within respective datasets.

	BA N	BA %	MA N	MA %	PhD N	PhD %	Other N	Other %	Total N	Total %	Missing N
ZRN Women	1	7.7	9	69.2	3	23.1	0	0	13	100.0	0
ZRN Men	0	0	2	13.3	12	80.0	1	6.7	15	100.0	0
AAA Women	2	22.2	4	44.4	3	33.3	0	0	9	99.9	0
AAA Men	0	0	4	36.4	7	64.6	0	0	11	100.0	3

ZOOARCHEOLOGISTS IN MAINSTREAM INSTITUTIONS

The AAA sample provides the most comprehensive overview of both work placement and achieved degree by gender. It reflects the existence of gender disparities in the institutional placements of women and men, especially in universities and colleges.

Work Placement

In the AAA sample, as in the ZRN respondent pool, female and male zooarcheologists were represented in roughly equal (though low) numbers in government agencies, research agencies, and museums. What contributes most strongly to lower proportions of women zooarcheologists in the overall AAA sample is their lower numbers in colleges and universities, which was the workplace of about 58% of the sample (Table 1).

Highest Achieved Degree

The low representation of women zooarcheologists in colleges and universities does not appear to result from differences in achieved degrees in these settings. Colleges and universities have the highest average proportion of doctorates of any workplace, in the AAA as well as the ZRN dataset. Academic men and women in the *Guide* sample actually show very similar patterns of highest degree achieved, within their respective genders (Appendix 1.9).

In contrast, strong gender differences at the M.A. level do emerge between the ZRN and AAA datasets. Table 3 shows that patterns of doctoral versus lower degree achievement for males in the AAA and ZRN samples do not differ significantly. By contrast, those for women differ, though not statistically significantly, between the two samples (Appendix 1.10), with the

ZRN sample having a much higher proportion of females MAs than does the AAA dataset. At first glance, women zooarcheologists in the mainstream institutions listed in the *Guide* seem to have been subject to a selection process not proportional to the present pool of MAs, as reflected in the ZRN sample. However, the present survey data cannot indicate whether *earlier* candidate pools from which these MAs were drawn differed in gender composition from that the ZRN sample -- or even if the ZRN sample is an accurate reflection of the gender composition of the MA population in zooarcheology. Sample sizes for government and research agencies are small. Within government agencies, the Masters is the most common degree among both men and women. In the research agency group, the sample is too small for a pattern to be identified.

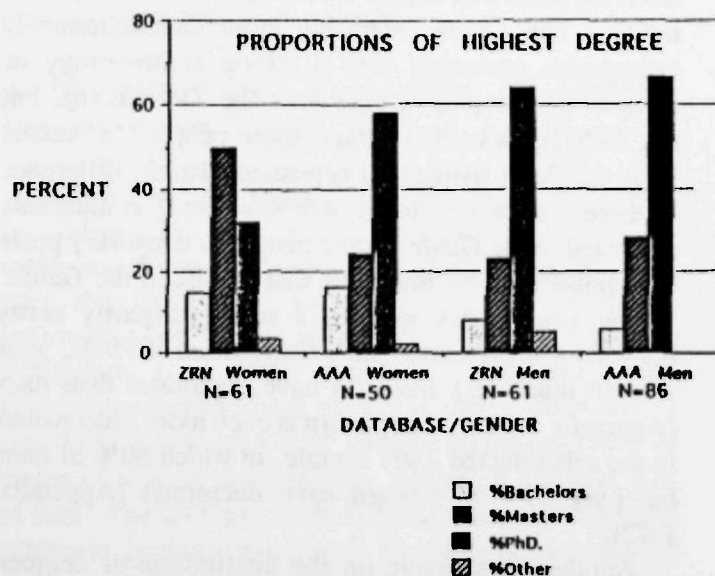


Figure 3. ZRN and AAA samples: proportions of highest achieved degrees within each gender subsample (see Appendix 4 for the base data).

