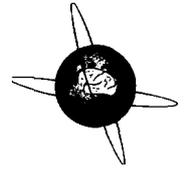




ELSEVIER



Mary A.B. Brazier 1904-1995 *

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In memoriam M.A.B. Brazier

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From among their ranks, electroencephalography and brain research lost at once, on May 9, 1995 at the remarkable age of almost 91 years, a senior member and a pioneer in the study of the electrical activity of the nervous system by computer techniques. In the international sphere alone, the contributions of Mary - or, Mollie, as she called herself - Brazier were so diverse that even three people from as many countries can barely begin to do them justice.

Hers was a long and rich career. She was born Mary Agnes Bumiston Brown into a family to which science was hardly unknown; a brother became a physicist, and her father was a cousin of Sir Arthur Eddington, the English astrophysicist whose 1919 solar eclipse observations provided a confirmation of one of the predictions of Einstein's general relativity theory. (Indeed, in the 1950s, she sent Einstein a copy (which he acknowledged) of the photograph her father took of Einstein and Eddington conversing.)

After attending Bedford College, she trained in physiology and biochemistry at the University of London (BSc 1926, PhD 1930), she was to turn first to endocrinology in her own research at the Maudsley Hospital in London. There, she demonstrated electrical changes of the skin that developed in the course of thyroid diseases, a test that could be used as a diagnostic aid. For this work, she received the Gold Medal of the (British) Institute of Electrical Engineers and the Van Meter Prize of the American Association for the Study of Goiter, in 1934. But it was the study of the electrical activity of the nervous system that was to become the focus of her life's work.

In 1940, she was able, thanks to the then new terms of her Rockefeller fellowship, to move with her young son from war-torn London to Boston to the Massachusetts General Hospital (MGH) and Harvard Medical School, while her husband, Leslie J. Brazier, an electrical engineer (whom she had married in 1928) remained in England. At the MGH as a neurophysiologist, she was initially in Stanley Cobb's Department of Psychiatry, and subsequently in the Departments of Anesthesia and Neurology. Her early work, in part with Dr. Robert Schwab and others, was on aircraft pilot selection, peripheral nerve

injuries, war neuroses and poliomyelitis, muscle function and EMG, and then increasingly she worked with the EEG in its various aspects (e.g., the effects of anesthesia). For a time during the Second World War, she was acting director of the MGH EEG Laboratory, and in 1946 she was instrumental, with Robert Schwab, in persuading Grey Walter to bring to Boston and demonstrate one of his frequency analyzers. This took place at a meeting of the

Eastern Association of Electroencephalographers in the historic Ether Dome at the MGH. The Walter analyzer remained at the MGH and doubtless was in part responsible for Brazier's growing interest in computer analysis of the EEG.

It was in the years following World War II that she became a member of the Cambridge-Boston group that was beginning to explore, in a diversity of fields and largely at his instigation, the implications of Norbert Wiener's then recently declassified mathematical techniques for signal analysis. It was in this setting that, in 1950 at Wiener's suggestion, James Casby and Mary Brazier at the MGH began their pioneering work on correlation analysis of the EEG with their colleagues at the Massachusetts Institute of Technology (MIT).

The MGH-MIT collaboration, which was to last for Dr. Brazier's remaining years in Boston and even beyond, was reinforced by the establishment, in 1952 under Walter Rosenblith's direction, of the Communications Biophysics Laboratory (CBL) in the Research Laboratory (RLE) of Electronics at MIT (RLE was the successor to the wartime Radiation Lab). It was in this new laboratory that an analog correlator was developed specifically for analysis of EEGs and related potentials. The objective of this work was to try to understand the nature of the EEG, as reflected in its statistical properties, as a signal in a communication system, i.e., the brain. Some of the earliest results with the correlator were presented by Brazier and discussed by Wiener at the Third International EEG Congress in Cambridge, Massachusetts in 1953. An important aspect of this work was the study of evoked potentials (event-related potentials), particularly to visual stimuli (flashes), in human subjects and in experimental animals by a special form of cross-correlation that was equivalent to the summation method of George Dawson. Brazier also utilized, in her studies, the early general-purpose digital computers that were developed a few years later at MIT. In addition to the MGH, Brazier also held appointments at Harvard Medical School and at MIT.

In 1961, after 20 years in Boston, and after periods in the previous two years as a visiting professor, Dr. Brazier joined the Brain Research Institute (BRI) that had then recently been established at the instigation of Horace Magoun at the University of California, Los Angeles (UCLA). At UCLA, she was appointed Professor of Anatomy, Physiology, and Biophysics. At the BRI, where she was active in the development of computer facilities, her computer studies of the electrical activity of the nervous system expanded to include, among other areas, investigations of the surface and depth EEG in connection with

evaluation of patients for possible surgical treatment of epilepsy.

