

Gordon S. Brown

Born August 30, 1907, Drummoyne, NSW, Australia; founder of the MIT Servomechanisms Laboratory, which pioneered the development of feedback-control theory and applications, digital computer technology, and automatic numerical control of machine tools.



Education: diploma, mechanical and electrical engineering, Royal Melbourne Technical School, Australia, 1925; SB, electrical engineering, MIT, 1931; SM, electrical engineering, MIT, 1934; ScD, electrical engineering, MIT, 1938.

Professional Experience: engineer, Electrical Supply Branch, State Electricity Commission, Victoria, Australia, 1926--1929; MIT: research assistant, electrical engineering, 1931-1932, instructor, electrical engineering, 1932-1939, assistant professor, electrical engineering, 1939-1941, associate professor, electrical engineering, 1941-1946, professor, electrical engineering, 1946-1973, Dugald C. Jackson Professor of Engineering, 1968-1973, institute professor, 1973-1974, institute professor emeritus, 1974-present, founder and director, Servomechanisms Laboratory, 1941-1952, chairman of the faculty, 1951-1952, head, Department of Electrical Engineering, 1952-1959, dean, School of Engineering, 1959-1968.

Honors and Awards: President's Certificate of Merit, 1948; Naval Ordnance Development Award, 1948; George Westinghouse Award, American Society for Engineering Education, 1952; Lamme Medal, American Society for Engineering Education, 1959; Medal in Electrical Engineering Education, American Institute of Electrical Engineers, 1959; Joseph Marie Jacquard Annual Memorial Award, Numerical Control Society, 1970; Bronze Beaver Award, Alumni Association, MIT, 1973; Robert Thayer Award, Thayer School, Dartmouth College, 1976; Rufus Oldenburger Medal, Automatic Control Division, American Society of Mechanical Engineers, 1977; Gordon Stanley Brown Building, MIT, dedicated 1985; DSc, Purdue University, 1958; DSc, Dartmouth College, 1964; DSc, Technical University of Denmark, 1965; DSc, Southern Methodist University (SMU), 1967; DSc, Stevens Institute of Technology, 1968.

Gordon S. Brown entered MIT from Australia in the junior year in 1929. With the BS degree in 1931, he was urged by Vannevar Bush to pursue graduate study instead of joining the Westinghouse Company test course as planned. He began his lifetime career at MIT as a research assistant in 1931; he retired in 1973 as Institute Professor Emeritus. His graduate study leading to the SM degree in 1934 and the ScD degree in 1938 was influenced by Vannevar Bush, Norbert Wiener, and Harold L. Hazen, whom he succeeded as head of the Department of Electrical Engineering in 1952; he became dean of engineering in 1959. The subject of his doctoral thesis was the Cinema Integraph, one of the precursors to the analog computer. He continued to work in the field of computers and automation and made contributions in the area of feedback controls, specifically for guns, radar, and industrial processes.

In 1941, Brown founded the Servomechanisms Laboratory, and served as its director until 1952. He and his laboratory colleagues undertook an extensive program of research and education in the field of servomechanisms and feedback control. The early work that led to the Whirlwind digital computer was done in his laboratory. Just prior to his retirement as director, the laboratory began a program that led to numerical control of machine tools and the development of the Automatically Programmed Tool System¹ (APT-automatic control of machine tools), which had a profound impact on industry. During World War II, Brown served as consultant to the fire control department of the Sperry Gyroscope Company, and from 1942 to 1944 he was War Department consultant to the fire control design section of the Frankford Arsenal, and participated in other ordnance activities. He was appointed associate head of the Department of Electrical Engineering in 1950 and was chairman of the faculty from 1951 to 1952. In 1952 he was appointed head of the Department of Electrical Engineering and his department embarked on a major program of educational innovation. Under his direction the curriculum of the department was revised, and new textbooks and laboratory equipment were developed. These changes initiated widespread reforms in the teaching of electrical engineering throughout the world. The work had important influence on the teaching of electrical engineering in most US engineering schools and many others abroad.

In 1959 Brown was appointed dean of the School of Engineering and his educational reforms were extended to other departments. He led a movement to enlarge the interdisciplinary nature of engineering and to strengthen its concern for societal issues.² A substantial grant that year from the Ford Foundation made possible a new emphasis on themes important to rapidly changing technology. Brown was a key figure in the establishment of the Center for Materials Science and Engineering, the Center for Advanced Engineering Study, the Information Processing Services Center, and Project Intrex.

Although many members of the engineering faculty had contacts with foreign universities prior to 1960, there was no concerted effort by the School of Engineering to sponsor such contacts. During the 1960s and 1970s MIT established more formal technology-transfer programs by assisting developing nations to establish technological education and research institutions. He advised these programs on administrative and educational issues. Included among these institutions were the Birla Institute of Technology and Science in India, the Technical University of Berlin, the Ayra-Mehr University of Technology in Iran, and the University of Singapore.

Brown's activities as an administrator and educator for more than three decades do not overshadow his important technological contributions.

From November 1968 through June 1973 Brown was the first occupant of the Jackson Chair, established to honor Dugald C. Jackson, head of the Department of Electrical Engineering from 1907 to 1935. As Jackson Professor, Brown contributed to the evolution of educational

¹ See biography of Douglas Ross.

² From Brown and Wiener 1955.

philosophy, giving attention to research and education in his own field and to the continued development of technology and engineering on a national and international scale. In March 1973 Brown was appointed Institute Professor, an honor bestowed by the faculty and administration of MIT. The Gordon Stanley Brown Building at MIT was dedicated December 6, 1985. Since the fall of 1986, Brown has served as a key participant in restructuring the Orange Grove Middle School in the Catalina Foothills School District in Tucson, Arizona. A new paradigm named Systems Thinking with Learner Directed Learning has been introduced and accepted district wide including a new high school that opened in 1993.

QUOTATION

“Too many people today begin to worry about qualifying for a new or different job only after their old one has disappeared. This is too late; they run and run and never catch up.” (Private communication)

BIBLIOGRAPHY

Biographical

Brown, G. S., and Norbert Wiener, “Automation 1955: A Retrospective,” reprinted in *Ann. Hist. Comp.*, Vol. 6, No. 4, 1955.

Significant Publications

Brown, G. S., and Donald P. Campbell, *Principles of Servomechanisms*, John Wiley & Sons, New York, 1948.

Brown, G. S., “Can Universities Fulfill the Challenge of Relevance,” *Technology Review*, Oct./Nov. 1973.

Brown, G. S., “Improving Education in Public Schools: Innovative Teachers to the Rescue,” *System Dynamics Review*, Vol. 8, No. 1, 1992.

UPDATES

Gordon Brown died August 23, 1996 (MRW, 2012). Portrait inserted (MRW, 2012)