

Obituary

David Harold Blackwell, 1919-2010

David Harold Blackwell, professor emeritus of mathematics and statistics at the University of California at Berkeley, passed away peacefully in Berkeley July 8, 2010, at age 91. He was a towering figure in probability, statistics and the mathematical sciences, He was much involved with the advancement of these fields, particularly because of his interests in theory and in teaching and for the benefit of minorities. He lived through the periods of World War II and when the United States was rejecting and dealing with segregation in legal and social ways. He experienced racism, but fought it with composure. He was the first African American inducted into the National Academy of Sciences.

He has received 13 honorary doctorates once remarking that the two most important to him were from Howard and Illinois as they knew him best. He has other notable ones in particular from the Universities of Lesotho and Warwick. He was elected to the American Academy of Arts and Sciences; he received the R. A. Fisher Award and also the von Neumann Theory Prize of the Operations Research Society of America. He received the Berkeley Citation, gave the Wald and Reitz Lectures of the Institute of Mathematical Statistics. He had lectures and concepts named after him including: MAA-NAM David Blackwell Lecture, Blackwell-Tapia Award, Blackwell determinacy, Blackwell games, Blackwell's renewal theorem, Blackwell spaces, the Rao-Blackwell Theorem, Blackwell optimal policies, Blackwell's theorem for G-sub delta winning sets, Blackwell's approachability theorem, Blackwell's theory of combination of experiments, and the Blackwell channel. When reading through Blackwell's Bibliography it is impressive how many highly topical and interesting papers he wrote on topics of contemporary interest. Topics include: Bayesian statistics, decision theory, duels, dynamic programming, game theory, information theory, logic, Markov chains, merging of opinions, probability theory, set theory, sequential analysis, the Big Match game.

David was born at home in Centralia, Illinois on 24 April 1919. Centralia was then a junction point of the Illinois Central Railroad. His father, Grover Blackwell, worked for the Railroad as a hostler, a hostler being someone who services train engines at the end of their runs. David remarked once, "I still get a special feeling every time I see a picture of a steam locomotive."

His higher education was all at the University of Illinois-Champaign. He entered university in 1935 aged 16. He was elected to Phi Beta Kappa, and obtained an A.M. after 3 years. having taken all the undergraduate mathematics courses. After receiving an A.M. in 1939, he studied for a Ph.D. with J. L. Doob obtaining it aged 22. His thesis was titled "Properties of Markov Chains". Of his supervisor David said in an interview, "He was ... clearly the most important mathematical influence on me." He also said, concerning his early papers, "the main question I asked myself was, what will Joe Doob think of this?"

In 1941 David was awarded a Rosenwald Fellowship at the Institute for Advanced Studies in Princeton. The year there he became acquainted with J. von Neumann, L. J. Savage, S. S. Wilks amongst others. He already knew P. Halmos from Illinois. Another Institute visitor, Hans Samuelson, later wrote that during that year there were two people that were not allowed into Fine Hall, because of military work going on there, himself as an enemy alien and David Blackwell as a black American. Fine Hall was then the Princeton Mathematics building.

During the Institute year David wrote 105 or so letters of application, all to black colleges. He visited 30 of them and to see what the country and black colleges were like. In the end he received three jobs offers and accepted the position of Instructor at Southern University in Baton Rouge in 1942. The following year he moved on to an Instructorship at Clark College, Atlanta. Finally in 1944 David obtained a regular appointment. It was in the Mathematics Department at Howard University, DC. He remained there until 1954 at which time he was a Full Professor and Department Chair.

During 1954-1955 Blackwell was a Visiting Professor at the University of California at Berkeley and then appointed Full Professor in 1955. At the time of his appointment he had published over 20 papers appearing in the major mathematics and statistics journals. He had also collaborated on a book, "Theory of Games and Statistical Decisions", with Meyer A. Girshick whom he has described as having a major influence on his career.

David's Berkeley years were full. He became Department Chair in 1957 and doing a remarkable job during a trying time, see E. L. Lehman (2008), "Reminiscences of a Statistician: the Company I kept". He was a member of a broad variety of committees, many within the university and many without. For example in 1964 he was member of the American Statistical Association's Census Advisory Committee. In the department he created the concept of Neyman Visiting Assistant Professorships. They were implemented to help reduce the pains associated with some not being promoted to tenure. People have wondered about David's political life. Here are some indications. During the Free Speech Movement period David joined Professors J. Feldman, H. Helson, M. Hirsch, L. LeCam, S. Smale, A. Thomasian and G. Turin in a public statement announcing their shock at the massing of police on campus. In an interview he said, "I am anti-war and have always been anti-war.", "I felt, and still feel, that Martin Luther King and Gandhi had the right idea." David has said that his father came to Centralia to replace striking railroad workers, noting that because of the railroad union's racism blacks had not been allowed to be members. In an interview he remarked, "That unions are sometimes good and sometimes not good." David attended the 1972 Democratic National Convention in Miami Beach as a delegate for George McGovern.

