A Look at the History of Mathematics and Statistics at Rice (And Rice Itself)

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Presented at the Opening of

A Symposium on Optimal Stopping In Memory of Larry Shepp

Duncan Hall, Rice University, Houston, TX

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Welcome and Brief History of Rice and Its Programs in Mathematics/Statistics

- I would like to also extend my welcome and hope you take advantage of many of the amenities in Houston, the 4th largest city in the USA
- We are very fortunate to have Philip Ernst on the Statistics faculty
- Philip is a man of endless talents (3 teaching awards, Tweedie Award, research), including organizing this barn burner event
- Philip asked that I present a short description of Mathematics and Statistics/Probability at Rice
- Rice's first President was a Mathematician, and a third of the original faculty were mathematicians and statisticians
- I hope these brief comments will inform you of this interesting history and the cast of the Institute, its faculty and personalities

Picture of a young William Marsh Rice



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Rice's Vision for the Rice University

- Rice split his time between Houston (before 1865) then NYC
- Made his fortune in Real Estate, Lumber, Cotton (rumors of gun running?)
- First 1882 Will established an Orphans Institute, but Rice later changed his mind
- Established Concept of Rice Institute in his 1891 NY Will
- Texas Lawyer (Captain) James A. Baker was named one of 3 Executors of the revised Will
- (James A. Baker III is his grandson Secretaries of Treasury and State; White House Chief of Staff; Rice University Trustee)
- Rice's vision was closer to The Cooper Union (est'd 1859, informally "The Cooper Institute") that offered a tuition-free technical education (as opposed to a *full* university)

Rice's Vision for the Rice University (continued)

- ► Mr. Rice was poisoned by his valet, Charles Jones, on 9/23/1900 in NYC at the age of 84
- A self-serving and forged will was filed by another of Rice's TX/NY Lawyers, Albert T. Patrick
- Captain Baker was suspicious and traveled to NYC; Jones and Patrick were convicted of conspiring to murder Mr. Rice
- ▶ The Rice Institute was "saved" and received \$5M and much property (e.g., Rice owned the land under Yankee Stadium until 1971 when Mayor Lindsey "stole" it via eminent domain)

Establishment of the William Marsh Rice Institute

- "Captain" James Baker chaired the new Board of Trustees (size seven and included Rice's nephew (Princeton grad), and the new Institute's President)
- Their preliminary studies shifted the original Rice vision from technical school to a full University
- The full name of the institute reflected the shift:

William M. Rice Institute for the Advancement of Literature. Science and Art

- President Wilson (then Princeton, soon USA) recommended a young Mathematics and Astronomy Professor, Edgar Odell **Lovett** to lead the new Institute in 1908
- Lovett famously traveled a year and visited all the major universities in the Northeast USA, Europe, and Asia
- Lovett studied building plans, architecture, labs, administration, museums, regulations
- Lovett sought advice, met faculty (with an eye to recruit),
 Control (100 met faculty (100 met faculty))

- Lovett recommended remote site 5 miles from downtown, where "no business would every choose to locate"
- Architect was not thrilled with flat, featureless, swampy site



Construction was begun in 1911



 Lovett recruited 9 more faculty and an extravagant opening ceremony occurred on 10/12/1912

PROGRAMME

OF THE FORMAL OPENING OF THE RICE INSTITUTE

THURSDAY, OCTOBER 10тн FRIDAY, OCTOBER 11тн SATURDAY, OCTOBER 12тн SUNDAY, OCTOBER 13тн

1912

Rice Institute President Edgar Odell Lovett



President's Lovett's 1898 Thesis Director, Sophus Lie

Sophus Lie was Professor, the University of Christiania (city renamed Oslo in 1925)



Sophus Lie Among Many Bust Reliefs on Lovett Hall



Famous Scientific Plenary Speakers at Opening

- Botany: Hugo de Bries, U Amsterdam
- Chemistry: Sir William Ramsay, U London, Nobel Laureate
- History: Rafael Altamira y Crevea, U Oviedo, Spain
- Mathematics: Emile Borel, U Paris
- Mathematics: Vito Volterra, Senator from Italy
- Philosophy: Sir Henry Jones, U Glasgow,

