



FRANCIS W HUTCHINSON
1910-1990



Member ASHRAE Hall of Fame

[180] Francis HUTCHINSON

active 1930

American pioneer in the air-conditioning and refrigeration industry. Professor of Mechanical Engineering at the universities of Berkeley and then Purdue. Saw the potential of solar energy as a heat source with a research program for Purdue Housing Research Association. Hutchinson was a specialist in thermodynamics and heat transfer in heating and cooling panels and co-author (with B.F. Raber) of *Panel Heating and Cooling Analysis* (1947). He was one of the first members inducted into the ASHRAE Hall of Fame.

(Mini-biography from "The Comfort Makers," Brian Roberts, ASHRAE, 2000)

Hutchinson was an early pioneer in the air-conditioning and refrigerating industry and a professor of mechanical engineering at the University of California-Berkeley and at Purdue University. As a teacher, he inspired many young engineers to pursue careers in HVAC&R. Hutchinson also foresaw the potential of solar energy as a heat source and, through the Purdue Housing Research Foundation, he established a solar research program. A specialist in thermodynamics and heat transfer, he studied insulation techniques for shipboard transportation of perishables, thermodynamics of refrigeration and heat transfer in heating and cooling panels. □

(From "HVACR Industry Pioneers Inducted into ASHRAE Hall of Fame," ASHRAE Journal, September 1994)

REFRIGERATION AND AIR CONDITIONING ENGINEERING

B. F. RABER

*Professor of Mechanical Engineering
Chairman, Division of Mechanical Engineering
University of California*

F. W. HUTCHINSON

*Associate Professor of Mechanical Engineering
University of California*

NEW YORK

JOHN WILEY & SONS, INC.

LONDON: CHAPMAN & HALL, LIMITED

Textbook from 1945 (CIBSE Heritage Group Collection)



Purdue University



University of California, Berkeley

Francis Hutchinson taught on the Berkeley campus from 1940 until his retirement in 1974. He was a native Californian, born in Suisun City in 1910. In 1931 he received a bachelor's degree in mechanical engineering from the California Institute of Technology and thereafter worked as a mechanical engineer until 1936. He then studied on the Berkeley campus and received the master of science degree in 1937 and an engineering degree in 1938, both in mechanical engineering. In 1940 he joined the staff of the Mechanical Engineering Department, teaching in the area of applied thermodynamics, particularly refrigeration and air conditioning. During the period of World War II he taught external classes on marine refrigeration and ventilation.

Hutchinson's research was concerned with the definition of human comfort as associated with environmental conditions. At that time radiant heating was of increasing interest. To improve the evaluation of radiant-heat input to a person, he measured shape factors from various locations to forms typical of the human body.

In 1945 he left the Berkeley campus for a professorship at Purdue University where he continued his research on comfort conditions. In 1947 he returned to Berkeley as Professor of Mechanical Engineering and so continued until his retirement.

“In Memoriam” (University of California, Berkeley web site)

FRANCIS W HUTCHINSON

1910 – 1990

Francis W Hutchinson received his Bachelor of Science degree from the California Institute of Technology in 1931, a Master of Science degree in 1937, and a Master of Engineering degree in 1938, both from the University of California-Berkeley. He was an ASHRAE Fellow and a highly respected Professor of Mechanical Engineering at the University of California-Berkeley and Purdue University. He was one of the pioneers of the air-conditioning and refrigeration industry and as a teacher, inspired many young engineers to pursue a career in the industry. Professor Hutchinson had the vision to foresee the need to increase the effectiveness of HVAC&R equipment and wrote papers dealing with improvements in efficiency. In 1945, through the Purdue Housing Research Foundation, he established a solar energy research program. Other research programs included insulation techniques for shipboard transportation of perishables, thermodynamics of refrigeration, and heat transfer in heating and cooling panels. The US State Department sponsored him for four years as a visiting scholar to institutions in Indonesia and India. Professor Hutchinson authored 178 papers and articles. He also authored and co-authored 14 books dealing with industry subjects. Francis W. Hutchinson was inducted into the ASHRAE Hall of Fame in 1994.

(Edited extract from ASHRAE “Hall of Fame” Citation)



MARGARET INGELS
Active 1916-1952



America's first woman air conditioning engineer



[109] Margaret INGELS

active 1916-1950

American engineer. One of the first women to earn a degree in Mechanical Engineering (University of Kentucky, 1916). Second female member of ASHVE, joining shortly after Helen Innis (1917). Joined (1921 or 1922) the staff of the ASHVE Research Bureau working under F. Paul Anderson [179] the Bureau's second Director (1921-1925). Ingels was later titled Mechanical Engineer and Research Head (c. 1926). She left the Bureau (1927) and rose to prominence in the industry with her later work in air conditioning as an associate of Willis Carrier [101]. Recognizing the increasing potential of small air-conditioning units, Carrier put "America's first woman air conditioning engineer" in charge of a campaign to educate the public as to the benefits of air conditioning. She made some 200 speeches (1932-1952) including *Petticoats and Slide Rules* (1952). Served as Librarian and Engineering Editor for the Carrier Corp. Ingels prepared a 400-page manuscript (Cornell University Archives) on the life and achievements of Carrier,* which was subsequently reduced "to about 16% of the original" in her biography *Willis Haviland Carrier: Father of Air Conditioning* (1952).

