
Icie Macy and Elsie Widdowson: Pioneers of Child Nutrition and Growth

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The roots of child nutrition are deep in time. Hippocrates wrote, “growing creatures have most innate heat, and it is for this reason that they need most food, deprived of which their body pines away” (Aphorisms, I. XIV), but the scientific basis for child feeding only developed within the 20th century. Two pioneer women members of the American Society for Nutritional Sciences (ASNS), Icie Macy and Elsie Widdowson, played major roles in developing our present understanding of the relationships of food to child growth.

Icie Gertrude Macy Hoobler (1892–1984)

Macy was the second woman to study nutrition with Lafayette Mendel at Yale University (1,2). Mendel had studied at Yale with Russell Chittenden, who wrote at the beginning of the century, “One of the great mysteries of life is the power of growth, that harmonious development of complete organs and tissues from simple protoplasmic cells, with the ultimate formation of a complex organism with its orderly adjustment of structure and function” (3). In her 1982 autobiography, Macy cited Chittenden as the inspiration for her scientific career (2).

An opportunity for human investigation in 1923 drew Macy to Detroit to establish the scientific work of the Merrill-Falmer School for Motherhood and Child. The Nutrition Research Laboratory was opened at the Children’s Hospital of Michigan in 1924 and the Children’s Fund of Michigan supported the laboratory from 1931 until 1975. The purpose of this laboratory was “to acquire useful and practical knowledge concerning the health care and nutritional influences that may affect or change the normal course of health, growth and development of children—the world’s most precious asset” (2).

In 1923 there were few nutritional investigations on women during gestation or lactation. Drawing on an extensive literature on animal nutrition, studies of the metabolism of women during the reproductive cycle were designed to estimate the nutritional requirement of the mother and to observe the effects of maternal nutrition on child growth and development (2).

Breast-feeding was already on the decline during this era. Studies from Macy’s group recognized that the composition of human milk, the variability of its composition and the nutritional requirements both of mothers for milk production and of infants for growth were inadequately understood (4). The systematic studies that were published by the group drew the attention of scientists to child nutrition and, in my view, laid the foundation for the resurgence of breast-feeding we see in this country today. It must be recognized that these studies were done in the midst of the depression of the 1930s. Macy’s investigations on maternal nutritional supplements influenced practices in prenatal clinics and her understanding of the nutritional supplement needs of the young child altered practice in all well-baby clinics. These investigations laid the early scientific foundations for much of the contemporary work of the USDA Women, Infants, and Children (WIC) Program. One of her findings was an increased frequency of low hemoglobin levels in normal black babies (4), and it is still a problem in well childcare today.

To “visualize the early chemical processes of life and the progressive changes expressed in terms of the actual metabolic activity of the normal healthy child,” Macy began a long-term comprehensive investigation in the Methodist Children’s Village in Detroit (5). The children lived in cottages with a housemother and three technicians trained in metabolic studies. Over nearly a decade, three major studies were initiated in children of 4–10 years-of-age. In the first, 11 children participated in 95 days of metabolic studies. In the second, 11 children were studied for 225 days and again for 55 days four years later. The large volume of data accumulated in these unique studies of normal children is published in three volumes. Macy wrote, “The purpose of the intensive investigations of normal children . . . has been to obtain sufficient knowledge of the normal child to enable comparative evaluation of the metabolism of the ill child” (5). I certainly appreciated the availability of her reference normal data when I was investigating mineral deficits in malnourished children.

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The Food and Nutrition Board of the National Academy of Sciences was organized in 1940. Macy took a leadership role as chair of the committee on Maternal and Child Feeding and coauthored two reports largely based upon her investigations (6,7).

Macy (Fig. 1) was a pioneer woman scientist who opened the way for present women leaders in nutrition sciences. She wrote that she drew inspiration from the lives of Elizabeth Blackwell, MD, Maria Mitchell and Ellen Swallow Richards. In 1917 her sister, Ina Wynne, died of childbed fever in Detroit. Hoobler and John Howland had collaborated in the first U.S. studies of infant energy expenditure with Graham Lusk. When Macy moved to Detroit, Hoobler was Chief of the Medical Staff of the Children's Hospital. She found many common interests with him and his wife, but in 1936 Madge Hoobler passed away. Afterwards, Macy's and Hoobler's companionship expanded into marriage and Macy wrote, “My life and work were enriched with the patience and deep understanding of my husband who bestowed praise, inspiration, profound love and encouragement on me. . . Our married life of only five years surmounted the happiness and joy of many marriages of a full lifetime” (2).