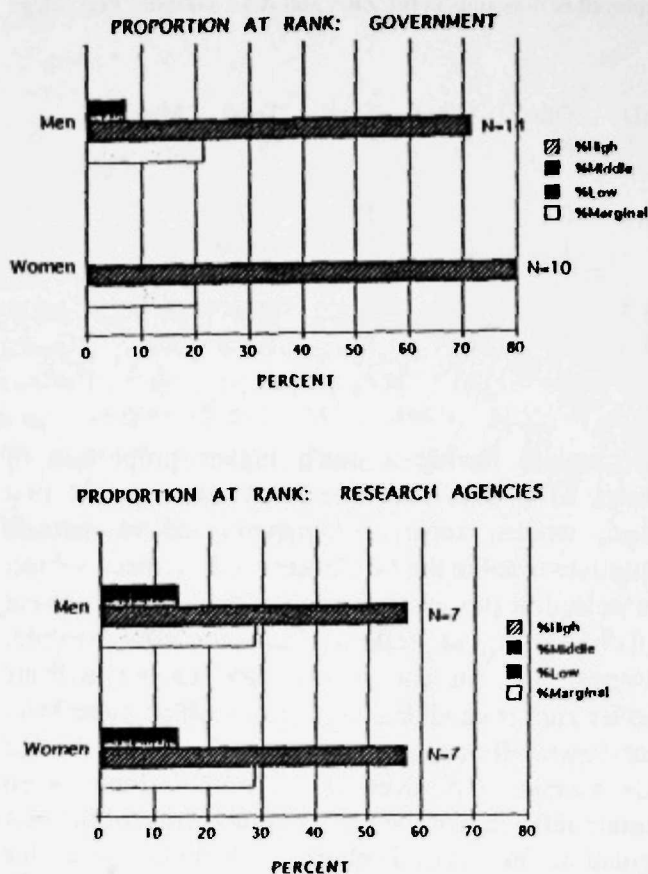


Figure 4. AAA sample: rates of appointment ranks in government and in consulting agencies, by gender.

Among people working in museums (Table 4), a different pattern of degree distribution relative to gender holds. The *Guide* ostensibly more comprehensively enumerates museums with a strong anthropology or archeology component than does the ZRN listing, but the ZRN list actually contains more people (28, versus 20 in the AAA listing). It is possible that the difference in these numbers includes people working at museums not listed in the *Guide* and/or people in temporary posts not enumerated by museums that do list in the *Guide*. In the small AAA sample, a strong disparity exists between women's and men's distribution of PhDs, with women much less likely to have doctorates than men (Appendix 1.11). This pattern is even more accentuated in the self-selected ZRN sample, in which 80% of men but only 23% of women have doctorates (Appendix 1.12).

Another perspective on the distribution of degrees relative to gender may be gained by examining the percentages within each gender subsample of the ZRN and AAA datasets holding four highest achieved degrees (Figure 3). From this perspective, men in the ZRN and AAA samples have virtually identical patterns of degree

distribution, and the AAA female subsample is not very different overall from the two male subsets, although proportionately more Bachelors degree holders are represented. As noted above, the ZRN female sample shows the greatest divergence from all other subsets, differing significantly from even the AAA female sample (Appendix 1.8), mainly because of the dominance of Masters as the highest achieved degree.

Gender and Rank in Mainstream Institutions

To gain insights into the relative positions of women and men in different mainstream settings, rank was cross-tabulated against gender for the various workplaces represented in the *Guide*. Four rank categories were used (low, middle, high, and marginal). Figure 4 displays the rates of occurrence of ranks in government and consulting agencies. Notably absent in both are high-ranking people. This may result from one or both of two factors. First, zooarcheology has existed as a specialty for a sufficiently short span that such archeologists hired in these agencies have not yet moved into higher administrative positions. Second, and perhaps more likely, as people move up an agency hierarchy and take on more administrative responsibilities, they may tend to identify themselves less by their earlier subdisciplinary specializations. It can be seen that in neither employment context is there a striking difference between the ranks of women and men, nor in their rates of being hired in marginal positions.

Since museum, colleges, and universities have been hiring archeologists longer than other agencies, one would expect that progress of women through the ranks would be more advanced in these. On the contrary, very strong disparities between women and men in achieved rank exist in this sample. Figure 5 displays the same data for museums and for colleges and universities. In colleges and universities, the asymmetry between male and female zooarcheologists at high rank appears strong but is not statistically significant (Appendix 1.13, 1.14). One way of expressing this asymmetry is as follows: 65% of men and 58% of women in the academic institution sample held doctorates; 21% of the same male cohort held high ranks, whereas only 4% of the women (in reality, one person) in the AAA sample had high rank. Women constitute 30% of zooarcheologists employed in these settings (24 individuals), so the divergence between this one-third proportion and their representation at full professor or equivalent demands an explanation.

