

Eva G. R. Taylor

PROFESSOR Eva G. R. Taylor, an Honorary Member of the Institute since 1954, died in Wokingham on 5 July 1966, aged 85. She was a Fellow of Birkbeck College and Victoria Medallist of the Royal Geographical Society. From 1930 to 1934 she was Professor and Head of the Department of Geography in the University of London, and in 1944 became Professor Emeritus.



Her contributions to the history of navigation were many and remarkable. As can be seen from the selective bibliography printed below, the great majority of her navigational works were written for this *Journal*. In addition, the Institute published, through Cambridge University Press, her two major works: *The Mathematical Practitioners of Tudor and Stuart England* (1959) and *The Mathematical Practitioners of Hanoverian England* (1966) and was associated in the publication of *The Geometrical Seaman*. In 1956 she published *The Haven-Finding Art*, a history of navigation 'from Odysseus to Captain Cook', which in both scope and authority is perhaps the

most definitive book of its kind, and is distinguished by the elegance of its writing. In this work, although it was not published for the Institute, she collaborated closely with the Executive Secretary and through him with the many members of the Institute whose names are acknowledged in the Preface.

In 1959 she delivered the first Duke of Edinburgh's Lecture, a series sponsored by the Institute 'to extend the horizons of navigational interest', taking as her theme Mathematics and the Navigator in the Thirteenth Century.

To mark her 80th birthday, a number of societies including the Institute, the Royal Geographical Society, the Hakluyt Society and the Society for Nautical Research launched an appeal for funds to enable a lecture to be given every year by a distinguished scholar in one or other of the branches of knowledge to which Professor Taylor made such notable contributions. The fourth in this series was given at the Institute's Annual General Meeting this year when Rear-Admiral G. S. Ritchie, D.S.C., Hydrographer of the Navy, presented the paper printed on p. 1 of this number.

Her last addition to historical research was a paper, published in summary in this *Journal* (19, 124), which cast grave doubts on the authenticity of the recently published Vinland Map. Professor Taylor was by this time too ill to follow up the controversy in both hemispheres which her views had stirred up. Whatever the outcome of this particular debate, there can be no one concerned with the history of cartography who will not acknowledge the deep debt which historians of this and the other mathematical arts owe to her.

SELECTIVE NAVIGATIONAL BIBLIOGRAPHY

The following bibliography includes only those works to which students of the history of navigation may wish to refer; Professor Taylor wrote on many other subjects.

Books

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- The Troublesome Voyage of Captain Edward Fenton 1582-83.* Ed. E. G. R. Taylor. Cambridge University Press for the Hakluyt Society, 1959. (Series II, Vol. CXIII.)
- The Geometrical Seaman.* A book of early nautical instruments. (With M. W. Richey.) Hollis & Carter in association with the Institute of Navigation, 1962.
- A Regiment for the Sea and other writings on navigation, by William Bourne.* Ed. E. G. R. Taylor. Cambridge University Press for the Hakluyt Society, 1963. (Series II, Vol. CXXI.)
- The Mathematical Practitioners of Hanoverian England.* Cambridge University Press for the Institute of Navigation, 1966.

Journal of the Institute of Navigation

- The navigator in antiquity (1, 103).
- The sailor in the middle ages (1, 191).
- The dawn of modern navigation (1, 283).
- An Elizabethan compass maker (3, 39).
- Five centuries of dead reckoning (3, 280).
- The oldest Mediterranean pilot (4, 81).
- Early charts and the origin of the compass rose (4, 351).
- The navigating manual of Columbus (5, 42).
- Hariot's instructions for Raleigh's voyage to Guiana, 1595 (5, 345).
- The doctrine of nautical triangles compendious: I. Thomas Hariot's manuscript (6, 131).
- Jean Rotz and the variation of the compass, 1542 (7, 9).
- A Norse bearing-dial? (Forum) (7, 78).
- Jean Rotz and the marine chart (7, 136).
- An American collection of source books for the history of navigation (8, 219).
- Early Pole Star tables (Forum) (8, 288, 382).
- John Dee and the nautical triangle, 1575 (8, 318).
- All plain sailing (Forum) (9, 230).
- The English and the Dutchman's log (Forum) (9, 357).
- A new history of navigation (Forum) (9, 362).
- A criminal trial at sea in 1582 (9, 406).
- Since when have we known that the Earth is a globe? (10, 133).
- Columbus the seaman? (Forum) (10, 417).

