

and in that way very slowly build up trust."

Bok is frequently compared to Yale University's President Kingman Brewster Jr., who has also been successful in dealing with campus crises. While acknowledging a possible resemblance to his former mentor and long-time friend, Bok has asserted that Brewster's peacemaking abilities have been overpublicized and that he will eventually be remembered for other accomplishments at Yale. "In the last analysis the business of a university is the quality of its education and its research," he told William Woodward of the *New York Post* (January 16, 1971), "and although those can be temporarily deflected by a particular crisis, they depend on different matters that are largely independent of student crises from one year to the next." As president, Bok has plans to revamp the university's administration and is giving serious thought to the feasibility of a three-year undergraduate program. But the matter that will demand a major portion of his attention in the coming years is money, for Harvard, like most of the nation's educational institutions, is facing a growing deficit and can look forward to a protracted period of belt-tightening.

With Archibald Cox, Bok edited the fifth, sixth, and seventh editions of *Cases and Materials on Labor Law* (Foundation Press, 1962, 1965, 1969), which is regarded as the basic textbook on labor law. With John T. Dunlop, the Harvard economist, he wrote a study of the history and problems of the American labor movement entitled *Labor in the American Community* (Simon and Schuster, 1970), and he has contributed widely to law journals. He was a member of President Lyndon B. Johnson's Committee on Labor Management and a consultant to the Department of Labor and the Equal Employment Opportunities Commission, and he has served as arbiter of many labor disputes, including the Florida East Coast railway strike. While dean of Harvard Law School Bok taught a course in legal education, and he served on a committee that conducted a survey of legal education in Colombia.

While he was studying in Paris, Derek C. Bok met Sissela Ann Myrdal, a psychology student at the Sorbonne, and they were married on May 7, 1955 in France by former French Premier Pierre Mendes-France. Mrs. Bok, who is the daughter of the Swedish social scientist Gunnar Myrdal, received a Ph.D. degree in philosophy from Harvard in 1970 and has taught at Tufts University and Harvard. With their three children, Hilary Margaret, Victoria, and Thomas Jeremy, the Boks lived for many years in Belmont, a suburb of Boston. At the time he was named Harvard president Bok told reporters that he planned to move his family from Belmont to Cambridge but not into the official presidential residence on Quincy Street in Cambridge.

President Bok is a handsome six-footer with a deep voice and dark hair that is graying at the temples. As law school dean he did not hesitate to speak out on political issues, denouncing the United States invasion of Cambodia and President Nixon's nomination of G. Harrold Carswell to the

Supreme Court, and he has said that he intends to follow the same policy in his new position. Bok is a Democrat. In his spare time he enjoys gardening, tennis, skiing, and taking his children to sports events. He is a trustee of the Cyrus H. K. Curtis estate.

References

N Y Post p22 Ja 16 '71 por
N Y Times p1+ Ja 12 '71 por
Newsweek 77:70+ Ja 18 '71 pors
Time 97:60+ Ja 25 '71 por
Directory of American Scholars (1969)
Who's Who in America, 1970-71

BORLAUG, NORMAN E(RNEST)

March 25, 1914- Plant pathologist and geneticist; international consultant
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The first agricultural scientist to receive the Nobel Peace Prize is the American plant pathologist Dr. Norman E. Borlaug, who was honored with the award in October 1970 for his leadership in the "Green Revolution" that has helped to dispell the specter of famine from underdeveloped countries. Now head of the wheat research and production project of the International Maize and Wheat Improvement Center in Mexico, Dr. Borlaug and his associates have engineered new varieties of high-yield cereal that, in the words of the Nobel Committee, gave "the developing nations the possibility of breaking out of hunger and poverty." "The apostle of wheat" is the fifteenth American to win the Nobel Peace Prize and the first to win it since 1964, when it was bestowed on the late Martin Luther King Jr. Because of Dr. Borlaug and his coworkers the world has been granted another three decades of grace in which to attack what is probably its most urgent problem—the population explosion.

The son of Norwegian immigrants, Norman Ernest Borlaug was born on March 25, 1914 to Henry O. and Clara (Vaala) Borlaug, who owned a 56-acre farm near Cresco, Iowa. The area around Cresco is still spoken of as Iowa's "little Norway," and Borlaug grew up surrounded by neighbors who lauded the virtues of hard work and proper living. He graduated from the local high school in Cresco, where he captained the football team, in 1932. He might have been content to become a farmer himself if his grandfather had not constantly urged him to go on to college. The urging won out; Borlaug enrolled at the University of Minnesota, and, doing odd jobs, worked his way through to a B.S. degree in forestry, which he received in 1937. At the University of Minnesota, as in high school, his extracurricular activities included wrestling and football.