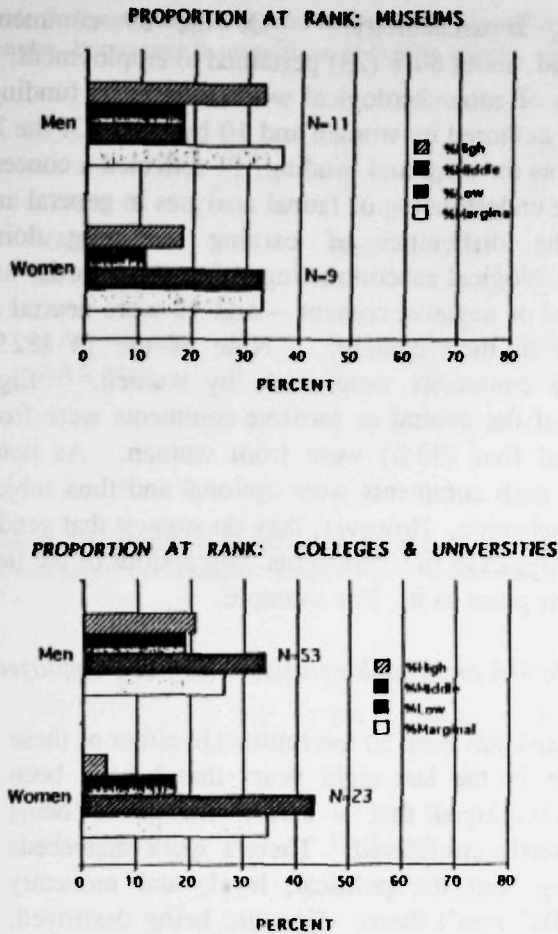


Figure 5. AAA sample: rates of appointment ranks in museums and in colleges and universities, by gender.

three tenure-track ranks, in five-year cohorts according to year of receipt of the doctorate (e.g. "1980" = 1980-1984, etc.).

Recall that the difference between rates of male and female doctorate holders in colleges and universities is negligible (6%), and so achieved degree level should not be an influential factor. One possible explanation for lack of promotion to full professor of women in this specialty is that all women zooarcheologists in the AAA college and university sample were hired in their first position much more recently than were men, and they have not had time to progress from assistant to full professor. Another explanation is that women's rates of progress through ranks is differentially slower than are men's. The data at hand tend to support the latter account. Figure 6 displays the proportions of men and women at the three tenure-track ranks, grouped in five-year cohorts according to year of receipt of the doctorate (for example, "1980" represents people receiving PhDs from 1980 through 1984). Men tend to gain tenure earlier and to be promoted to full professor earlier than do women in their cohorts, a pattern that becomes more accentuated with time. The differences at rank are not statistically significant, but reflect a trend away from parity (see Appendix 1.13). These findings are in line with those reported in a much more extensive study of anthropology as a whole (Hammel et al 1993). Similar divergences in rates of women's and men's progress through the academic ranks have been reported in other sciences (e.g. Brush 1991; Amato 1992; Selvin 1992) and will be discussed in the concluding section of this article.

A Note on Gender Composition in Academic Institutions over Time

The data on representation of women zooarcheologists in colleges and universities suggests that they are under-represented relative to the candidate pool extant over the last decade or more. I cannot derive information on hiring practices in higher education institutions from two essentially synchronous and non-commensurate slices of recent time. However, I have been able to gain some insights on the outcomes of hiring of women *archeologists* through a different line of data. The 20% proportion of women archeologists in academic institutions reported by Gero is, as stressed early in this article, the result of historical trends. Data from *Guide* listings, 1962-1987 (provided by Eugene Hammel, Quantitative Anthropology Laboratory, University of California, Berkeley, personal communication 1992), shows that women have made