- Henri Poincarè also accepted the invitation (1912 photo)
- ▶ In poor health; sent remarks ahead; died 7/16/1912
- His speech was read by Vito Volterra as parts of his remarks



Other Selected Speakers at Events During Opening

- Princeton, Professor William Francis Magie, Dean of Faculty
- Princeton, Professor Edwin Grant Conklin, Chairman Biology
- Chicago, President Harry Pratt Judson
- Vanderbilt, Chancellor James Hampton Kirkland
- Wisconsin, George Gary Comstock, Dean Graduate School
- Baylor, President Samuel Palmer Brooks
- Stanford, (First) President David Star Jordon (1891-1913)
- Johns Hopkins, President Ira Remsen
- Texas, President Sidney Edward Mezes
- New Mexico, President David Ross Boyd
- Reed College, (First) President William Trufant Foster (1911-1919)
- Governors, Politicians, Poets, Artists, Clergy, ...

Attendees at the Opening Ceremonies Rice Institute 1912



President Lovett's Original Ten Faculty

- The Rice Institute opened in 1912 with 10 faculty and 77 students
- Mr. Rice's Will spoke of "for men," but the first class was 1/3 women
- Most were in the sciences; humanities faculty hired later
 - Mathematics: Griffith Conrad Evans (Harvard PhD) and Percy John Daniell (Cambridge); Lovett rarely taught
 - Biology: Julian Huxley (Oxford; brother of Aldous Brave New World)
 - History/Literature/German: Thomas Blayney (Heidelberg, Kentucky's Central U)
 - Physics: Harold Albert Wilson (from King's College)
 - Architecture: William Ward Watkin (Construction supervisor; Rice's Architect was Ralph Cram from Boston)
 - Others: Athletics, Chemistry, Electrical Engineering, English
- Professional schools in Architecture, Music, Law, Medicine, and Business were planned
- ► The first Phd was awarded in 1918 to Hubert Bray in Mathematics!

Original Faculty and Trustees



Griffith Conrad Evans: Mathematics Department Chair



Another Photo Labelled "Dreamboat GC Evans"



Evans' Long Career in Mathematics

- Evans, G.C. (1936), "Potentials and Positively Infinite Singularities of Harmonic Functions," Monatshefte für Mathematik und Physik, 43:419–424.
- When Rice decided to create a sheltered program in Athletics in 1933, Evans left the next year (after 22 years) to Chair the Math Department at Berkeley (1934-1949), retiring in 1955
- Evans is credited with succeeding at Berkeley, hiring notables such as (cf Wikipedia)
 - Hans Lewy (PDEs, Functions of Several Complex Variables)
 - Jerzy Neyman (Confidence Intervals, Hypothesis Testing, Neyman-Pearson Lemma)
 - Alfred Tarski (Model Theory, Metamathematics, Algebraic Logic,...)
- Evans Hall is his namesake
- Ironically, Evans told Lovett that athletics' influence was 10 times worse at Berkeley!!!
- ► Evans died in 1973 at the age of 86

Percy John Daniell (1889 - 1946)

http://www.jehps.net/Decembre2007/Aldrich.pdf for biography: Electronic Journ@l for History of Probability and Statistics



Profs Daniell, Wilson & Hughes in Football Stands 1915



Percy Daniell's Amazing Work at Rice (1912-1924):

Daniell, P.J. (1918), "A General Form of Integral," Annals of Mathematics, 19:279–294.

The Daniell Integral

- Daniell, P.J. (1919), "Functions of Limited Variation in an Infinite Number of Dimension," Ann. Math., 20:30–38.
- Daniell, P.J. (1919), "Integrals in an Infinite Number of Dimensions," Annals of Mathematics, 20:281–288.
- Daniell, P. J. (1920), "Further Properties of the General Integral," Ann. Math., 42:203–220.
- Daniell, P. J. (1920), "Observations Weighted According to Order," American Journal of Mathematics, 42:222–236.