(Mini-biography from "The Heat Makers," Brian Roberts, ASHRAE, 2000)

Margaret Ingels

One of the first women in the world to earn a degree in mechanical engineering; awarded in 1916 by the University of Kentucky. She became one of the first female members of The A.S.H.V.E. and joined the staff at the Research Bureau in 1922.

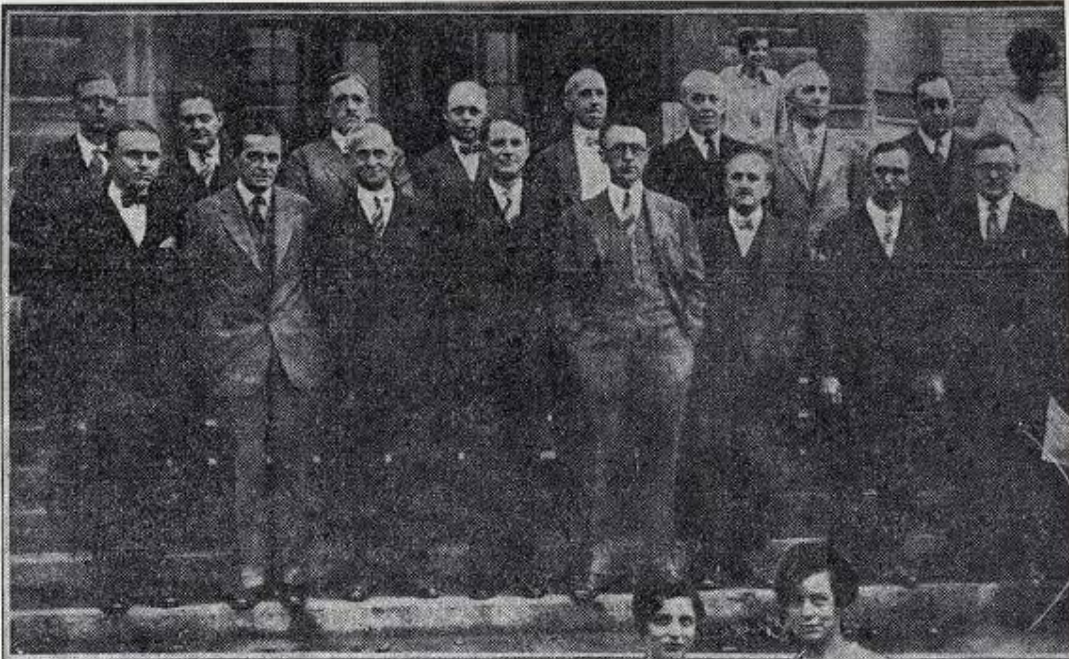


(From "Proclaiming the Truth," ASHRAE, 1995)



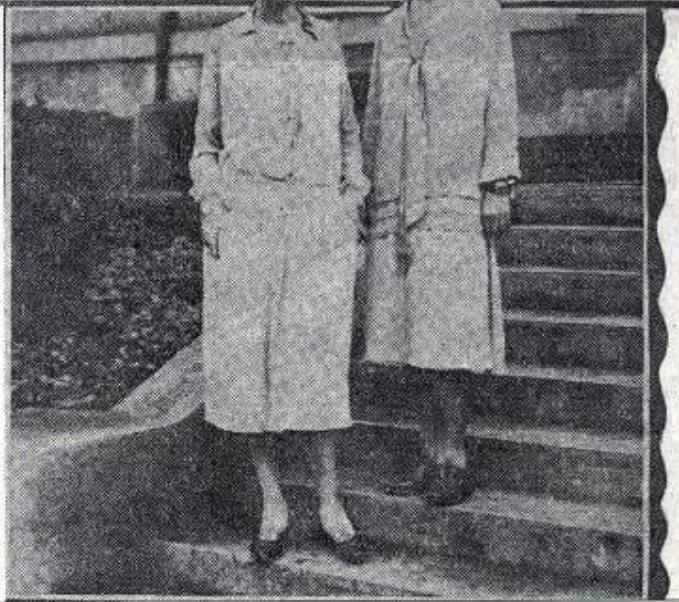
Margaret Ingels (pictured) and **Helen R. Innis** were the first female members of ASHVE. Ingels was called the first woman to receive a mechanical engineering degree, earned at the University of Kentucky's College of Engineering. She began working for Carrier Corp. in 1917 and joined the ASHVE Research Laboratory in 1921. In 1927, she worked for the New York State Commission on Ventilation, before rejoining Carrier Corp., from which she retired in the 1950s. Innis attended the New York School of Heating and Ventilating, and worked with the Positive Differential System Co. and Donnelly Systems Corp., designing residential and industrial heating systems.

