J. NEYMAN

ON THE OCCASION OF HIS 80TH BIRTHDAY

By L. Lecam and E. L. Lehmann

On April 16, 1974 Jerzy Neyman celebrated his 80th birthday. This issue of the *Annals of Statistics* is dedicated to him on this occasion to honor both the scientist, who continues to make important contributions at an astonishing rate, and his earlier work, the impact of which has been so extraordinary that it has completely revolutionized the field of statistics.

At present, Neyman is Director of the Statistical Laboratory at the University of California, Berkeley which he founded in 1938, and is Professor (retired but recalled to active duty) in the Department of Statistics which grew out of this Laboratory in the 1950's. He is supervising several Ph.D. students, has just completed editing a volume of essays on Copernican Revolutions for the National Academy of Science, and is continuing his work on cosmology, weather modification, $C(\alpha)$ tests, and other problems.

Neyman's publications span a period of fifty years.[1] His early work has become so thoroughly part of the common statistical consciousness that it is now only rarely referenced and is no longer conceived as an individual contribution. At the present occasion it may therefore be appropriate to sketch briefly the formative influence which this work has exerted on our discipline.

1. The theory of hypothesis testing developed in collaboration by Neyman and E. S. Pearson[2] in the years 1928–1938 ushered in the subject of mathematical statistics as we know it today. The first of their joint papers [1] brings the fundamental ideas that the choice of a test requires consideration of the *alternatives* to the hypothesis being tested, and that there are *two kinds of error*, false acceptance and false rejection, both of which must be taken into account. Fisher's likelihood ratio is then proposed as an intuitively appealing solution to the testing problem. The rest of the paper and those following in the next few years are devoted to working out the likelihood ratio tests for a number of important examples.

The second decisive step came in the 1933 paper [3], in which the authors are no longer satisfied with an intuitive solution to their problem but take on the task of determining the test which at the given significance level will maximize the power against a given alternative. (Actually, the terms "power," "most powerful," etc. are only introduced in the next paper [4].) This problem is solved completely for the case of a simple hypothesis by the celebrated Neyman-Pearson Fundamental Lemma, which states that for testing a simple hypothesis against a simple alternative the

[1] A bibliography, complete at that time and comprising 156 items, can be found in the volume *A Selection of Early Statistical Papers of J. Neyman*, University of California Press, 1967.

[2] The ten papers comprising this work are reprinted in the volume *Joint Statistical Papers of J. Neyman and E. S. Pearson*, University of California Press, 1966.