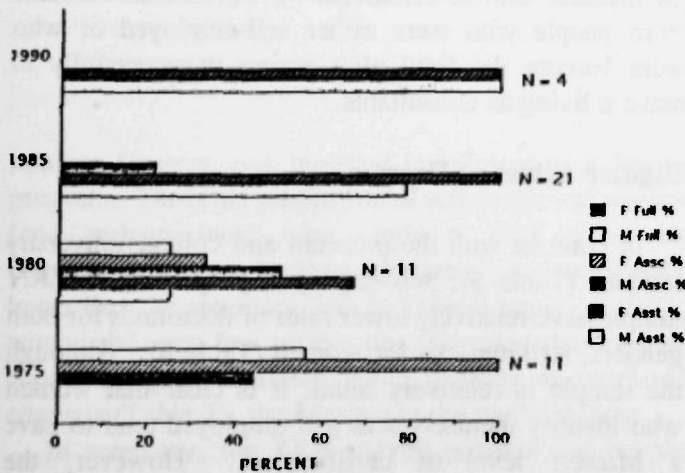


Figure 6. AAA sample: proportions of women and men at the

differing gains in institutions of various ranks (Gourman 1987). Early in the period, women archeologists comprised between 20% and 25% in lowest-ranked institutions, and they have held steady at that proportion for the full survey period. In the middle-ranking institutions, they have doubled in representation, from about 10% to about 20%, reaching parity with the lowest-ranked institutions. At top-ranked institutions, their proportions have held more or less steady at less than 12%. Thus, hiring practices have varied with the rank of the institutions in question, with elite schools least likely to hire women archeologists. For more information on gender differences in hiring and promotion over time in anthropology as a whole, see Hammel et al. (1993).

ZOOARCHEOLOGISTS IN NON-MAINSTREAM SITUATIONS

The ZRN database allows us some insights that the *Guide* does not into the careers of people who work outside mainstream institutions and agencies. The ZRN sample indicates that zooarcheologists who work as self-employed subcontractors or in unrelated occupations are active practitioners, subscribing to the newsletter to stay current in their specialization. However, they probably bear greater financial burdens because of their employment status and of the upper limits on income possible with various degree levels. Although I did not ask a question about annual income, voluntary comments by some of these people indicate how difficult making a living by zooarcheological skills may be for those outside the mainstream institutions. Most of the optional respondent comments with negative content came from people who identified themselves as self-employed, including some who were in the process of leaving the field.

Women only slightly outnumber men in these two categories (18:14). Nonetheless, this segment of the ZRN sample offers some insights on the nature of the "attrition" of women at more advanced steps of training and careers. Discussions of attrition of women in science are almost always framed in terms of loss of female students and professionals from mainstream institutions. The ZRN study indicates that women (and men) lacking jobs in *Guide* institutions and agencies do not necessarily abandon archeology, but at least some remain active workers.

Among self-employed people, women were much more liable than men to articulate problems either in their own work situations or in the funding priorities

affecting zooarcheology. Of the 29 comments submitted, about 80% (23) pertained to employment, to contexts of zooarcheological work, and to its funding, with 13 authored by women and 10 by men. Of the 23 comments on work and funding, 11 reflected a concern with the underfunding of faunal analyses in general and with the difficulties of earning a living doing zooarcheological subcontracting -- in other words, had a critical or negative content -- and 12 were neutral or positive in their content. Nine of the 11 (82%) negative comments were made by women. Eight (67%) of the neutral or positive comments were from men and four (33%) were from women. As noted earlier, such comments were optional and thus subject to self-selection. However, they do suggest that gender differences exist in respondents' perceptions of the field and their place in it. For example:

female MA anthropology/archeology, self-employed

...work has been so intermittent in either of these areas in the last eight years that I have been self-employed that a career change is being seriously considered. There's work that needs doing, but the political, legal, and monetary "wills" aren't there. Sites are being destroyed, and the work isn't being done, or else students and volunteers are being relied on, while others trying to make a "living wage" doing such work "go without." Underfunding results in reliance on low-paid or unpaid people to do what little work gets done: subsidizing the "profession."

Of the nine critical comments by women, seven came from people who were either self-employed or who were leaving the field after trying unsuccessfully to make a living as consultants.

Highest Achieved Degrees

In contrast with the museum and college/university samples (Table 5), self-employed people in the ZRN sample have relatively lower rates of doctorates for both genders, strikingly so for women (Table 6). Although the sample is relatively small, it is clear that women who identify themselves as self-employed tend to have a Masters level of certification. However, the association of MAs with self-employment is a more complex matter than it might seem at the outset. In fact, of the nine self-employed women with Masters degrees, five (55.6%) stated they were in advanced degree programs. Of the three self-employed men

Table 5. Proportions of highest achieved degree, by gender, for people employed in colleges and universities in the ZRN and AAA samples. Percentage is proportion of gender holding each degree within respective datasets.

	BA N	BA %	MA N	MA %	PhD N	PhD %	Other N	Other %	Total N	Total %	Missing N
ZRN Women	4	20.0	3	15.0	11	55.0	2	10.0	20	100.0	0
ZRN Men	2	8.7	4	17.4	17	73.9	0	0	23	100.0	0
AAA Women	2	8.3	2	8.3	20	83.3	0	0	24	99.9	0
AAA Men	0	0	9	16.4	46	83.6	0	0	55	100.0	3

Table 6. Proportions of highest achieved degree, by gender, for self-employed people in the ZRN sample (AAA sample does not contain this category). Percentage is proportion of gender holding each degree within dataset.

