

problems caused by the smoking of tobacco.

But it would be an error to conclude that without such forces rational and effective policies would be easy to implement. This volume documents that, despite its awesome toll, tobacco itself is a powerful force—one that is likely to defy our efforts at control for the near future.

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Women Pursuing Careers

Successful Women in the Sciences. An Analysis of Determinants. Papers from a conference, New York, May 1972. RUTH B. KUNDSIN, Ed. New York Academy of Sciences, New York, 1973. 256 pp. Paper, \$20. *Annals of the New York Academy of Sciences*, vol. 208.

Women and Success. The Anatomy of Achievement. RUTH B. KUNDSIN, Ed. Morrow, New York, 1974. 256 pp. \$7.95. New edition of *Successful Women in the Sciences*.

The work under review is a collection of autobiographies and essays touching on many aspects of the complex phenomena associated with the emergence of women from psychological and educational deprivation to their present position of challenge to male domination of the professions and of American cultural life generally. In content *Women and Success* differs from *Successful Women in the Sciences* principally in the addition of a preface by Kundsins and the omission of the summaries and discussions that followed five of the six sessions of the conference on which it is based. As the changed title indicates, the book will be effective for women in other fields as well as for those in science.

The book is well integrated considering the diversity of topics covered and the variety of contributors. An opening statement of purpose is accompanied by an elegant essay by Cynthia Fuchs Epstein giving a sociological view of the pressures acting on women as they attempt to achieve and reconcile their professional and personal goals. This is followed by autobiographies of 12 professional women.

The autobiographical section is the most interesting part of the book. The contributors were selected because they

are professionally successful as well as being wives (present or past) and mothers. In their endeavors all of them benefited presumably from native ability, from some parental encouragement, the stimulus of social exclusion or poverty or family conflict in childhood, some exposure to good educational opportunities, and finally from happenstance or luck. Most of them attribute a large degree of their ability to function professionally to their husbands; perhaps they consciously or unconsciously married men who were philosophically compatible with career women. The subjects of the autobiographies (now 41 to 70 years of age approximately) were young and struggling mostly before World War II, before "the pill," in short, in a different era. But their stories will be of value to young women, for they demonstrate that success is possible and illustrate for those who fear the "woman's lib" label the high caliber of their peers.

Five workshops on the broader subjects suggested by the experiences of women pursuing careers make up the remaining two-thirds of the book. Problems of employment are considered in one workshop, psychological determinants of success in another. Another concerns the practical problems of childbearing and rearing and homemaking. The viewpoint of the husband of a successful wife is also presented. The spirit of these essays is serious, scholarly, and factual. The last one, by Estelle Ramey, is witty in addition. In refuting arguments that executive ability is determined by sex hormones, Ramey effectively dispels one cause of self-doubt in many women.

The workshops open several avenues of thought for women and will confirm many of their unexpressed feelings about the influence of family attitudes and of school and college experiences on their career decisions. The thesis that women are reluctant to be considered successful is a challenging one that should prompt every woman, whatever her position, to examine her own motives with respect to her current life-style. The argument that women are "other-directed" will also trigger deeper introspection, which could reveal that many women who are really "inner-directed" bow to external pressures. Women may be led to realize that their dilemma arises from a misinterpretation of biological and intellectual (or domestic and professional) roles as fragmenting rather than as complementary. Failure to modify ambivalent

psychological attitudes or to find practical solutions for domestic responsibilities constructs barriers to achievement in addition to those put up by the antifeminist "gatekeepers."

If one measures the achievement of women in science in terms of the value of their scientific contributions, the dimension attained is "macro." If one uses more worldly criteria—attainment of decision-making positions in the professions, election to the prestigious academies, participation in the governing councils of the professional societies, acceptance as a scientist rather than as a "woman scientist"—then the anatomy of female achievement is still microscopic. In these essays the second-class status of women in this respect is well documented with statistics, and the political dynamics of the subordination of women are analyzed. The questions are raised, but no answers are provided.

The book is important because it provides a constructive demonstration of the possibilities that exist for women and of what is required—hard work and perseverance—if they are to be made the most of. It will be of interest to newly aroused profeminists of both sexes who want a survey course in the life science of "feminology" and to all those who want to proselytize but lack the verbal facility, the factual information, and the bibliography. Although not comprehensive, this book is a starting point and contains references for further study.

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Early Environmentalist

Ellen Swallow. The Woman Who Founded Ecology. ROBERT CLARKE. Follett, Chicago, 1974. xii, 276 pp. + plates. \$7.95.

From its breezy style, "relevant" title, and lack of documentation this book appears at first glance to be an amateurish effort to prove that it was Ellen Swallow Richards (or Ellen H. Richards as she is usually called) who founded "ecology" and not Ernst Haeckel, the German zoologist who coined the word in 1873. But despite these faults and a generally bad case of "precursoritis," the book raises new and important questions about two largely unstudied aspects of the history

of science—the role of women in science and the history of ecology.

