Georges DARMOIS
b. 24 June 1888, d. 3 January 1960

Summary. Darmois was the first French mathematician to teach and popularize British mathematical statistics. He was a pioneer in the theory of the statistical concept of sufficiency, in stellar statistics, and in factorial analysis.

Georges Darmois was born at Eply in the district of Meurthe-et-Moselle, France and died in Paris. He entered the École Normale Superiéure (ENS) in 1906, and defended a beautiful thesis in geometry which he had begun under the supervision of G. Darboux. From 1911 to 1914, he was a qualified assistant (agrégé préparateur) at the ENS, whose scientific activities were then directed by Émile Borel (q.v.) who rapidly grew to appreciate Darmois' energy and intelligence. Darmois' work was interrupted by the First World War, during which he served in the artillery, in particular with anti-aircraft batteries, and later in a section working on location by sound. This was Section 25, under the command of the physicist Gustave Ribaud (1884-1963), who had graduated with Darmois from the ENS, and with whom he collaborated on various technical studies. Ribaud was later to become a Professor in Strasbourg and Paris.

Darmois had a brilliant and practical mind, and was an enthusiastic and sound teacher. He discovered the calculus of probabilities by teaching its applications to military studies in the framework of the École des Généraux (School for Generals) in 1919. He was not the only scientific worker who had discovered probability and its applications during the 1914 war: other examples are Jules Haag with his treatise *Applications au tir (Applications to Gunnery)*, and Paul Lévy, although his case is not quite so clear.

On his discharge from the army, Darmois was appointed lecturer (chargé de cours) at the University of Nancy, where he was later Professor from 1921 to 1933. Once he had defended his thesis, he became interested in the new problems arising in the general theory of relativity. Fortet wrote in his obituary, "there is no doubt that this part of Georges Darmois' work was the most important thing he did, and it is first rate". Darmois' volume, published in 1927 in the *Mémorial des Sciences Mathématiques* initiated a large number of subsequent works, such as his pupil André Lichnérovicz's thesis of 1939.

It was also at Nancy that Darmois discovered English mathematical

statistics through the work of Galton (q.v.), Karl Pearson (q.v.), Yule (q.v.), Spearman and especially R.A. Fisher (q.v.), whose genius he was among the first to recognize. Darmois began to teach this statistics in France in 1923. Thus it was to him that Borel decided to hand over his course in probability and statistics at the Institute of Statistics of the University of Paris (ISUP), created in 1923, when Borel was elected to the Chamber of Deputies in 1925. Darmois rapidly understood the fundamental importance which statistics must shortly assume in all branches of science and economics, a cause for which Borel had fought from the very beginning of the century. Starting in 1923, Darmois appears to have had "the will to create a school of theoretical and applied statistics in France" (Fortet 1960). One could say that the ISUP, of which he was the Director of Studies from 1944 on, and the centres which gradually became attached to it, were basically his creation. Darmois' statistics course, very Anglocentric in its style and spirit, was published in 1928 and translated into Spanish, Chinese and even into English. One should also mention his small book of 1934 which contains interesting comments on the applications of statistics to economics and psychology. Thus Georges Darmois swam against the French probabilistic current between 1930 and 1950; the opinion of French probabilists on British researchers was lukewarm, and they sought "to take inspiration from physics rather than economics or sociology", as Fortet puts it in his note of 1960. Moreover, the French School of statistics had difficulty in grasping the direction in which history was moving after the Second World War, just at the time when theoretical and applied statistics suddenly acquired an added dimension, and came to the forefront almost everywhere in the world.

In mathematical statistics, Darmois' original contributions of the 1930's and 1940's are particularly interesting. Let us note particularly his work on the concept of sufficiency; Darmois appears to have been the first to study it in the general framework of exponential models. We should also point out that the general Cramér-Rao inequality is partly due to Darmois, as well as others before and after him (see the note by L.Lebart on this topic in Benzécri, 1982). Darmois was also one of the pioneers of stellar statistics; and of factorial analysis. As an outcome of this last interest, his name is commemorated in the Skitovich-Darmois Theorem for the characterization of the normal distribution by the independence of linear forms, although he did little more than enunciate a general form (Darmois, 1951). The case of two variables had been initiated by S. Bernstein (q.v.) in 1941, and is known as Bernstein's Theorem. However, Darmois soon lost his interest in contem-

porary research in mathematical statistics. Whether because of his nature or through choice, Darmois progressively devoted himself to teaching and the dissemination of statistical methods at all levels. This included the work of Neyman (q.v.), Wald (q.v.) and the various American Schools of the post-war years of which he knew, and had encouraged in their early years, but whose developments he had not kept up with, possibly because of his loyalty to Fisher, and certainly because he was busy with other projects. Nevertheless, we should note that among those researchers who learned their probabilistic statistics from Darmois were such remarkable personalities as Doeblin, Loève, Halphen, Malécot, Guilbaud, Massé, LeCam and others. Thus Edmond Malinvaud reminiscing about his master, who in 1953-54 had asked him to give an innovative course on econometric methods, found a beautiful form of words to speak of "Georges Darmois, who thought so well and taught so well, but wrote so little (though I should have said 'but published so little')".

Darmois was appointed to the Faculté des Sciences de Paris in 1933 on the death of Painlevé. He was tenured in 1942 while he was in Britain "appointed irrespective of his will" (Archives Nationales AJ/16/5737). In fact, Darmois was part of the Anglo-French Scientific Mission which happened to be in Britain at the time of France's collapse in June 1940. He decided, or had it decided on his behalf, that he should not return to France. From 1940 to 1944, he was entrusted with teaching and research assignments for the Free French, first in London and later in Algiers, where no one held him by force. Exempted from Army service, he taught at the University of Algiers, where he supervised two theses in statistics. The administrative fiction of Darmois' being held in Britain against his will allowed him to retain his salary, and to pursue his career most honorably. In contrast, his brother Eugène (1884-1958), a physicist who was Professor in the Faculté des Sciences de Paris, was accused of being a collaborator after the liberation of France. Suspended from his duties for a time, like Julia and de Broglie, he was reinstated "with a reprimand" in December 1944, and was even elected to the Academy of Science in 1951.

It was Darmois who succeeded Fréchet (q.v.) in the Chair of the Calculus of Probabilities and Mathematical Physics at the Sorbonne in 1949. He retired in 1958, shortly before his death in January 1960. His successor, Fortet, was the last holder of the historical chair of the Calculus of Probabilities, which was abolished together with all other chairs by the Loi d'orientation (Orientation Law) of 1968. Dugué was then appointed director of the ISUP,

a responsibilility which he fulfilled for twenty years until his retirement.

Georges Darmois was elected to the Academy of Science in 1955 in the Astronomy Section, to take up Jean Chazy's (1882-1955) place. Among positions held by him, were the Presidencies of the Société Mathématique de France and the Société Statistique de Paris. He represented France in all the international statistical institutions, and from 1953 until the time of his death in 1960, served as the ninth President of the International Statistical Institute. One should add that Darmois for a long time managed a family smelting works, and always retained close contacts with French industrial circles.

On the basis of the opinions of all who knew him, Darmois was an extraordinarily dynamic man, who was open to the influences of both things and people. The number of his pupils and the diversity of subjects in which he guided them bear witness to this. He was gifted with a brilliant vitality, an illuminating intelligence and immense goodwill. Most of this he directed towards the young researchers who came to him from all parts of the world, many of whom continue to recall him with profound gratitude.

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