	BA N	BA %	MA N	MA %	PhD N	PhD %	Other N	Other %	Total N	Total %	Missing N
ZRN Women	1	7.7	9	69.2	3	23.1	0	0	13	100.0	0
ZRN Men	1	10.0	3	30.0	5	50.0	1	10.0	10	100.0	0

Table 7. Proportions of highest achieved degree, by gender, for people employed in unrelated work contexts in the ZRN sample (AAA sample does not contain this category). Percentage is proportion of gender holding each degree within dataset.

	BA N	BA %	MA N	MA %	PhD N	PhD %	Other N	Other %	Total N	Total %	Missing N
ZRN Women	1	20.0	3	60.0	1	20.0	0	0	5	100.0	0
ZRN Men	1	25.0	2	50.0	1	25.0	0	0	4	100.0	0

holding Masters, one reported enrollment in a degree program. Thus, the proportion of self-employed women (and perhaps men) who might at first glance be considered to have "terminal Masters" is considerably lower than the summary data in Table 8 imply. Finally, among the very few people reporting that they pursue zooarcheological analyses while working in unrelated contexts (Table 7), the Masters is the modal degree.

In summary, the ZRN survey testifies that people working outside mainstream institutions maintain an interest and to some degree a practice in zooarcheology, and that "attrition" of students from the mainstream institutions and agencies reported in the *Guide* must be qualified by an awareness that other career paths are

possible. However, I expect that people in the last two categories experience the greatest difficulties both in staying in touch with the field and in finding zooarcheology a sustainably remunerative endeavor. Respondent comments, if read with attention to the gender and work situations of their authors, appear to support this expectation. These comments are produced in full in Gifford-Gonzalez 1993.

GENDER AND STUDENT TRAINING

Gender Differences in Contexts of Training

ZRN subscribers were asked how they gained their

technical skills in zooarcheology. Many respondents checked more than one option, since they believed that they had acquired important skills in more than one venue. Each response category was therefore tabulated for the frequency of positive responses. About two-thirds of respondents said they had gained a significant proportion of their skills in college classes (about 55% of women, about 67% of men). Seventy-five (62% of all) respondents described themselves as significantly self-taught, with men and women more or less evenly divided.

Figure 7 displays proportions in which men and women reported different contexts of skills acquisition. Apprenticeship learning was noted by nearly 40% of respondents as a major source of their skills, with men reporting this mode of acquisition at a higher rate (47%) than did women (33%). This context of learning showed the greatest amount of gender difference. While not statistically significant at the .05 level (Appendix 1.15), the trend may reflect differences in the amounts of active mentoring received by men versus women, a factor reported to affect women's careers in other science fields (Brush 1991; Gibbons 1992a). Field schools were cited as significant sources of skills acquisition by 11% (13) of respondents, with women and men evenly divided.

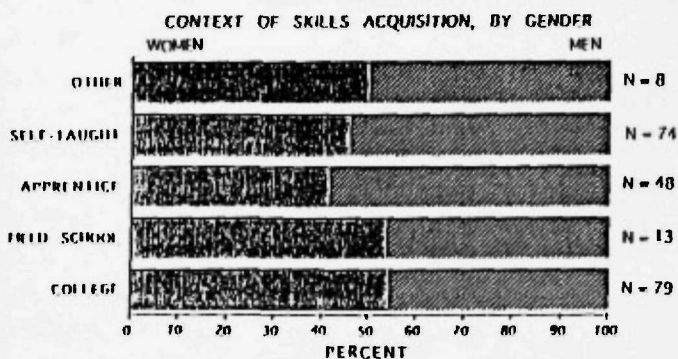


Figure 7. ZRN sample: context of skills acquisition, by gender.

Trends in Degree Achievement

The ZRN database includes graduate students currently in training and thus provides insights into possible gender composition among zooarcheologists with advanced degrees in the future. About half of the men and women ZRN survey who listed the Masters as their highest achieved degree noted that they were in programs for more advanced degrees, usually the PhD. The gender proportions of people currently in advanced

degree programs suggests that the present asymmetry between men and women with PhDs may not hold true for much longer. A total of thirty-five respondents (29% of the total sample) stated they were currently in a degree program. Of these, 22 (62.9%) were women, a strong trend away from the proportions of women to men in the sample as a whole, although not significant at the 0.05 level. The cohort of younger female zooarcheologists in training may even out the statistics for male and female PhDs.