(ASHRAE Journal, June 1994)



Engineers in Convention

On October 18, 1926, the Research Bureau held its first open house for Society members. Pictured are back row, left to right -- C. F. Zobel; L. A. Harding; C. V. Haynes; A. E. Stacey, Jr.; H. P. Gant, chairman of the Committee of Research; A. J. Wood; F. B. Rowley; and F. C. Houghton, director of the Research Bureau. Bottom row, left to right -- E. W. Stitt; William G. Boales; J. A. Donnelly; E. C. Lathrop; Percy Nicholls; Thomas M. Dugan; Samuel R. Lewis; and R. V. Frost. In the lower picture are Helen Cochran, secretary of the Research Bureau, and Margaret Ingels, mechanical engineer and research head of the Bureau.



(From "Proclaiming the Truth," ASHRAE, 1995)



Figure 9-22 *Margaret Ingels was a staff engineer at the ASHVE Research Bureau from 1921 to 1927. Ingels was apparently the first woman engineer to join the ASHVE, and rose to prominence in the industry with her later work in air conditioning as an associate of Willis Carrier (from Sheet Metal Worker, April 4, 1930, p. 193).*

*(From "Heat & Cold: Mastering the Great Indoors,"
Barry Donaldson & Bernard Nagengast, ASHRAE, 1994)*

WILLIS HAVILAND CARRIER

*Father of
Air Conditioning*

by Margaret Ingels

1952 • COUNTRY LIFE PRESS • GARDEN CITY

*Ingels' Biography of Willis Carrier
(CIBSE Heritage Group Collection)*

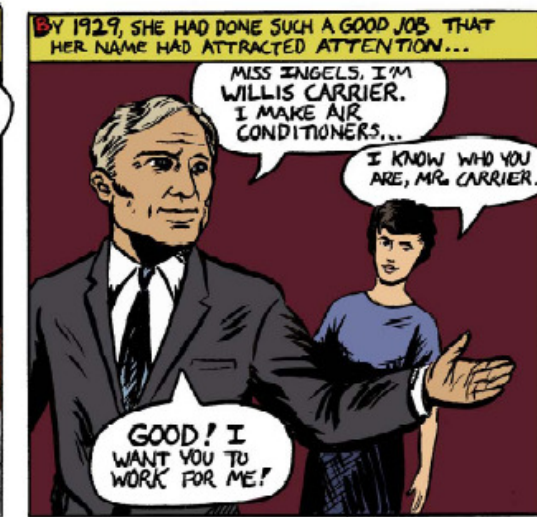


Willis Carrier and Margaret Ingels



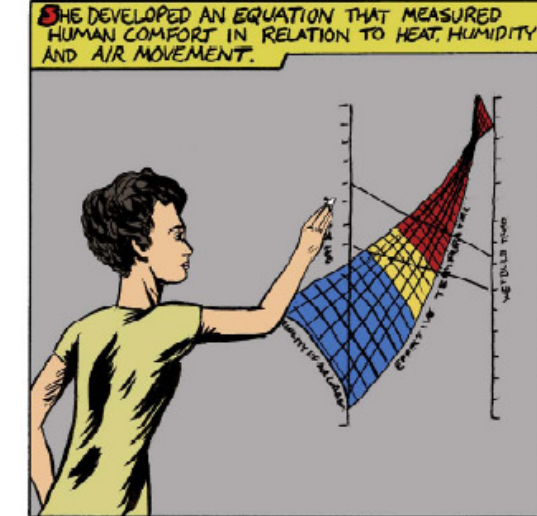
The Margaret Ingels Hall of Residence, University of Kentucky

