

THE MATHEMATICS OF SEX AND MARRIAGE

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1. Introduction

The models of this paper attempt to account for the age, sex, and marital status distributions of human populations. A marriage market develops around preferences for mates of different ages, and we study this market as changes in age distributions change the availability of mates. Unless we know how to relate marriages to the exposed population, we cannot even calculate rates that will tell us whether marriage is increasing or decreasing. Sections 11 to 16 below attempt an empirically based solution of the two-sex problem.

2. Separate treatment of the sexes

To suggest what constitutes a “solution” from a demographic viewpoint, think of the sense in which the one-sex problem is solved. A given and fixed set of birth and death rates, specific by age, say for females, determines the entire trajectory of a closed population. Theory permits a calculation of exactly how many individuals would be present at each future time if those rates applied; the ultimate stable age distribution, the ultimate stable rates of birth, death, and natural increase, are similarly calculable. For the shorter term, a spectral analysis specifies the waves through which the population at each age would move on its way to the stable exponentially increasing condition; we can in particular trace the echo effect by which an initial hollow in the age distribution tends to be reflected in later generations with gradually diminishing relative amplitude until it disappears.

Aside from this, the one-sex theory enables us to say just what a given degree of emigration will do to the level of the ultimate population; how birth control applied by women aged 40 will affect the rate of increase of the population, as compared with birth control applied by women aged 20; when we find that the United States has a much higher mean age than Mexico, the theory enables us to trace this to our low birth rates rather than to any advantage that we may have in lower mortality. Within its own assumptions, often a close approximation to reality, the model gives complete and consistent results.

Acknowledgment is made of NSF grant GZ995 and NIH Research Contract 69-2200. The text was prepared while I was Visiting Professor at the University of Wisconsin in September 1971.