- The Earth but a satellite of the Sun (11, 150, 409).
 A voyage from Blackwall to Southampton in 1582 (12, 18).
 The grand topography of the universe (12, 260).
 Mathematics and the navigator in the thirteenth century (Duke of Edinburgh's Lecture), (13, 1).
 Columbus the navigator? (14, 185).
 Four steps to Longitude (15, 257).
 First round the world, 1519–22 (16, 463).
 A log-book of Magellan's voyage, 1519–1522 (17, 83).
 A note on the Kamal (Forum) (17, 459).

The Geographical Journal

- William Bourne: a chapter in Tudor geography (72, 329).
 Jean Rotz: his neglected treatise on nautical science (73, 455).
 Roger Barlow: a new chapter in early Tudor geography (74, 157).
 The missing draft project of Drake's voyage of 1577–80 (75, 46).
 Master Hore's voyage of 1536 (77, 469).
 16th century M.S. navigating manual in the society's library (78, 346).
 The geographical ideas of Robert Hooke (89, 525).
 Some notes on the early ideas of the form and size of the Earth (85, 65).
 Robert Hooke and the cartographical projects of the late seventeenth century (1666–96) (90, 529).
 Notes on John Adams and contemporary map makers (97, 182).
 Richard Hakluyt (109, 165).
 The early navigator (113, 58).
 The origin of continents and oceans: a seventeenth century controversy (116, 193).
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- Master John Dee, Drake and the Straits of Anian (15, 125).
 More light on Drake, 1577–80 (16, 134).
 The seaman's bookshelf on the eve of the Restoration (18, 403).
 Sir William Monson consults the stars (19, 22).
 Infinite inexactitude of longitude in 1622 (20, 248).
 Old Henry Bond and the Longitude (25, 162).
 Instructions to a colonial surveyor in 1582 (37, 48).
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 The mathematicians' revolution (26, 409).
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 Richard Hakluyt and England's sea story (35, 694).
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 The fisherman's story 1354 (37, 709).

The Scottish Geographical Magazine

- The earliest account of triangulation (43, 341).
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 French cosmographers and navigators in England and Scotland, 1542–1547 (46, 15).
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Imago Mundi

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Hudson's Strait and the oblique meridian (3, 48).

The south-pointing needle (8, 1).

John Dee and the map of north-east Asia (12, 103).

A letter dated 1577 from Mercator to John Dee (13, 56).

The Geographical Review

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Idée fixe: the mind of Columbus (*The Hispanic American Historical Review*, 11, 289).

Ideas of the shape and habitability of the Earth prior to the great age of discovery (*History*, 81, 54).

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Some aspects of Professor Taylor's work:

A HISTORIAN OF SCIENCE

Professor Eva Taylor made an exceptionally important contribution to learning during her long and productive life. Having received a chemical education before she began the professional study of geography, she was free from literary and anecdotal bias which often affected students of that science. In fact, this bias had led some chemists to suggest years ago that the Geography Section of the British Association for the Advancement of Science should be closed down, on the ground that the subject was not a science. This attitude was not shared by the fathers of chemistry, for Joseph Priestley in his early days as a teacher stressed the importance of commercial geography, and emphasized that 'a knowledge of chemistry is absolutely necessary to the extension of this useful branch of science'.

