

This article was contributed
by an anonymous associate
of Professor Hougen.

Olaf Andreas Hougen, Emeritus Professor of Chemical Engineering at the University of Wisconsin, has pursued a distinguished career in the field of chemical engineering education. He has been one of the leaders in bringing the profession from a state of empirical practice to a state where it is firmly based upon sound basic principles of chemistry, physics, and mathematics.

He was born in Manitowoc, Wisconsin, on October 4, 1893, the son of a prominent pastor, who was a pioneer in the development of the Norwegian Evangelical Lutheran Church of America. When Olaf was four years old, his father was assigned a pastorate in Decorah, Iowa, and it was there that Olaf received his elementary grade school education. While the material resources of the Hougen family were limited—one of Olaf's daily chores was to take the family's cow to pasture and back—it was a family rich in intellectual and social activities, with constant encouragement to the children to achieve high educational attainments. Proximity to Luther College and the fact that he had several attractive sisters made the Hougen home in Decorah the center of much lively social activity. The family later moved to the State of Washington, where Olaf graduated from Tacoma High School. He then decided to enroll at the University of Washington in the Department of Chemical Engineering, which was headed by Dr. H. K. Benson, one of the early leaders in the development of chemical engineering as a separate educational discipline. At the University of Washington, Olaf established a distinguished career, both academically and in extracurricular activities. He received his BS degree in 1915, cum laude, and was a member of Tau Beta Pi, Phi Beta Kappa, and other honorary societies.

After graduation, he spent one year with the American Smelting and Refining Company, at their Tacoma plant. Then, with the encourage-

A GREAT TEACHER OLAF A. HOUGEN

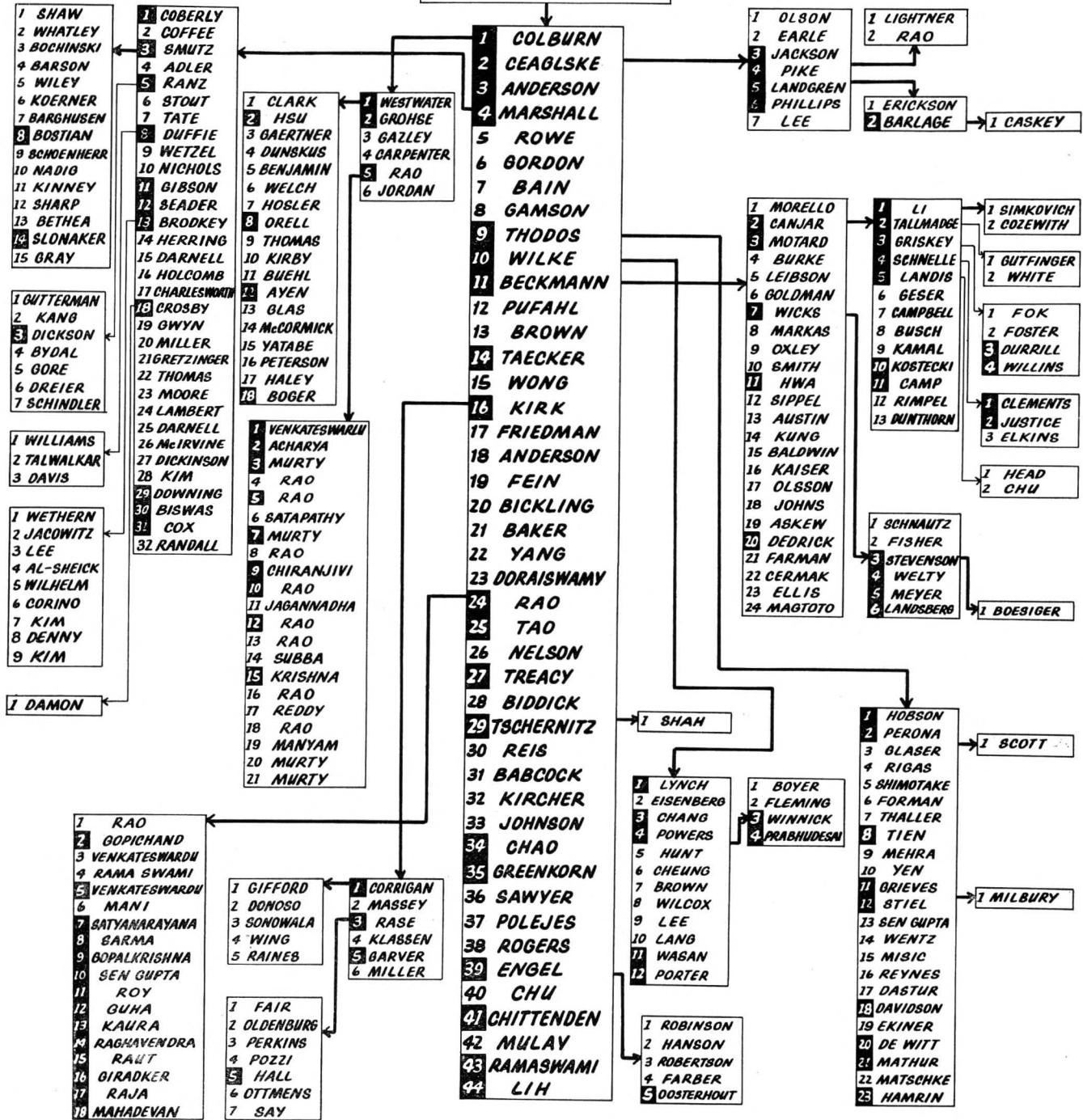
ment of Dr. Benson, Olaf decided to take up graduate work in chemical engineering. He chose the University of Wisconsin because of the nationally recognized work of C. F. Burgess (founder of the Chemical Engineering Department and of the various Burgess companies, including the Burgess Battery Company), O. L. Kowalke (prominent in gas manufacture research; Chairman of the Chemical Engineering Department for 25 years), and O. P. Watts (leader in the field of applied electrochemistry). After two years at Wisconsin, first as a Graduate Fellow and then as a full time Instructor, he served in World War I, 1918-1919, in the Chemical Warfare Service, assigned to chemical engineering work at the Saltville, Virginia, plant. Following his discharge from the armed forces, he spent one year with the Carborundum Company, in their research laboratories at Niagara Falls, New York, where his work was largely focused upon the development of refractory materials.

