ANNOTATIONS

PROBLEMS IN STABLE POPULATION THEORY[1]

As a part of his work in physical biology, Lotka gave a dynamic treatment to the age structure of a closed population having a fixed schedule of age specific fertility and mortality rates. He showed that ultimately such a population, termed a stable population, would be growing geometrically, with a fixed age distribution determined by the schedules of rates and independent of the initial age distribution. These results gave a tool that was extensively used by some demographers, though others argued that the conditions postulated precluded its utility in human population analysis. Lotka's work was also a stimulus for extensive and rigorous analysis in the more general field of renewal theory, and this analysis raised for consideration the conditions under which Lotka's proof was valid.

In the first part of the present book, Dr. Lopez treats analytical questions related to Lotka's proof, the first two of his five chapters being concerned primarily with the theory of stable populations. He restates Lotka's proof with appropriate recognition of the conditions of continuity and gives a proof that the exponential series used by Lotka is convergent over the necessary range. He follows this with a proof of the stable population theorem under discrete conditions, following the method developed by Feller for treating renewal theory. Thus he answers the mathematical questions that had been raised with regard to Lotka's proof and concludes that "we must accept the fact that Lotka's exposition of his continuous stable model was after all correct and that all his formulae can be used in actual practice without fear of being wrong".

[1] Alvaro Lopez: PROBLEMS IN STABLE POPULATION THEORY, (Princeton: Office of Population Research, Princeton University, 1961), 107 pp.

In Chapters III and IV, Dr. Lopez considers the case in which fertility and mortality rates change with time and shows that in this case, also, the resulting age distribution is dependent on the rates and pattern of their change, but is independent of the initial age distribution. In interrelating the mathematical work that has been done in this field and in developing additional theorems the author has made a valuable contribution to the mathematical theory of demography.

The usefulness of the book, however, is not limited to its mathematical side. In many places throughout the book and particularly in Chapter V, Dr. Lopez has pointed up the demographic meaning of features of the theory and has demonstrated the usefulness of stable population concepts in treating demographic problems. Chapter V could well be on a required reading list for workers in the field of population dynamics, for it considers with some breadth the meaning of an index in this field and clearly explains the misconceptions with regard to an index which have led some workers to overlook useful descriptions of the current situation by expecting them to be predictors. An actual application fortifies the exposition, which is of high quality throughout.

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POPULATION CONTROL

THE eradication of poverty is one of the greatest challenges that man must meet today. A central focus of this challenge is the population problem: the hard fact that in many of the less industrial countries the number of people is rising more rapidly than the quantity of food, housing, manufactured goods and services needed to provide them with higher levels of living. Much has been done and is being done to raise production in these countries, with visible and dramatic results. But, with a few exceptions, little has been done to lower rates of population growth. On the contrary, the introduction of relatively simple and inexpensive public health meas-