The year before he took his B.S. degree Borlaug worked as a field assistant with the United States Forest Service, and as a graduate student of plant

pathology he divided his time between studying and earning a living at forestry-related jobs. In 1937 he served in the Idaho National Forest, and in 1939 he was a junior forester in Massachusetts. He returned to the campus of the University of Minnesota in 1940 as a research assistant, and the following year, when he was promoted to instructor, he received his doctor of philosophy degree in plant pathology.

When Borlaug emerged from graduate school, American organic chemists were synthesizing thousands of new chemicals aimed at controlling insect pests and plant diseases and at killing weeds without damaging crops and ornamental plants. It was not surprising that in 1941 E. I. du Pont de Nemours and Company recruited Dr. Borlaug as a promising plant pathologist from the University of Minnesota to study the effects of the new chemicals on plants and plant diseases. He remained with du Pont in Delaware as a plant pathologist for three years.

In 1944 the Rockefeller Foundation, at the request of the Mexican Ministry of Agriculture, appointed George Harrar, a plant pathologist, to assemble a small team of American agricultural scientists, including himself, to "export the United States agricultural revolution to Mexico." The men whom Harrar chose to accompany him were Edward Wellhouse, a corn breeder, William Colwell, an agronomist, and Borlaug. Each of the men was convinced that the application of scientific methods in agriculture could benefit poor countries even more than it had benefited the affluent United States.

When, late in 1944, that team of young enthusiasts gathered in the hills outside Mexico City, they knew that many obstacles lay ahead. Corn, which is still the principal bread grain in Mexico, was cultivated there by the Indians for centuries before the first Spaniards arrived. With them the European conquerors brought wheat, and at the time they began its cultivation, in the early 1520's, they probably expected it to become eventually the staple grain. But four centuries later wheat culture in Mexico was still in a primitive state. Although some mechanization had taken place in Sonora, the northwestern coastal state, everywhere else the cultivation of wheat resembled that of the early Spaniards. Land was prepared for planting with the Egyptian wooden plough, pulled by mules or oxen. Harvesting was done with hand sickles, oxen trod out the grain just as they had done in Biblical times, and the grain was winnowed by being thrown into the air for the wind to blow the chaff away.

As Borlaug later recalled, for members of the third international Wheat Genetics Symposium, held in Canberra, Australia in 1968: "When the program was established there were only a very few qualified agricultural scientists in Mexico. A wheat-breeding program was non-existent. Only one qualified scientist was available for wheat breeding, but because of other responsibilities he spent only about ten percent of his effort in wheat research. No soil fertility or agronomic research of any type was being done. Nothing was being



NORMAN E. BORLAUG

done on research to control losses from diseases, insects, and weeds."

As one of his primary goals, Borlaug aimed at a drastic improvement of the tall, thin-stemmed varieties of Mexican wheat that had evolved over the centuries to compete with weeds for sunlight. As soon as those varieties were given enough fertilizer and water to increase the yield, they became top-heavy and fell over, or "lodged," to use the jargon of the field. New varieties with shorter and stronger stems were needed.

At about that time the Japanese had developed a sturdy, short-stemmed wheat variety, called the Norin dwarf, that could carry a heavy head and still stand sturdily erect. Soon afterward, the agronomist Dr. Orville A. Vogel, of Washington State University, succeeded in crossing the Japanese dwarf with breeding varieties having other superior characteristics to produce a new dwarf called Gaines. In the favorable growing conditions of the Pacific Northwest, and under the best cultivation practices, Gaines wheat produced enormous yields.

Borlaug obtained Gaines seeds from Vogel and began making crosses of Gaines with the Mexican varieties. He could have followed the common practice of growing one experimental crop each year, but since he was a man in a hurry, he grew two alternate crops each year at different sites. The summer site was in upper Sonora, just south of the United States border, and the winter site was some 800 miles south, near Mexico City. The elevation at Sonora was not far above sea level and the latitude some 30°, and near Mexico City, the elevation was over 7,000 feet and the latitude about 20°, with a corresponding difference in length of days. By exposing his progressive new crosses to repeated alternations of such differences in climate and photoperiod, Borlaug bred into them a revolutionary new adaptability to a wide range of conditions. They have been successful all the way from the Equator to Turkey, near the fortieth parallel.

