Marshall Harvey Stone

Marshall Harvey Stone (April 8, 1903 – January 9, 1989) was an American mathematician who contributed to real analysis, functional analysis, topology and the study of Boolean algebras.

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Biography

Stone was the son of Harlan Fiske Stone, who was the Chief Justice of the United States in 1941–1946. Marshall Stone's family expected him to become a lawyer like his father, but he became enamored of mathematics while he was a Harvard University undergraduate. He completed a Harvard Ph.D. in 1926, with a thesis on differential equations that was supervised by George David Birkhoff. Between 1925 and 1937, he taught at Harvard, Yale University, and Columbia University. Stone was promoted to a full Professor at Harvard in 1937.

During World War II, Stone did classified research as part of the "Office of Naval Operations" and the "Office of the Chief of Staff" of the United States Department of War. In 1946, he became the chairman of the Mathematics Department at the University of Chicago, a position that he held until 1952. He remained on the faculty at this university until 1968, after which he taught at the University of Massachusetts Amherst until 1980.

The department he joined in 1946 was in the doldrums, after having been at the turn of the 20th century arguably the best American mathematics department, thanks to the leadership of Eliakim Hastings Moore. Stone did an outstanding job of

Marshall Harvey Stone	
 Zürich 1932	
Born	April 8, 1903 New York City
Died	January 9, 1989 (aged 85) Madras, India
Citizenship	American
Alma mater	Harvard
Known for	Stone–von Neumann theorem, Stone–Čech compactification, Stone–Weierstrass theorem, Stone's Representation Theorem
Awards	National Medal of Science (1982)
Scientific career	
Fields	Real analysis, Functional analysis, Boolean algebra, Topology
Institutions	Harvard University, University of Chicago, University of Massachusetts Amherst
Doctoral advisor	G. D. Birkhoff
Doctoral students	Holbrook MacNeille, Harvard, 1935 John W. Calkin, Harvard, 1937 William Frederick

making the Chicago department eminent again, mainly by hiring Paul Halmos, André Weil, Saunders Mac Lane, Antoni Zygmund, and Shiing-Shen Chern.

Eberlein, Harvard, 1942

Edwin Hewitt, Harvard, 1942

George Mackey, Harvard, 1942

Richard V. Kadison, U. Chicago, 1950

Bernard A. Galler, U. Chicago, 1955

Ádám Korányi, U. Chicago, 1959

Accomplishments

During the 1930s, Stone did much important work:

- In 1930, he proved the celebrated Stone–von Neumann uniqueness theorem.
- In 1932, he published a classic monograph 662 pages long titled *Linear transformations in Hilbert space and their applications to analysis*, a presentation about self-adjoint operators. Much of its content is now deemed to be part of functional analysis.
- In 1932, he proved conjectures by Hermann Weyl on spectral theory, arising from the application of group theory to quantum mechanics.
- In 1934, he published two papers setting out what is now called Stone–Čech compactification theory. This theory grew out of his attempts to understand more deeply his results on spectral theory.
- In 1936, he published a long paper that included Stone's representation theorem for Boolean algebras, an important result in mathematical logic, topology, universal algebra and category theory. The theorem has been the starting point for a whole new field of study, nowadays called Stone duality.
- The Stone–Weierstrass theorem substantially generalized Weierstrass's theorem on the uniform approximation of continuous functions by polynomials.

Stone was elected to the National Academy of Sciences (United States) in 1938. He presided over the American Mathematical Society, 1943–44, and the International Mathematical Union, 1952–54. In 1982, he was awarded the National Medal of Science.[1]

Selected publications

- "A comparison of the series of Fourier and Birkhoff". *Trans. Amer. Math. Soc.* **28** (4): 695–761. 1926. doi:10.1090/s0002-9947-1926-1501372-6 (https://doi.org/10.1090%2Fs0002-9947-1926-1501372-6). MR 1501372 (https://www.ams.org/mathscinet-getitem?mr=1501372).
- *Linear transformations in Hilbert space and their applications to analysis*. New York: American Mathematical Society. 1932.[2]
- "Boolean algebras and their applications to topology" (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1076376). *Proc Natl Acad Sci U S A.* **20** (3): 197–202. 1934. doi:10.1073/pnas.20.3.197 (https://doi.org/10.1073%2Fpnas.20.3.197). PMC 1076376 (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1076376). PMID 16587875 (https://pubmed.ncbi.nlm.nih.gov/16587875).
- *The theory of real functions*. Ann Arbor: Edwards Brothers. 1940.
- "Mathematics and the future of science". *Bull. Amer. Math. Soc.* **63** (2): 61–76. 1957. doi:10.1090/s0002-9904-1957-10098-6 (https://doi.org/10.1090%2Fs0002-9904-1957-10098-6). MR 0086013 (https://www.ams.org/mathscinet-getitem?mr=0086013).
- *Lectures on preliminaries to functional analysis*. Madras: Institute of Mathematical Sciences. 1963. Notes by B. Ramachandran (50 pages)

See also

- Banach–Stone theorem
- Glivenko–Stone theorem
- Stone duality
- Stone–Weierstrass theorem
- Stone's representation theorem for Boolean algebras
- Stone's theorem on one-parameter unitary groups
- Stone–Čech compactification
- Stone–von Neumann theorem

References

1. National Science Foundation - The President's National Medal of Science (https://www.nsf.gov/od/nms/recip_details.cfm?recip_id=348)
2. Hille, Einar (1934). "Review: *Linear transformations in Hilbert space and their applications to analysis*, by M. H. Stone" (http://www.ams.org/journals/bull/1934-40-11/S0002-9904-1934-05973-1/). *Bull. Amer. Math. Soc.* **40** (11): 777–780. doi:10.1090/s0002-9904-1934-05973-1 (https://doi.org/10.1090%2Fs0002-9904-1934-05973-1).

External links

- O'Connor, John J.; Robertson, Edmund F., "Marshall Harvey Stone" (http://www-history.mcs.st-andrews.ac.uk/Biographies/Stone.html), *MacTutor History of Mathematics archive*, University of St Andrews.
- Johnstone, Peter (1982). *Stone Spaces*. Cambridge: Cambridge University Press. ISBN 0-521-23893-5.