The post war upsurge in student enrollment that was felt throughout the country resulted in an invitation being extended to Olaf to resume his Wisconsin connection. He accepted, and returned to Madison in the fall of 1920, as an Assistant Professor. Since that time until his retirement in 1964, he has been associated continuously with the University of Wisconsin, except for several leaves of absence. He rose through the various academic ranks, and served three terms as Chairman, totaling to 8 years. His first graduate degree, Chemical Engineer, was earned in 1918; his PhD was received in 1925, number 4 in a list that now includes over 200 names.

When Olaf Hougen started his career as a teacher, chemical engineering courses were largely qualitative in character; the pioneering texts of Walker, Lewis and MacAdams and of Badger and McCabe had not yet been published. Through-

The Academic "Family Tree" of a Great Teacher

O.A. HOUGEN



The above academic family tree indicates those persons who have held university professorships by white numbers on a black background. Over the years Professor Hougén has been advisor for 44 PhD's of which nearly half are now in educational work.

Despite his many honors, Olaf remains a modest person, with a warm and outgoing personality; with a host of friends not only in University circles, but in the Madison community as well.

out his career at Wisconsin, Olaf was a leading force in bringing about a constant modernization and upgrading of the undergraduate curriculum, including the establishment of unit operations theory and laboratory courses, chemical engineering thermodynamics, and kinetics and reactor design. It was through his influence that Bird, Stewart, and Lightfoot wrote their text, *Transport Phenomena*, which has had such a widespread impact in chemical engineering education in recent years.