Dr. Brazier was a gifted and a prolific author and editor to whom writing came easily. Her bibliography comprises nearly 250 titles and includes several books. Even an overview could hardly begin to encompass the wide range of topics of her publications. Her *Bibliography of EEG 1875–1948* (1950), which was the first Supplement to this Journal, was a guiding beacon to the then newcomers to the field, and her textbook (1957), *The Electrical Activity of the Nervous System*, in its 4 editions and translations into 7 languages, served generations of students. Among many other books, she was editor for several of the Macy volumes on *The Central Nervous System and Behavior*, the UCLA-BRI series of volumes on *Brain and Behavior*, and the *Brain Function* series of the UCLA Forum in the Medical Sciences series. In addition, she was invited to lecture widely, on a great diversity of topics, and she served on innumerable national and international committees, councils, and advisory groups.

Indeed an ardent internationalist, she was active in the International Federation of Societies for Electroencephalography and Clinical Neurophysiology (IFSECN, more recently shortened to IFCN) from its founding at the first International EEG Congress in London in 1947: she was Treasurer 1953–1957, Secretary 1957–1961, and President 1961–1965. She performed yeoman service as Editor for the Americas and the Far East from 1972 to 1987, and as Editor-in-Chief from 1975 to 1984 of this Journal, the official organ of the IFSECN. In 1989, under the auspices of the International Federation, Elsevier Science Publishers established two Young Investigator Awards to honor Brazier and her long-standing editorial colleague of this Journal, William Cobb.

Dr. Brazier was also active from the first in the International Brain Research Organization (IBRO), having been the only woman from the West to have been invited to the Moscow Colloquium on Higher Nervous Activity in 1958 (its proceedings volume was published as a supplement (No. 13, 1960) to this journal), at which plans for the establishment of IBRO (in 1960) were drawn up. Brazier had also been the only woman to speak at what could be considered a predecessor of the Moscow Colloquium, namely the Laurentian Symposium on Brain Mechanisms and Consciousness (published in 1954), a satellite symposium of the 1953 Cambridge (Massachusetts) Third International EEG Congress. From 1978 to 1982, she was the Secretary General of IBRO.

She was devoted not only to promoting collaboration between scientists from East and West, but also to the training of scientists from developing countries; she organized or co-organized with them a number of IBRO Symposia and edited or co-edited the respective symposium volumes. When it appeared that this activity might be undermined because of fund shortages at IBRO and weakened ties between IBRO and UNESCO, she undertook to

strengthen the latter ties with the help of the then Assistant Director General (now the Director-General) of UNESCO, Federico Mayor.

All of these activities she carried out at a time when it was not easy for a woman to be accepted as a scientist and as a leader in scientific organizations. For her, there could be from the outside an impression of strength (she could hold strong opinions), but this could mask an inner fragility, a kindness, and at times even a certain secretiveness, on her part.

An international outlook was also reflected in yet another of her activities, her long-standing interest in, and publications on, the history of neurophysiology. An early example was her chapter, "The historical development of neurophysiology," in the original *Handbook of Physiology – Neurophysiology* (1959). Her definitive publications in this field were landmarks: *A History of Neurophysiology in the 17th and 18th Centuries* (1984), and *A History of Neurophysiology in the 19th Century* (1988). She combined her interest in the major figures in neurophysiology of the past with a warm concern for young colleagues whom she inspired and supported wherever she was able to.

Honored by her alma mater, the University of London, with a DSc in neurophysiology in 1960, Dr. Brazier was also honored by the University of Utrecht with an MD degree in 1976, and by the British EEG Society with the Grey Walter Medal at the International EEG Congress in London in 1985. She held one of only four of the very prestigious Research Career Awards from the Neurology Institute of the U.S. National Institutes of Health. She was a member of the American Academy of Arts and Sciences, and an honorary member of the American EEG Society (of which she was president in 1955) and of the British EEG Society. She was also a member of, or a consultant to, a number of other professional and scientific organizations and institutions in the U.S. and abroad.

Born, literally, by the sea (i.e., at Weston-super-Mare, near Bristol, England – she was proud to be English), Mollie built a house by the sea, in East Falmouth on Cape Cod, during her Boston years. It was again to this beloved spot that she moved from Los Angeles in 1988. Her favorite pastimes were gardening (especially of shrubs) and sailing. She loved nature in all its aspects. Until well into her 80s she was a world traveler, which included a visit to her very favorite cities of Paris and London at least once almost every year for many years, to see her family and old friends. She was also an avid reader of French and English literature, until failing vision forced her to rely on tape-recordings of books.

In her last years, her vision became very poor indeed; otherwise her scholarly writing would undoubtedly not have ceased with her paper: "The Abbe Nollet (1700–1770): the beginnings of electrotherapy" (*J. Hist. Neurosci.*, 1993, 2: 53–64). Almost to the very last, and yet aware of her irrevocable fate, she maintained a keen

interest in the developments in her fields, and in the activities of her friends and colleagues, near and far.

Indeed, throughout her life, Mollie Brazier had many friends not only in the world of science but in other areas as well. And when she considered someone woman or man, anywhere in the world, to be a friend, she was extraordinary; nothing stopped her when she thought help was needed, or in expressing her sympathy and love – but always with discretion. These many friends in

the world will sorely miss her, but will treasure her memory and her many remarkable accomplishments.

Dr. Brazier leaves a son, Oliver G. Brazier, an oceanographer at the Woods Hole Oceanographic Institute. •