

Feature

Cod all mighty

A new book explores the importance of marine resources and, in particular, cod for the history of Catholic Europe and the conventional views on the European settling of North America. **Nigel Williams** reports.

The importance of fish in the history of Europe, particularly in Catholic countries, and the European colonisation of North America, have been underplayed, according to a new book by University of California anthropologist, Brian Fagan. Most Americans have been traditionally schooled to believe that the European discovery and settlement of the New World arose from two events: the first voyage of Christopher Columbus in 1492, and the landing of the pilgrims in Plymouth, Massachusetts in 1620. Fagan's book tells a dramatically different story, one centred on the immense fish resources of the North Atlantic and North Sea,

and upon the Catholic Christian prohibition of eating meat during Lent and on fast days.

Virtually ignored in most history books are centuries of exploitation of these resources by often unrecorded fishermen who travelled across some of the world's most dangerous seas to catch cod, herring, hake and other fish for the European market and, in the process, find previously unknown shores.

As European populations expanded during the Middle Ages, the demand for fish to be eaten on fast days increased accordingly. Initially, this could be met by coastal fishing and by subsistence fishing

in streams, rivers, ponds and lakes. The monastic establishments throughout Europe resorted to artificial fish ponds in which species such as carp could be raised, but this was never very productive and the demand for sea fish steadily grew. "By the tenth and eleventh centuries, fish had become not a catch but a commodity. The stage was set for the extraordinary journey to North America," writes Fagan.

The problem with fish from the sea was that they readily spoiled and could not be transported very far before they became inedible. This was particularly true of herring, an oily fish abundant in the shallow seas of northern Europe. The solution was to preserve them once the catch reached the coast, either by salting and/or drying or



Fishy tales: 'Fish market' by Joachim Beucklaer, 1568. (Picture: Bridgeman Art Library.)

smoking, or by a combination of the three, and to pack them into barrels for transport. The cod and its relatives hake and haddock, were a different matter and more easily preserved than herring. The pursuit of cod took fishermen much further away. A huge industry developed, centred on Bergen, where ships exchanged dried fish for grain. Archaeological excavations in the Norwegian Lofoten Islands have pinpointed the moment around the eleventh century when cod became a lucrative trading commodity that supplanted herring in many European meals.

The greatest riches in this commerce came to those whose ships managed to reach Newfoundland, writes Fagan. This huge island was discovered and temporarily settled by the Norse in about AD 1000 and rediscovered by John Cabot in 1497. Fagan admits that there is some speculation about the extent of early European fishing expeditions to North America ahead of the arrival of Cabot but “why would hard-nosed merchants keep sending their ships west if there was no profit in it? Cabot shipped out with at least two merchants on board, who may have known sailing directions to the Newfoundland fishing grounds.”

It soon became clear that the world’s most productive fishery was the Grand Banks, teeming with cod. It was not long before other English, Basque and French fishermen were on site, and soon other similar banks were discovered further south off the coast of what became ‘New England’. As Fagan writes: “over the next four and a half centuries, the brutally tough Newfoundland cod fisheries would generate more wealth in Europe than all the gold of the Indies.”

He concludes that the *Mayflower* pilgrims with few practical skills were for decades no more significant than the many English fishermen and fur traders.

“It was not the sudden inspiration of famous names that brought Europeans to North America — not Columbus or Cabot or the settlers at Plymouth Rock — but the thousand-year journey in the pursuit of fish.”

Fish on Friday by Brian Fagan.
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Q & A

Trudy Mackay

Trudy F. C. Mackay is William Neal Reynolds Distinguished Professor of Genetics at North Carolina State University. After growing up in Canada, where she completed her undergraduate and Master’s degrees at Dalhousie University, she did her doctoral work with Alan Robertson at the University of Edinburgh. She remained there as a lecturer until 1988, when she joined the faculty at North Carolina State University. Her work focuses on the genetics of mutation and variation in Drosophila melanogaster and the analysis of complex morphological, physiological and behavioral traits. She co-authored the fourth edition of Introduction to Quantitative Genetics with Douglas Falconer. She has served on numerous editorial and advisory boards, and in 2004 received the Genetics Society of America Medal. She is a Fellow of the American Academy of Arts and Sciences and of the UK’s Royal Society.

How did you decide to become a quantitative geneticist? When I was at high school I discovered that I had a knack for mathematics and at the same time I developed a strong interest in understanding the basis of life and the evolution of biological form and function. Genetics appealed to me, because the mathematical and statistical analyses used to analyze complex traits were all logical and seemed to make things fall neatly in place. Genetics felt to me then, as it still does, to be the most exact and rigorous discipline in experimental biology. I was formally introduced to evolutionary and quantitative genetics in my undergraduate sophomore year by Roger Doyle at Dalhousie University, under whose mentorship I completed my Master’s dissertation on the quantitative genetics of the settling behavior of *Spirorbis borealis*, a marine polychaete.

This work had several consequences. First, I learned

the basics of quantitative genetic analysis by using Douglas Falconer’s 1960 version of *Introduction to Quantitative Genetics* and Robert Sokal and James Rohlf’s 1969 version of *Biometry* as ‘how to’ instruction manuals. Second, I developed a lasting fascination with animal behavior. And third, I realized that I needed to work with a better genetic model system and abandoned *Spirorbis* in favor of *Drosophila*. Thus, I was delighted to be able to continue my graduate studies at the University of Edinburgh, then and now a powerhouse for quantitative genetic studies. My mentor was Alan Robertson, one of the fathers of current day quantitative genetics, but I learned much from Douglas Falconer and William (Bill) Hill.

What do you consider the single most important development in quantitative genetics since you were introduced into the field? In global terms, the most important transformation the field has undergone is the transition from ‘complex statistics’ to ‘complex genetics’; in the words of Alan Robertson, we have begun to “lift the statistical fog” clouding our understanding of the genetic basis of quantitative variation. That is not to say that statistical analyses are no longer critical; of course, they are. But we have moved beyond simply understanding complex traits in terms of probabilities and numbers arising from complicated equations to being able to actually understand genetic mechanisms in the context of the biology of the organism. I refer, of course, to the ability to identify genes underlying complex traits by linkage to marker loci exhibiting Mendelian inheritance patterns (albeit it with some difficulty).

It may surprise people not familiar with the history of the field that quantitative trait locus (QTL) and linkage disequilibrium mapping did not spring into existence in the late 1980s/early 1990s with no precedence. As early as 1923, Sax recognized that one could map genes associated with a quantitative