Possible Gender Differences in Graduate Support

One survey finding from the ZRN database may indirectly reflect gender differences in graduate students' access to funding. None of nine men with Masters who were enrolled in advanced degree programs reported themselves as self-employed, whereas five of fourteen (36%) women in the same situation did. Because of the overall low sample size, and the fact that one cell of a Chi2 type comparison would be filled by a zero, a statistical assessment of this difference is suspect. However, this is a reasonably strong pattern of difference. I cannot with the data at hand account for the patterning, but two possible explanations may be drawn from existing literatures on support of graduate students in the science. Males currently in graduate programs may be more successful at obtaining fellowship support, either intramural or extramural, than are women. Levine (1991) notes that access to graduate fellowships has historically been biased towards men, although Yellen (1991) reports that rates of receipt of NSF graduate fellowships have more recently evened. Gender bias may play a role in privileging men's access to jobs on professors' grants and other positions offered at the discretion of faculty and administrators, as part of gender disparities in mentoring noted earlier (Brush 1991; Gibbons 1992a).

DISCUSSION AND CONCLUSIONS

The strong representation of women in North American zooarcheology reflects a well-recognized historical tendency of women working in laboratory specializations in archeology (viz. Williams 1981; Gero 1985). Gero (1985, 1991) attributes this to long-standing North American tradition of discouraging women from engaging in active fieldwork and encouraging them to develop a laboratory specialty. I agree with her perceptions in this connection. However, long presence in a field is not enough to assure women of either equity in hiring or promotion to

higher ranks, even when they have the requisite degrees and time at rank.

Given the recent rate of female PhDs (about 36%) in archeology, the 36% representation of women in the AAA sample appears at first glance to reflect equity in hiring in this area. Recall that Gero's study of the 1989 *Guide* showed that women comprised only about 20% of all archeologists in mainstream institutions. Thus, the parity in zooarcheology masks serious deviations from equity with the candidate pool in other areas of archeology. In academic institutions, however, only 30% of zooarcheologists are women. Thus, a slight deviation in parity in colleges and universities is balanced by considerably higher rates of representation of women in other employment contexts. Colleges and universities thus seem to be under-recruiting female PhDs with this specialization. Masters degree representation in colleges and universities seem to bear out the impression of under-recruiting of women in these institutions, but to a more extreme degree. In the AAA listing of academic institutions, 14% of 79 of appointments were of people with the Masters as their highest degree; men outnumbered women 9:2.

Especially striking in light of the long-standing tradition of women practicing archeological faunal analysis is their under-representation at higher ranks in academic institutions and museums, relative both to men and to their own overall proportions in those institutions. The most extreme expression of this is within colleges and universities. Although women constitute about a third of zooarcheologists in these settings, less than a twentieth are full professors, as opposed to a fifth of their male counterparts, despite the fact that male and female PhD rates are more or less the same. This study shows that women progress through ranks more slowly than do men. Such slower rates of progress have real economic impacts on the people involved, prolonging both the lower income levels and uncertainty of the pre-tenure span and deferring the higher salary levels and prestige of full professorship (see also Hammel et al. 1993).

This study thus adds to a growing body of literature which suggests that the halls of academe are at least as unfriendly to women as are more public employment contexts. A number of studies in the sciences have concluded that academic institutions are indeed the places in which the greatest disparities between women's and men's rates of advancement occur (Brush 1991; Amato 1992; Selvin 1992). One commonly cited reason for these disparities is the slowdown of some women's research productivity during the years they are raising

children and simultaneously being reviewed for tenure. However, other, "chilly climate" factors affecting all women, regardless of whether they rear children, are gaining more recognition as pervasive influences. These are often-subtle patterns of discriminatory practices on the part of male colleagues and administrators that interact to track women into less prestigious lines of teaching and service and to impede their access to resources supporting research (see Levine 1991; papers this volume). The secret nature of tenure and promotion evaluation is cited as a major contributing factor in slowing women's rates of progress relative to men's, for it is there that implicitly or explicitly androcentric assumptions about quality of performance are least held accountable (viz. Gibbons 1992b).