Considered weighted sum of various percentiles

- Daniell, P. J. (1921), "Integral Products and Probability," American Journal of Mathematics, 43:143–162.
- ► Daniell was promoted to full_Professor in 1920.

Daniell's Work Per Aldrich's 2007 Article in JHEPS

- ▶ From the abstract: *P. J. Daniell is a mysterious figure who* appears at several turns in the history of mathematics in the 20th century, in the fields of integration, stochastic processes, statistics, control engineering and even in the history of English mathematical education.
- When David Kendall was asked about the origins of British probability tradition, he wrote:

But you have to remember P. J. Daniell of Sheffield. Daniell wrote his major papers in the US in the South — I think. Who taught him? When he went to Sheffield he apparently gave up probability and started working on the design of blast furnaces.

The mystery is especially teasing when the name is so familiar through eponyms—Daniell integral, Daniell window, & Daniell-Kolmogorov extension theorem.

For statisticians he was discovered — or perhaps re-discovered — when Stigler (1973) brought to light a paper on robust estimation, mentioned in passing one on stochastic processes.

- Daniell had been recommended to President Lovett by Cambridge Physicist, J. J. Thomson, as Daniell had won the Rayleigh Prize in 1911 and was top wrangler at Cambridge
- Daniell had trouble finding appropriate journals in which to publish; those papers were "missed" by European and mainstream US researchers
- He likewise had trouble finding related work since journals were scarce in Houston
- Aldrich gives a detailed account of discovery, missed connections, who deserved credit. As Stigler wrote:

It could in fact be claimed that Daniell was at least thirty years ahead of its time, for it took that long for his major results to be rediscovered.

Professor Jim Douglas, Jr

- I include Jim Douglas not only because he was an accomplished pioneering computational mathematician and numerical analyst, but also because he once flunked every Engineering student in his ODE course, leading to the formulation of the Dept of Mathematical Sciences in 1969
- MathSci trifurcated into Computer Science (1984),
 Computational and Applied Mathematics (1984), and
 Statistics (1987), all in Duncan Hall



Professor Salomon Bochner

Bochner came to Rice after retiring at Princeton.

1968-1983

Salomon Bochner

Recognized for profound and seminal contributions to disparate areas of analysis including almost periodic functions, Fourier analysis, complex analysis, Lie groups, differential geometry, partial differential equations, functional analysis and probability theory

Solomon Bochner at Rice (after Princeton Retirement)



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Professor Roger Penrose in his Rice Office (1983-1987)



Penrose Gave Lectures on Penrose Tilings, both 2-D & 3-D (the latter unpublished?)



Professor Robert Bryant — Next Young Generation

After Phd, 1 year leave at IAS (Princeton); then at Rice promoted to Assoc Prof 2nd year; Full Prof 3rd year

1979-1988 **Robert Bryant** Contributed to differential geometry, including exterior differential systems, exceptional holonomy, and **Finsler geometry**

Bryant as MSRI Director 2007-2013 (Currently at Duke)



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Origin of the Statistics Department

Founded in the School of Social Sciences in 1987, with Jim Thompson as Chair, Scott, and Ensor continuing faculty



James R. Thompson (1938-2016); Princeton student of Tukey.

- Three years later, Scott became Chair (1990-1993); Moved Statistics back to Engineeringl Hired Dennis Cox; Promoted Kathy Ensor (Dept Chair for 14 years, Current VP of the ASA)
- Faculty has grown to 14+3, including our Provost and 4 outstanding Assistant Professors such as Philip Ernst



- Joint Phd program with MD Anderson
- 100 majors, 45 doctoral students, 45 professional masters students
- Please visit our web site: statistics.rice.edu
- And enjoy the symposium

Welcome and Thank you