One of the recent tendencies in the history of science is specialization on a single aspect, such as the internal logic of discovery. This leads to the presentation of science as a chain of ideas, and ultimately as a system of ideas separated from the rest of human activity. The tendency is dangerous, when a deeper understanding of the relations of science and society is vital for our survival.

Geography provides an excellent medium for the demonstration of the relations between science and life's needs. One of the outstanding merits of Professor Taylor's work was that she took full advantage of this, and thereby was able to perform a service, not only to geographers, but to mankind in the midst of its present difficulties. As she pointed out, for thousands of years science has stood between death and survival for mariners, a relation which was more pregnant than logic for its effective development. Telescopes, submarines and longitude by lunar distance were thought of centuries before they were made practicable. Other conditions besides those of science itself were needed to promote their development.

The consideration of navigational and geographical problems has been notably stimulating to the most profound thinkers. In the late Middle Ages and early

Renaissance times, geographers were among the most influential of scientists, with the kind of prestige that space scientists possess today. They had their part in inspiring the discovery of the New World.

Francis Bacon, who specifically aimed at carrying the spirit which discovered the New World of Land into a New World of Thought, and thereby foretold the modern age of science, appealed to geography for an illustration of his Conformable Instances, in his development of inductive logic. 'The very configuration of the world itself in its greater parts presents Conformable Instances which are not to be neglected. Take for example Africa and the region of Peru with the continent stretching to the Straits of Magellan, in each of which tracts there are similar isthmuses, and similar promontories, which can hardly be by accident.' Bacon's thought may be compared with Wegener's deduction of the theory of drifting continents from the parallelism between the east coast of South America and the west coast of Africa.

Professor Taylor, whose strong intellect allied her with such thinkers as Bacon and Priestley, was always conscious of the profound relation of science to the needs of practical life. She showed that the process of turning the craftsman, whose skill rests on tradition and experience, into a technician who works on scientific principles first occurred among seamen. These technicians were the precursors of the experimental scientists who are the most characteristic figures of modern times.

Her volumes on the *Mathematical Practitioners* of Tudor and Stuart, and Hanoverian, England have revealed the magnitude of the practical scientific activity of those times. She gave information on some 2500 practitioners of various kinds, from calculators and theorists to navigators and instrument-makers, whose work underlaid the brilliant scientific achievements of the seventeenth century. The mathematical practitioners and the makers of instruments, with James Watt and John Smeaton at their head, in turn became the Engineers of the Industrial Revolution. Watt was descended from a family of teachers of navigation. After being brought up to make the kind of instruments required in the navigational age which gave birth to Newtonian science, he invented the master instrument of the next age. This was the steam engine, which led to the conception of energy, and through his invention of the governor involving feed-back, to automation.

No one did more than Professor Taylor to reveal the fundamental unity of practice and science, in her classical investigations of the history of geography and navigation.

J. G. CROWTHER

A HISTORICAL GEOGRAPHER

It would be idle to boast that modern geographers concern themselves greatly with the foundations of navigation and surveying: their difficult and complex subject demands their attention in other directions. However, there was a long period in history when the principal aim of geographical study was the development of the companion arts of navigation, nautical astronomy, surveying and cartography, which collectively form the domain of mathematical geography.

It is strange indeed that a popular view, even amongst geographers of our time, is that the serious study of geography in Britain commenced only when Sir Halford Mackinder was appointed, in 1887, to a Readership at Oxford. True,

Mackinder and his associates contributed greatly to geographical education in England; and the effect of the so-called English School of Geography has been, and continues to be, considerable. But at no time in our history was the progress of geography in England more rapid than in Elizabethan times. It was during this colourful period that circumstances forced Englishmen to think geographically as they had never done before. The geography of the period extending from the beginning of Tudor times to the commencement of the nineteenth century has been studied with meticulous assiduity, and with striking success, by the late Honorary Member of our Institute and doyen of British geographers, Professor E. G. R. Taylor.