Borlaug's development of high-yield, highly adaptable dwarf wheats has won him internation-

al acclaim, but he sees his achievement as just one element in the many-pronged attack needed to solve the food and population problems of the underdeveloped countries. He has been called on for technical advice to West Pakistan, to India, and more recently to Turkey, Afganistan, Tunisia, and Morocco. Where his advice has been followed, cereal production has risen as much as 50 percent within two years. Government officials in some countries have not always been happy about the programs that Borlaug recommends. Bluntly pointing out that the new grain varieties—by themselves—cannot solve any country's food problem, he hammers home a list of conditions that a host country must meet before technical assistance can have a significant effect.

A host country, insists Borlaug, must have political stability, and its top-level officials must commit themselves to an aggressive program of action. The government must adopt fiscal policies that will stimulate agricultural production rather than stifle it and must guarantee that fertilizers, pesticides, weed killers, and modern machinery will be available so that new seed varieties can achieve their full potential. The program must be organized around the wheat crop, by a government willing to streamline administrative procedures and cut through red tape. Above all, the government must support a program of training young native scientists who can be counted on to develop and maintain a stable research program. Such continuing research is critical, for the best-yielding wheat varieties become increasingly susceptible to rust, and varieties with greater resistance to disease must continually be developed.

Borlaug's deep-rooted impatience with red tape has led him to fight throughout his career against administrative routines that stand in the way of getting the job done. Unintermittedly devoted to his dusty and sweaty chores, he still spends most of each day in the fields with young scientists from many countries (the so-called "Borlaug apostles"), pointing out to them that they should listen closely to what the plants themselves are saying. They tell more, he insists, than textbooks. Characteristically, Borlaug was working in an experimental plot fifty miles outside Mexico City on October 21, 1970, when his excited wife drove out to tell him that word had reached Mexico from Norway that he had won the Nobel Peace Prize. He pushed his sports hat back on his head and grinned. "That's just fine," he said, "but I still have a day's work to do here. After that we'll celebrate."

The Nobel Peace Prize of \$78,400, which Borlaug received at Oslo University in Norway on December 10, 1970, climaxed a long series of awards and honors. Among them were a citation and award from the government and farmers of Tlaxcala, Mexico, in 1955; a diploma of honor from the wheat farmers of Queretaro, Mexico, in 1956; the outstanding achievement award of the University of Minnesota, in 1959; the national award of the Agricultural Editors' Association, in 1967; the International Agronomy Award of the American Society of Agronomy, in 1968; and the

Distinguished Service Medal of Pakistan, in 1968. The University of Punjab, India awarded him an honorary doctorate in 1969. The citizens of Ciudad Obregón, Mexico's wheat capital, have named a street in Borlaug's honor. He is a member of many professional societies and of the National Academy of Sciences.

Although Borlaug has been too busy with field work to write many scientific papers, he has been called on to deliver keynote addresses at international symposia. Outstanding among them was the public lecture with which he opened the third international Wheat Genetics Symposium in Canberra in August 1968, an address titled "Wheat Breeding and its Impact on World Food Supply."

Bronzed, trim, and vigorous from his work in the fields, Norman Borlaug still weighs the 155 pounds that he did as a champion wrestler at the University of Minnesota. Shortly after he completed his undergraduate work in forestry there he married Margaret G. Gibson, on September 24, 1937. For many years now the couple have made their home in Mexico City. They have two children, a daughter, Norma Jean (Mrs. Richard H. Rhoda), and a son, William Gibson Borlaug.

Borlaug takes a cautious view of the ultimate benefit of his work to human society, believing that population growth transcends all other problems. He thinks that all of his own work, and that of his fellow scientists, has won only a temporary truce in man's war against hunger and deprivation. Still, he is no pessimist. "Since man is potentially a rational being," he has said, as quoted in *National Observer* (March 1, 1971), "I am confident that within the next two decades he will recognize the self-destructive course he steers along the road of irresponsible population growth, and will adjust the growth rate to levels which will permit a decent standard of living for all mankind."

References

- Nat Observer p7 O 26 '70
- N Y Times p1 O 22 '70 por
- Read Digest 98:104+ Mr '71 por
- Science 170:518 O 30 '70 por
- American Men of Science 11th ed (1965-68)
- International Who's Who, 1970-71
- Who's Who in America, 1970-71

CÂMARA, HELDER PESSOA

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In Latin America, where a privileged minority, however good its intentions, willy-nilly maintains its wealth at the expense of an oppressed majority, the Roman Catholic Church has traditionally been identified with the elite rather than the masses. Young priests in increasing numbers have been calling for an about-face on the part of their church, but relatively few members of the hier-