

HSU'S WORK IN PROBABILITY

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Hsu returned from England to Kunming in the middle of the Sino-Japanese war, apparently in 1940. He gave a long course beginning with the theory of measure and integration, through probability theory, and leading to mathematical statistics. For the first part he based his lectures on Carathéodory's *Vorlesungen über Reelle Funktionen*, for the second on Cramér's *Random Variables and Probability Distributions*. He was a polished and vivacious lecturer with complete notes written out beforehand in a notebook he carried. He enjoyed making a fine point in class. For instance, when he was doing the inversion formula for characteristic functions, he took delight in the fact that one could integrate over a single point by the Lebesgue-Stieltjes integral. He had a tattered copy of Cramér's book with many marginal notes and used to say that it was written in a more difficult way than necessary but contained all that was essential for probability. He was a true virtuoso in the method of characteristic functions. His papers [17], [23], [25], [26], [31] and [35] all showed his fascination for, as well as mastery of, this precious tool. Mathematical literature was hard to come by in Kunming during those years, and some of the old volumes shipped from Peking (then called Peiping) were kept in caves to preserve them from air raids. (We did not actually live in caves, but frequently had to run to them for hours at a stretch under raids or alerts.) Among the books so kept was, for example, Kolmogorov's *Grundbegriffe der Wahrscheinlichkeitsrechnung*. At my request Hsu had this book extracted from the caves, but I remember his saying of it: "This is another kind of mathematics". He was not, of course, a probabilist *per se* at a time when such an appellation hardly existed anywhere in the world; by education and inclination he was more fond of problem-solving than generalities. However he never tried to dissuade others from following their own bent and getting interested in those other kinds of things. Indeed, if he could be drawn into a new topic, he would work at it in earnest and quickly produce something of value. For instance, when Borel's work on what he called "denumerable probabilities" attracted my attention, Hsu took an interest also, which led to the paper [21]. This was an early approach to what became known as "recurrent events" under Feller's development. Papers [23] and [30] were probably written under similar circumstances.

But, of course, Hsu's major contribution to probability and its applications flowed from his consummate skill in manipulating characteristic functions. Let me describe and comment on these papers in their chronological order.

Received June 1978.

AMS 1970 subject classifications. Primary 01A70; secondary 60E05.

Key words and phrases. Obituary, probability theory.