When Olaf started his teaching career at Wisconsin, graduate enrollment in chemical engineering was low, being generally limited to one or two graduate fellows and to the young members of the teaching staff working for their degrees. While some growth took place, it was greatly accelerated when Olaf, in recognition of his substantial research contributions with limited support, received a grant in 1941 of \$100,000 from the University Research Committee, using funds given by the Wisconsin Alumni Research Foundation. This grant enabled him to start a program of graduate research that not only resulted in a sharp increase in the number of graduate students, but also enabled him to initiate a program of staff additions. He was largely responsible for bringing in K. M. Watson (who later resigned), C. C. Watson, W. R. Marshall, E. N. Lightfoot, W. E. Stewart, and R. B. Bird, all of whom contributed greatly to making Wisconsin's Department of Chemical Engineering one of the leading ones in this country.

When Olaf Hougen joined the Wisconsin staff, his unusual talents as a classroom teacher became apparent at once. While his courses were demanding, his enthusiasm, his clarity of exposition, his excellent organization of subject matter, and his fresh approach to solving chemical engineering problems won him immediate acceptance by the students as being one of the outstanding teachers in the College of Engineering. Olaf has always treated his students with courtesy and respect, and has encouraged them to do original analytical thinking in solving difficult problems.

Olaf Hougen early recognized that the ideal teacher strikes an effective balance between classroom teaching and research, and he constantly

strove to match this ideal, with the high degree of success that his associates fully appreciate. Over the years, he has trained 44 PhD's, with somewhat less than half now being in educational work. The widely disseminated influence that Olaf has had in graduate education is illustrated by his academic "Family Tree," shown in the accompanying figure, which was prepared by R. B. Bird and presented to Olaf at a recognition dinner given in his honor on October 8, 1966. On this chart, the white numbers on a black background indicate those persons who have at sometime held university professorships. Olaf's publications cover a wide diversity of subjects in the field of chemical engineering, and total to over ninety.

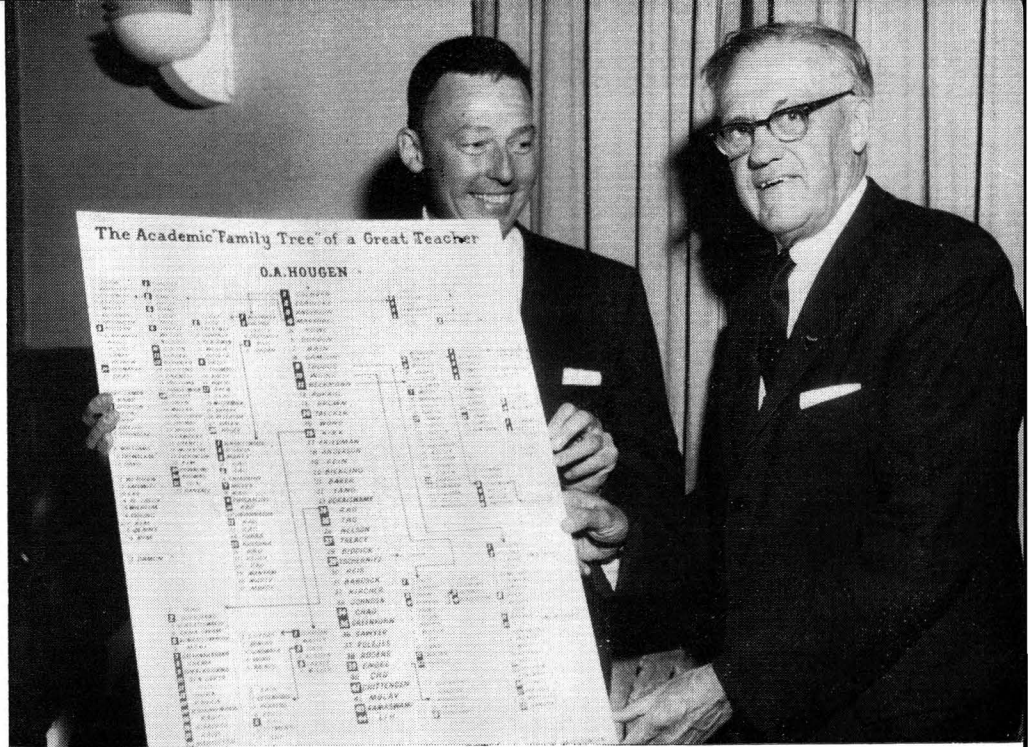
Olaf Hougen's influence in the field of chemical engineering education has been felt not only through his classroom teaching and his direction of graduate research, but also by the publication of a series of widely used text books. *Industrial Chemical Calculations*, published in 1931 with K. M. Watson as co-author, was later followed by the three volume series, *Chemical Process Principles* (Material and Energy Balances; Thermodynamics; Kinetics), again with K. M. Watson as co-author. These texts have been highly successful, and have been translated into Italian, Japanese, and Spanish.