David spent several summers out of academia: in 1942 as Assistant Statistician at the Office of Price Administration in DC and later in the period 1946-1950 at the Rand Corporation, Santa Monica. During the Rand periods, David was author of some 10 reports. Richard Bellman was often the co-author. There Blackwell became a diehard Bayesian, once saying, "Jimmy [Savage] convinced me that the Bayes approach is absolutely the right way to do statistical inference." Savage had been at the Institute for

Advanced Study with him, and they worked together again at RAND. Blackwell has said that he thought that he was looking for Bayes all along, and Savage was the one who brought him to it. At a 1950 garden party at Stanford University, in a discussion of which current statistical developments would prove interesting in the future, David said, "Of all the things going on in statistics today, the only work sure to be significant fifty years from now is Savage's". David was the first Bayesian that I met in my career that was not confrontational.

David's teaching and lecturing were always described in superlatives. In particular one can point to his 1969 gem of a text, "Basic Statistics". It was meant for students with little mathematical background. In the Preface he wrote, "Balls and urns are used to illustrate practically every idea introduced. ...The approach is intuitive, informal, concrete, decision-theoretic, and Bayesian." Concerning David's research Paul Halmos has written that "David is both a pure mathematician, who knows about some of the fanciest parts of what is known as a descriptive set theory, and as a statistician, who can use fancy set theory to get results that other statisticians regard as important." An early paper with Richard Bellman, "Some two-person games involving bluffing", was communicated to the Proceedings of the Academy of Science by John von Neumann. David wrote about 84 research papers. Some 42 appeared in *Ann. Math.*, *Statist./Ann. Prob./Ann. Statist.* His first student was, Howard Tucker, who wrote a thesis titled, *Contributions to the Mathematical Theory of Accident Proneness with Particular Reference to Multiple Exposure* (1955). His last doctoral students were Kooros Mahjoob-Behrooz and Robert Nau with thesis titles *The Unobserved Variables in Simultaneous Equations Systems* (1981) and *Coherent Assessment of Subjective Probability* (1981), the latter jointly supervised with R. Barlow). There were 62 doctoral students in between.

David had some notable connections with the United Kingdom and the Royal Statistical Society. In high school he had used Hardy's *Pure Mathematics* as a text. The opening of his 1974 Rouse Ball Lecture was to the effect that he had heard of W.W. Rouse Ball long before he had heard of Cambridge University. This was because his high school library, with perhaps five mathematics books in it, had Rouse Ball's *Mathematical Recreations and Essays*. There was a 1964 paper with David Kendall, "The Martin boundary for Polya's urn scheme". David Kendall speaking of Blackwell's 1958 paper, "Another countable Markov process with only instantaneous states" David Kendall spoke of being surprised by the result. In 1970 David read a Discussion paper to the Society, "On stationary policies". During 1973-1975 David was the Director of Berkeley Study Abroad program for Ireland and the UK. He, his wife, Ann, and his youngest daughter, Sara, moved to London. David visited various British universities and gave lectures. He noticed some basic differences with the USA: the politeness, the queuing, the manners on the pavement, and the general lack of competitiveness. He hadn't realised these differences existed until he came to live in the UK. In one interview he said, "I've never regarded the police as my friends. They were always the enemy. Not that they ever did anything to me. In England I did. They didn't carry guns and also their general attitude. Their attitude was to try to be helpful. Not to try to control you, but to try to be helpful."

Throughout his life David had amusements. In his youth there were checkers, chess, marbles, baseball and softball, He was long a track devotee and attended the US National Championships. In his youth he organized track meets. Later on in the Department he would be seen acting as a kriegspiel judge. The family had property in Mendocino County. He paid someone to bring a bulldozer to carve out a swimming area at the river. David hoped to spend time under the redwoods sipping martinis, but found chores to do. (His martinis were renowned for their strength and I never dared try one.) There is a sad sports story. During his stint in London David was on the Tube going to a game at Wembley. As the train got closer to the stadium, David felt that he had to turn back because the atmosphere had gotten too rough.

David was an excellent toastmaster. He had various sayings for particular occasions: "Always look for the simplest solution", "If all else fails, read the manual." and "Once one is seventy one gets to tell the truth."

David's Berkeley appointment became joint with mathematics in 1973. He retired as Emeritus Professor in 1989, but continued to come into the Department, most every weekday until just before he died,

Blackwell is survived by four of his eight children: Hugo of Berkeley; Ann Blackwell and Vera Gleason of Oakland; and Sarah Hunt of Houston, Texas. He was preceded in death by his wife, Ann Madison Blackwell, who died in 2006 after 62 years of marriage; and children Julia Madison Blackwell, David Harold Blackwell Jr., Grover Johnson Blackwell and Ruth Blackwell Herch.

Being David's colleagues it has been a privilege. His honours and accomplishments listed here are but a few of many.

David R. Brillinger