Dr. Macy was widely recognized and was elected the president of the American Institute of Nutrition (AIN) in 1944. She was honored during her life by the Borden Award of the American Home Economics Association in 1939, the Garvan Award of the American Chemical Society in 1945 and the Osborn and Mendel Award of the American Institute of Nutrition in 1952. The Macy legacy continues to challenge the composition of the type of fats used for infant feeding (15). One of the discoveries was that the suckled pig's duodenum gained 42% of weight in the first 24 hrs. I was of the opinion that this was due to enterocyte endocytosis of milk immunoglobulin. Widdowson maintained that it was due to growth factors. In an experiment at the Children's Nutrition Research Center, the immunoglobulin was stripped from pig colostrum and the depleted milk fed to newborn piglets. Widdowson was proven right in this wager! Her focus on infant feeding led to the identification of differences in the linoleic acid content of adipose tissues from Dutch infants (46%) compared to British infants (1%) at three months. This was proven to be a consequence of the type of fats used for infant feeding (15).

Dr. Macy first visited America in 1936 when she befriended many women pioneers in child nutrition and food composition analysis. Among the scientists she visited were, Charlotte Chatfield and Hazel Stiebeling of the USDA, Genevieve Sterns of the University of Iowa, Precious Mabel Nelson and Pearl Swanson of Iowa State University, Icie Macy of the Children's Hospital in Detroit, Lydia Roberts of the University of Chicago and Mary Swartz Rose of Columbia University. . . Our married life of only five years surmounted the happiness and joy of many marriages of a full lifetime” (2).

FIGURE 1  Icie Gertrude Macy Hoobler (bronze medallion executed by Joseph Paderewski hanging in USDA Children's Nutrition Research Center, Houston, TX).
University. These linkages, especially with USDA and its *Handbook 8*, lasted for many years (9,18). Widdowson was made an honorary member of the AIN in 1978 and a Fellow in 1995.

Dr. Widdowson (Fig. 2) received many honors during her lifetime. In 1977 she served as President of The British Nutrition Society. She became a Commander of the British Empire in 1979 and a Companion of Honor in 1993. She became one of the few women to be named a Fellow of the Royal Society in 1976. In the U.S. she received the 1982 Bristol Myers and 1986 Atwater Awards (9).

Widdowson considered herself a jack-of-all-trades and wrote, “I get invited to sit on expert committees, speak at conferences and write chapters on topics such as bread, infant feeding, growth, undernutrition, obesity, and body composition (15).” She was widely recognized as a scientific leader in each of the areas. In her personal life, she never married but felt a close bond with each student, which lasted into later life. She described her retirement life stating, “I live in a thatched cottage in the middle of an apple orchard, and I enjoy the thought that I have come full cycle, from apples to apples, but now I deal with them in a practical way” (12). Someone described her home as being straight out of a Beatrix Potter drawing. Widdowson cared for her mother, who lived past 100 years in this home. She also looked after McCance who lived at a nearby retirement center until his death in 1993. She wrote about McCance, “If asked what has been most important to me in all my adventures in nutrition over half a century I would say without hesitation that it has been the companionship of my partner, Professor McCance. He has taught me, inspired me, supported and helped me all the way along” (15).

In this team, Widdowson was the experimental designer and facilitator (17).

**Macy and Widdowson in historical context**

The social context for the careers of these two women pioneers of research on nutrition and growth was bleak. Few women chemists served at universities (19). Macy’s and Widdowson’s prominent careers in nutritional sciences served as role models and contributed to recruiting more women to this field. Their investigations on the nature of growth can also be viewed in a scientific context. They worked in a period after Mendel, Frederick Hopkins and others had led nutritional chemistry away from an era of proximate analysis to discovery of accessory factors necessary for animal growth. Thus, both Macy and Widdowson were able to pioneer research on the cellular nature of growth and investigate this in children. Macy’s careful balance studies remain the reference for studies of nitrogen and mineral retentions in normal childhood. Widdowson was the first to expand these studies with balance experiments on nutrient retentions of malnourished subjects. She then illuminated the “black box” of balance retentions by chemical analyses of tissues during growth. This was followed by experimental manipulations of the diet in animals. Both women studied the effects of diet on reproductive processes in the human with a focus on mothers’ milk as the basis for normal infant nutrition. Widdowson measured tissue DNA and documented the cellular nature of growth and differentiation and thus set the stage for the present studies of nutrient turnover in the human and molecular investigations of tissue proliferation and differentiation. Their contemporary peers recognized the scientific contributions of both women, but we recognize them today because they were pathfinders in research on child growth and development. In this context, the U.S. Department of Agriculture, Agriculture Research Service, Children’s Nutrition Research Center at Baylor College of Medicine and Texas Children’s Hospital honors them with bronze bas relief medallions hanging in conference rooms named for each.

**LITERATURE CITED**


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