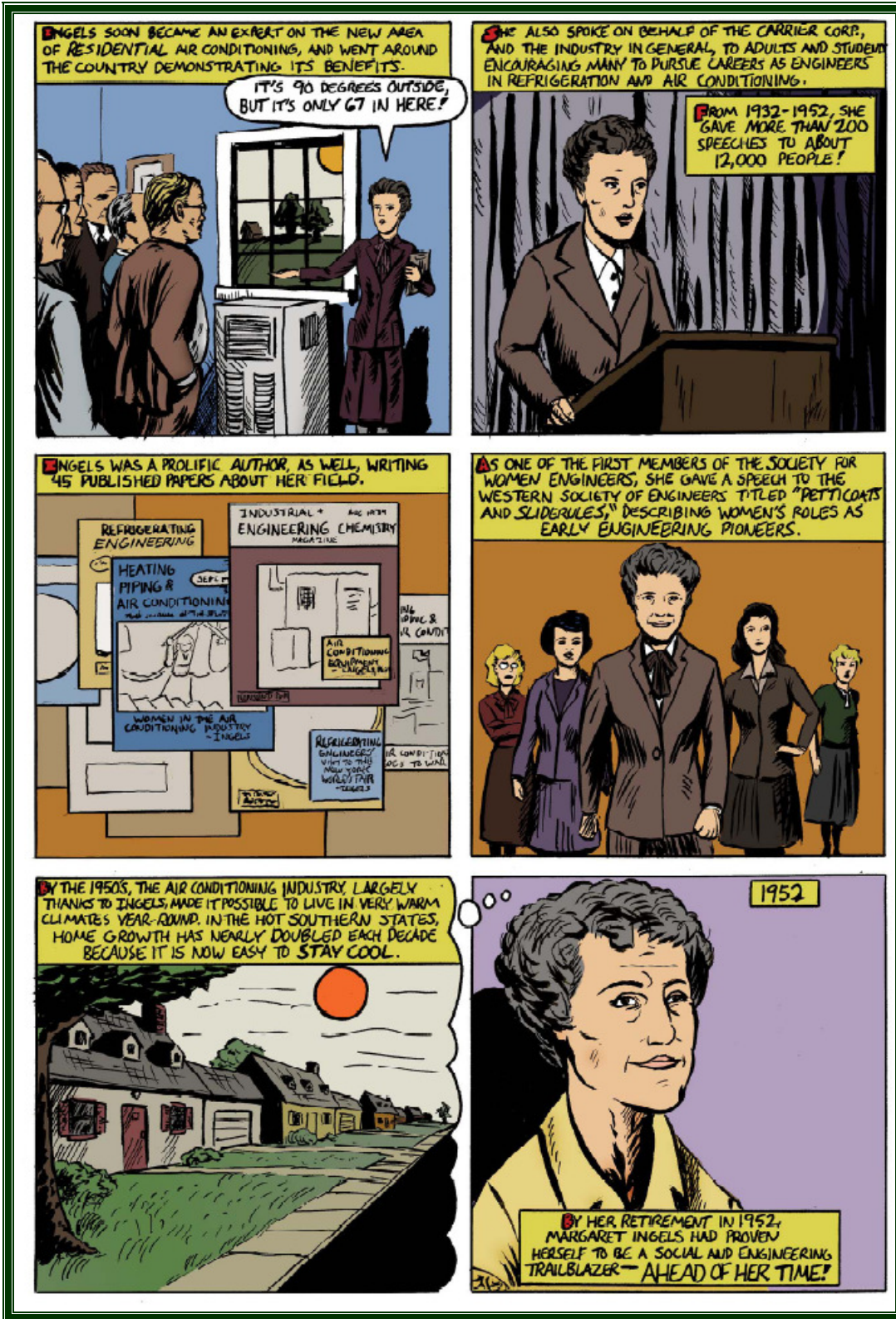
AHEAD OF HER TIME



AIR CONDITIONING WAS A RELATIVELY NEW INDUSTRY. THE TECHNOLOGY WAS STILL DEVELOPING, AND MOST AIR CONDITIONERS WERE BEING USED IN INDUSTRIAL BUILDINGS AND THEATERS.

INGELS JUMPED RIGHT IN AND BEGAN TO MAKE HER MARK!





(From the web site anniversary.asme.org/comic book American Society of Mechanical Engineers, founded 1880)

MARGARET INGELS**1892 – 1971**

Margaret Ingels was a student of F Paul Anderson and was the first woman to graduate from the University of Kentucky School of Engineering and the second woman to receive an engineering degree in the United States. In addition, she was the first woman in the United States to receive a graduate engineering degree. Ingels worked with Anderson at the ASVE laboratory and later became a long time associate of Dr. Willis Carrier and became a spokesperson for Carrier Corporation and for the industry. She captured the interest of many young minds with demonstrations of refrigeration principles and her speeches inspired young people to enter the air conditioning and refrigeration fields. Ingels was more than just a competent engineer, as her 45 technical publications in various journals attest. She developed the "effective temperature" scale to incorporate humidity and air movement in the equation for human comfort. She wrote the book "Father of Air Conditioning," which outlined some of the Carrier Corporation history and the life and contributions of Dr. Willis Carrier himself. Margaret Ingels was inducted into the ASHRAE Hall of Fame in 1996.

(Edited extract from ASHRAE "Hall of Fame" Citation)