One example of a seemingly irrelevant gender-difference that could add up to a male-female status differential in zooarcheology is the tendency toward taxonomic specialization. Women surveyed were less liable to identify themselves as specialists, and may have been less encouraged than were men to develop such taxonomic specialties. In fact, it is possible that women may have similarly specialized knowledge of certain taxa, but were less likely than men to describe themselves as "specialists." Because such specializations carry the prestige of being an "expert," if women are less inclined to identify themselves as specialists, they may be seen as less "expert" in their zooarcheological knowledge. Whether men are in truth more specialized on certain taxa than are women, or whether they are simply more likely to identify themselves as specialists cannot be ascertained from the data at hand, but is an interesting cultural question.

To affirm remarks made by Gero in another context (1991) the problem with the gender differences expressed in this survey is not simply that men's and women's career trajectories are different, but that these differences constitute and reflect disparities in their status, expressed in terms of real income as well as prestige.

To be sure, factors affecting women's careers in archeology are considerably more complex than exclusion from fieldwork and shunting into careers deemed of secondary status by their male mentors and colleagues. Any of us who have counseled students on career paths are aware of these. Women's careers are determined by wider cultural and social patterns of gender difference and discrimination than just those operating within archeology (see Brush 1991). Achieved educational level, for example, may result from a variety of factors, including gender disparities in early educational opportunities, parental support, the

differentially higher time and energy investments of women in child-rearing duties, the secondary status of women's professions to men's in culturally traditional marriages, as well as choices freely made by women to pursue alternative, non-mainstream life courses.

But recognizing that some negative influences on women's career paths come from outside the academic training context should not be reason to ignore them. Leaders in science and engineering are realizing that the changing demographics of the United States mean that their fields can no longer afford to continue discouraging women (or non-white men) from entering and remaining in their fields (viz. Brush 1991). Some are beginning to argue that academic institutions themselves may have to take the initiative to intervene or cope with androcentric biases not only within their own institutional processes, but also in wider social contexts.

Archeology, if it is to thrive in the 21st century, must also face and cope with these issues. In-depth monitoring studies of patterns of men's and women's career development in archeology are now required to identify the dominant factors operating to produce the patterns revealed by this and other studies, and to suggest strategies for successfully recruiting and retaining women in the field.

ACKNOWLEDGEMENTS

I thank Pam Crabtree and Doug Campana for sharing the 1989 *Zooarchaeology Research News* mailing list with me, and all the ZRN subscribers who responded so promptly and profusely to the survey. I am grateful Tony Pratkanis of the Board of Studies in Psychology, U.C. Santa Cruz, for survey analysis advice, to Bill Hyder, Director of Computing, Social Sciences Division, U.C. Santa Cruz for access to software, and especially to Michael Santos for his invaluable help in data analysis. Support for data processing was provided by a U.C. Santa Cruz, Social Science Divisional Research Grant. Heidi Hester and Jackie Leighton provided help with the mailings. Longitudinal data from the *Guide* was provided by Eugene Hammel, Quantitative Anthropology Laboratory, University of California, Berkeley. I am grateful to Carolyn Martin Shaw and Olga Najera-Ramirez for their comments on an earlier version of this paper. I also thank Pat Watson and Alison Wylie for encouraging me to produce this report.

REFERENCES

Amato, Ivan

1992 Profile of the field: chemistry. Women have extra hoops to jump through. *Science* 255:1372-1373.

American Anthropological Association

1991 1991-1992 *Guide to Departments*. Washington, D.C.: American Anthropological Association.

Barinaga, Marcia

1992 Profile of the field: neuroscience. The pipeline is leaking.

Science 255:1366-1367.

Brush, Stephen G.

1991 Women in science and engineering. *American Scientist* 79:404-419.

Gero, Joan M.

1985 Socio-politics and the woman-at-home ideology. *American Antiquity* 50:342-350.

1991 Gender divisions of labor in the construction of archaeological knowledge. In *The Archaeology of Gender: Proceedings of the 22nd Chacmool Conference*, ed. D. Walde and N.D. Willows, pp.96-102. Calgary: Archaeological Association of the University of Calgary.

Gibbons, Ann

1992a Key issue: mentoring. Women in science issue. *Science* 255:1368.

1992b Key issue: tenure. Women in science issue. *Science* 255:1386.

Gifford-Gonzalez, Diane

1993 Report on the Zooarchaeology Practitioner Survey. *Zooarchaeology Research News* 12: 3-15.

Gourman, Jack.

1987 The Gourman report: a rating of graduate and professional programs in American and international universities. Los Angeles: National Education Standards.

Hammel, E.A., C. Mason, A.H. Prater, and R.AT. Lundy

1993 Gender and Jobs II: the academic market in anthropology 1964-1989. *Program in Population Research Working Paper No.36*. Berkeley: Institute of International Studies, University of California.