Many honors and awards have come to Olaf Hougen because of his distinguished career in engineering education and research. He has delivered many invited lectures at other universities, and before industrial groups. His major awards are as follows.

Awards Based on Contributions in Engineering Education

1. The Warren K. Lewis Award of the American Institute of Chemical Engineers, 1964. Second recipient of the award.
2. The Lamme Award of the American Society for Engineering Education, 1961. This is considered the major award of the ASEE.
3. Appointment to the Burgess Research Professorship at the University of Wisconsin, 1955-1961.
4. Benjamin Smith Reynolds Award for Excellence in Teaching Future Engineers, 1955. An award of \$1,000 given annually to an outstanding Wisconsin Faculty member. First recipient of the award.

Professor R. B. Bird presented the academic "family tree" to Professor Hougen at a dinner in his honor.



Awards From Professional Societies

1. American Chemical Society Award in Industrial and Engineering Chemistry, sponsored by the Esso Research and Engineering Company, 1961.
2. Founders Award, American Institute of Chemical Engineers, 1958.
3. Institute Lecturer, American Institute of Chemical Engineers, 1950. The second lecturer to receive this honor.
4. William H. Walker Award of the American Institute of Chemical Engineers, 1944.

International Recognition and Awards

1. Scientific Attaché, U. S. State Department. Assigned to American Embassy, Stockholm and covering Denmark, Finland, Iceland, Norway, and Sweden 1961-63.
2. Honorary Doctor of Science Degree from the Norwegian Institute of Technology, Trondheim, Norway, at 50th Anniversary Celebration, 1960.
3. Honorary member, Indian Institute of Chemical Engineers, 1958.
4. Fulbright Professorship
To Norwegian Institute of Technology, 1951
To Kyoto University, Japan, 1957-58.
5. Invited to give keynote address before the Deutsche Bunsen Gesellschaft, Duisberg, West Germany, 1953.

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Olaf Hougen was married in 1919 to Olga M. Berg, and one daughter, Esther, was born to them. Esther is married to F. G. Taylor, and has

3 children, in whom the Hougen grandparents take great pleasure. One of Olaf's brothers, Joel O. Hougen, is presently the Alcoa Professor of Chemical Engineering at the University of Texas. A nephew, Wendell T. Berg, is a chemical engineer with Union Oil Company. The nationally known CBS commentator, Eric Sevareid, is one of his nephews.

Because of his Norwegian ancestry, Olaf has taken a prominent role in Norwegian-American activities, as well as developing and maintaining strong ties with Norway. He is a member of Sons of Norway and of Ygdrasil Literary Society. Because of his activities in 1940-45 as Wisconsin Treasurer for American Relief for Norway, he received a citation from King Haakon of Norway. As a result of his father's influence, religion has been a strong and continuous force in his life. He has participated extensively in the activities of Luther Memorial Church, a large church located in the University area. Olaf is a long standing member of the Optimist Club, and has served as an officer. Golfing is his chief outdoor recreation, and keeps him in excellent physical condition.

Though Olaf retired in 1964, he is still actively interested in his department and in the chemical engineering profession. He frequently is at his office, and the members of the staff have the benefit of his counsel and advice. He truly is one of the revered elder statesmen of the chemical engineering profession.