Mrs. Richards is usually honored as the first woman to attend the Massachusetts Institute of Technology and as the guiding spirit of the home economics movement from about 1890 to 1910. Robert Clarke, cofounder of the International Institute of Euthenics, argues, contrary to other assessments, that rather than coming to home economics at the climax of a long career in food and sanitary studies Mrs. Richards arrived at it only after her vision of a more comprehensive “home ecology” or “euthenics” had been “slapped down by the hierarchy of science” (p. 211) and she was forced to retreat to various women’s groups and reformulate her ideas (which Clarke admits elsewhere were a “mixed bag”) as the largely female science of “home economics.” If true, this episode would present an interesting case of sex discrimination in the 1890’s. Unfortunately Clarke does not make a convincing case and cites no direct evidence for this interpretation. Although he used most of Mrs. Richards’s publications and many letters still in private hands, he relies heavily on the 1912 biography by Caroline Hunt and gives little additional information on Mrs. Richards’s relationship to the rest of the scientific community. Mrs. Richards encountered difficulties that are probably attributable to her sex (she was frequently a hardworking assistant on a project for which the male director earned all the credit), but she was also a chemist interested in water studies at a time when bacteriology was sweeping the field, she lacked a Ph.D. at a time when the degree was becoming increasingly important (although still well-nigh unobtainable for a woman in the 1880’s), she was a firm “environmentalist” at a time when many other Bostonians were becoming “hereditarians,” she preached conservation at a time when the industrialists were discovering “planned obsolescence,” she was interested in applied science rather than in pure science, and, perhaps worst of all, she was concerned more with diffusing applied science to laymen (especially housewives, children, and immigrants) than with advancing it through her own researches, as did W. O. Atwater, for example. Thus her work was more akin to agricultural extension and public health than to pure science, and she would have occupied a marginal position in any scientific community regardless of her sex. More-

over, in her reform interests Mrs. Richards, for all her differences, was not unique, and from Clarke’s account she seems curiously out of touch with other reformers of the time; for instance she seems, from Clarke’s account, to have had no association with Harvey Wiley, who crusaded for the pure food and drug law of 1906. Clarke would have given us a better picture of Mrs. Richards had he tried to place her more within her own context (or “environment” in a certain sense) and not tried so hard to make her speak like an environmentalist of the 1970’s.

Clarke raises, however, the interesting additional question of the relationship of these various environmental reformers between 1890 and 1920 to the emergence of the science of ecology. He sees early ecology, which was limited largely to studies of plant and animal communities, as reflecting a reluctance or unwillingness on the part of zoologists and botanists to take on the larger, more political concerns of protecting the environment. But suggestive as this interpretation is, we have as yet too few studies of the history of ecology to judge its validity with certainty.

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Unbalanced Ecosystems

Peatlands. P. D. MOORE and D. J. BEL-LAMY. Springer-Verlag, New York, 1974. viii, 222 pp., illus. \$12.

This information-packed little book, the first of its kind in English, is a compact summary of an important and little-known subject. Peatlands—unbalanced ecosystems that store much of their organic product—cover 230 million hectares, or about 1.5 percent of the earth’s land surface. Nearly all of this is in Canada and the U.S.S.R., but about a third of Finland and 14.5 percent of Sweden are occupied by peatlands. A single subtropical country, Pakistan, claims 200 million tons of air-dry peat. The total carbon reserve of peatlands, long given as 223 billion tons, is raised in this book (without documentation) to 330 billion tons. At the lower estimate, the reserve amounts to about 20 milligrams of carbon per square centimeter of earth’s surface (0.02 g/cm^2), some 16 percent of the atmospheric reservoir of CO_2 , or 7 percent of the terrestrial biosphere. As a

combustible source of power, peat is unimportant compared to coal, but the known reserve, if burned, would more than duplicate the “industrial effect”—the 15 mg/cm^2 of fossil carbon that had been added to the atmosphere by 1950. Whether it is burned, exploited for horticulture, or left in place to perform its manifold ecological functions, peat is not a negligible resource.

The authors do not neglect the economic geology and conservation of peat, but their main interest is in peatlands as ecosystems specialized for storage. The great strength of the book, in fact, is its “IBP (International Biological Program) viewpoint”—the espousal of biogeochemical ideas about ecosystems as productive systems with definable inputs and outputs. This approach appeared on the IBP scene in 1967, in a peatlands setting, as the “Moor House model” of production, and has given a new look to much terrestrial ecology. Biogeochemistry is here applied not only to quantitative considerations of production, decomposition, and mineral cycling but to the morphology of bogs and the geography of boggy landscapes. One effect is to dissect out an element of “climate” that climatologists usually ignore and to put the old topic “climate and peat growth” on a new footing.

Nutrition of bogs, during upward and outward growth, has long been known to be increasingly independent of surface- and groundwater supply and to become totally dependent on solutes supplied by rainfall. To an older generation of bog geologists (who were botanists by training), differences in bog structure were sufficiently accounted for by “pure water” (for high moor or raised bogs) and “water plus minerals” (for low moors). Now that we know that rainwater is far from pure, ecologists can focus on inputs—concentrations and fluxes of various solutes—and ask whether all solutes are equally important, what proportion of them is airborne, and which bog-plant associations select and concentrate which nutrients and export others.

Making good use of recent studies, some of which were their own, the authors consider these questions and give some tentative answers. Analytical data on rainfall are still scanty outside the western British Isles, a fact that perhaps accounts for a red-brick-university or Celtic bias that is occasionally evident in the book. Within Britain, one outstanding discovery is that three major plant nutrients, nitrogen,