Haraway, Donna J.

1989 *Primate Visions: gender, race, and nature in the world of modern science*. New York: Routledge.

Kramer, Carol and Stark, Miriam

1988 The status of women in archaeology. *Anthr. Newsletter* 29: 1, 11-12.

Levine, Mary Ann

1991 An historical overview of research on women in anthropology. In *The Archaeology of Gender, Proceedings of the 22nd Annual Chacmool Conference*, ed. D. Walde and N.D. Willows, pp. 177-186. Calgary: Archaeological Association of the University of Calgary.

Selvin, Paul

1992 Profile of the field: mathematics: heroism is still the norm. *Science* 255:1382-1383.

Williams, Barbara

1981 *Breakthrough: Women in Archaeology*. New York: Walker.

Yellen, John

1991 Women, archaeology, and the National Science Foundation. *SAA Newsletter* 9(1): 7.

APPENDIX 1: Chi2 Values for Comparisons Cited in Text

Notes:

[value] = Chi2 with frequencies of 5 or less in > one-fifth of fitted cells, hence significance test suspect.

Chi2 = significant at the .05 level

Chi2 = significant at the .01 level or above

1. ZRN: distribution of women and men citing historic archeology as a specialty:

	women	men	
Historic	18	11	
Not Historic	43	50	Chi2=2.67, df=1, p=0.109

2. ZRN: people working with combinations of faunas (generalists) versus people who specialize in a major vertebrate class, by gender:

	women	men	
Generalist	36	24	
Specialist	22	35	Chi2=5.357, df=1, p=0.021

Base	61	61
Missing values	3	2

3. ZRN: generalist-specialist gender distribution among people working in mainstream institutions:

	women	men	
Generalist	32	19	
Specialized	18	32	Chi2=7.225, df=1, p=0.007

Base	50	51
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4. ZRN: generalist-specialist gender distribution among holders of doctorates:

	women	men	
Generalist	11	10	
Specialist	8	28	Chi2=5.429, df=1, p=0.020

5. Generalist-specialist gender distribution among self-employed people:

	women	men	
Generalist	11	5	
Specialized	6	5	[Chi2=0.564, df=1, p=0.453]

6. ZRN: Men's and women's distributions of highest achieved degree relative to representation in the sample:

	women	men	
PhD	20	39	
Overall Sample	61	61	Chi2=4.170, df=1, p=0.041

7. AAA: men's and women's PhD as highest achieved degree versus their overall representation in sample:

	women	men	
PhD	28	57	
Overall Sample	50	86	Chi2=0.335, df=1, p=0.563

8. Distributions of highest achieved degree in ZRN women and AAA women:

	BA/MA	PhD	
ZRN women	39	20	
AAA women	20	29	Chi2=6.905, df=1, p=0.009

9. AAA: distributions of highest achieved degree in women and men working in universities:

	BA/MA	PhD	
AAA women	4	20	
AAA men	9	46	Chi2=0.001, df=1, p=0.973

10. Distributions of highest degree among AAA and ZRN women working in universities:

	BA/MA	PhD	
AAA women	4	20	
ZRN women	7	11	[Chi2=2.628, df=1, p=0.105]

11. AAA: distributions of highest degree by gender, among those working in Museums:

	BA/MA	PhD	
AAA women	6	3	
AAA men	4	7	[Chi2=1.818, df=1, p=0.178]

12. ZRN: distributions of highest degree by gender, among those working in Museums:

	BA/MA	PhD	
ZRN women	10	3	
ZRN men	2	12	[Chi2=10.711, df=1, p=0.001]

13. AAA: rank distributions of women and men within colleges and universities:

	low	medium	high	
Women	10	4	1	
Men	16	10	11	[Chi2=3.632, df=1, p=0.163]

14. AAA: rank distributions of women and men within colleges and universities, collapsing medium and high ranks:

	low	medium/high	
Women	10	5	
Men	16	21	Chi2=2.342, df=1, p=0.126

15. ZRN: proportions of men and women reporting apprenticeship learning as a major source of their skills:

	Women	Men	
Apprentice	20	28	
No Apprentice	41	33	Chi2=2.198, df=1, p=0.138

16. ZRN: proportions of men and women in advanced degree programs, versus their overall representation in sample:

	Women	Men	
Degree Program	22	13	
Overall Sample	61	61	Chi2=3.04, df=1, p=0.081