Although, as even a cursory survey of her published work will reveal, the Professor ranged widely in the broad field of geography, she will best be remembered for her expert explorations in the realms of Historical Geography. The numerous and brilliant contributions to progress in this avenue of geography bear witness to this; and these brought her distinction and renown, and the acclamation of scholars from all quarters of the globe.

It appears that Professor Taylor undertook a close study of the geographical concepts prevailing in England during the time of the English exploratory voyages of the sixteenth and seventeenth centuries, with the aim of placing the history of the English discoveries in their true perspective. The first-fruit of this study is to be found in her *Tudor Geography 1485-1583*, published in 1930. This work is a significant contribution, not only to the literature of historical geography, but to that of the history of science and technology in general and the history of navigation and its companion arts in particular. A sequel to her *Tudor Geography, Late Tudor and Early Stuart Geography, 1585-1650*, which was published in 1934, carried her study of English geography to the threshold of the period in which, as the Professor put it '... truth is sought by experiment and observation instead of as formerly by reference to authority and revelation.'

Perhaps the most valuable of the Professor's many contributions to the advancement of knowledge are her two monumental volumes on the Mathematical Practitioners published respectively in 1954 and 1966. This work was modelled on the lines of her earlier work on historical geography.

Professor Taylor was endowed with an enormous capacity for the prolonged, persistent and painstaking research which brought her deserved fame. It is a vivid memory of the writer of this note seeing the elderly lady, regularly and frequently, studying acutely in the library of Birkbeck College during the evening hours when this famous institution was (as it still is) a hive of scholarly activity.

Of the numerous academic awards and honours bestowed upon her, the Professor prized highly her Honorary Membership of the Institute of Navigation. This regard for the Institute was a reflection of her intense interest in the history of mathematical geography, particularly as it applies to navigation and nautical astronomy, and in the history of voyages of discovery and exploration. These are regions of knowledge in which the Professor had no peers.

C. H. COTTER

A HISTORIAN OF CARTOGRAPHY

At the time when Professor Eva Taylor served her apprenticeship to geography the history of cartography was *terra incognita*, even for those working in this new academic discipline. The treasures in the great map collections of the country

were as yet untrapped. Professor Taylor took upon herself the role of a modern Richard Hakluyt, 'to bring Antiquities smothered . . . in darke silence, to light'. Like Hakluyt, she showed, in her public lectures, 'the olde imperfectly composed, and the new lately reformed Mappes, Globes, Spheares . . . to the singular pleasure and generall contentment of her auditory'. She showed that in those old imperfections lay the key to the past; they revealed the secrets of many an enterprise in its planning and execution. Her *Tudor Geography, 1485-1583*, published in 1930, marked a first attempt at a new history, 'the History of Geographical Thought' which (as she asserted) had yet to be written. In it she revealed the geographical and cartographical perceptions of the men among whom Hakluyt and his predecessors moved, men such as the Cabots and John Dee. The appendices provide fascinating glimpses into the libraries and writings of the time. The sequel, *Late Tudor and Early Stuart Geography, 1583-1650*, appeared in 1934. In 1954 *The Mathematical Practitioners of Tudor and Stuart England* provided 'a chronicle of lesser men', filling in the details and carrying the story on. It was completed in 1966 by her final work, *The Mathematical Practitioners of Hanoverian England, 1714-1840*. Her editions of works published by the Hakluyt Society covered 30 years, ranging from Roger Barlow's *Briefve Summe of Geographie* (1932) to William Bourne's *A Regiment of the Sea* (1963), and including *The Original Writings . . . of the two Richard Hakluyts* (1935). In these and in her works on navigation, most notably *The Haven-Finding Art* (1956), she offered much original comment on early maps and charts.

Professor Taylor also contributed many articles on the history of cartography to the journals of learned societies, such as the *Geographical Journal* and the *Journal of the Institute of Navigation*. The founding in 1935 of *Imago Mundi*, still the only specialized journal serving the history of cartography, gave her an additional outlet for her writings. In it she threw light on many obscure subjects, such as Mercator's correspondence with John Dee, and Dee's cosmographical ideas. In all these works Professor Taylor displayed a mastery of technical detail combined with a warm interest in the diverse personalities concerned. She brought life into the somewhat prosaic activities of chartmakers and cartographers because she portrayed the men as well as their maps. She conveyed to her readers the magic of the quest into the unknown. Her writings were characterized by the extensive use of original sources and documentary evidence; and they were always a delight to read.

Finally, it was typical of Professor Taylor's indomitable spirit that, even in her last days, she entered into the controversy over the Vinland Map, whose novelty disturbed her deeply ingrained conceptions of medieval cartography. Whatever her views on the map itself, the fact that an early map can now be headline news may be regarded as one of the results of the lifelong work done by Professor Taylor in the field of historical cartography.

HELEN WALLIS

A RECORDER OF MATHEMATICAL METHODS

In her many writings on navigation Professor Taylor paid particular attention to the 'mathematical' content of the science, and of the art. Apart altogether from her abiding interest in the 'mathematical practitioners', whose lives and accomplishments she has so brilliantly chronicled, she always took the liveliest interest in the development of mathematical methods. The transition of the 'Haven-Finding Art', with its necessarily minimum dependence on the exact

sciences, to the highly mathematical methods whose bicentenary we are at present celebrating, encompasses a revolution in mathematical thinking. During this period algebra and trigonometry, as we know them, were developed and enormous strides were made into the art of computation; Professor Taylor, perhaps because she herself was not a mathematician, followed and described these developments with a rare understanding and sympathy. One of the most difficult tasks for the scientific historian is to trace, often from incomplete or fragmentary records, the growth of an idea that is blindingly obvious today. In her researches into the development of meridional parts for the sphere, and the invention and application of logarithms, at the end of the sixteenth century, she showed remarkable comprehension of these difficulties. It is to be regretted that she did not possess the technical knowledge of theoretical astronomy to be able to add, in similar detail, a study of the mathematics that entered into the long and glorious story of the determination of longitude at sea by the method of lunar distances; this is indeed a theme worthy of her pen, but one which requires technicalities that are (fortunately) outside the present requirements of navigation.

Professor Taylor will, possibly above all else, be remembered for her championship of the 'mathematical practitioners'; all interested in the history of navigation will be grateful to her for putting permanently on record their achievements and, through them, providing an insight into the gradual development of the mathematical equipment of the practical navigator.

D. H. SADLER

E. G. R. TAYLOR AS A WRITER

In a broadcast talk about town-planning, Professor Taylor once said that to plan a new town on the lines she was criticizing was like 'trying to stop Tommy growing by refusing to buy him a new pair of boots'. It was typical of her forthright use of English. Many people know and respect her as a geographer and historian, but to many she is endeared by her absolute mastery of language: no stylist in the prissy sense of the word, but a writer in whom two great literary virtues were eminently found. First, the absolute reflection of the writer in the words—so that her tone and personality come through so unmistakably that no other person could have written them. And secondly, so complete a certainty of what she had to say that the language she used took on a natural, unforced, direct form that gave it immense pungency and punch. That clarity of mind extended not simply to the construction of each sentence but to the whole plan of the essay or book—an essentially classical virtue even more admirable when found in a person who had a poor opinion of the exclusively classical—to put it in terms that are probably historically out of date and that would (God rest her) perhaps infuriate her, an Oxford rather than a Cambridge virtue.

As a historian, Professor Taylor was constantly dealing with movements, inventions, discoveries, manifesting themselves in persons: and no matter which of her writings you turn to, you will find (and this is what gives her writing such ease and clarity) that she never wrote until she had a clear picture of the personality behind the person. There are no lay figures in her work. It is supreme craftsmanship, even supreme artistry.

RENÉ HAGUE