

tribution of Particulate Matter in a Firn Core from Eights Station, Antarctica" by L. D. Taylor and J. Gliozzi.

It is noted that more than half of this book is written by scientists connected with the Institute of Polar Studies at Ohio State University.

A high standard of scientific writing is maintained throughout and the editing of the text is excellent. Not one typographical error was noted, a fact which gives the reader confidence to use this book with its large amount of numerical material as a reference source. The illustrations, including a large number of fold-in maps and diagrams, are clear and well reproduced. High quality paper and first-class workmanship in the production of the book give it a good appearance. It is sincerely hoped that the good intention of the organizers of the series, *i.e.* to make available the vital information gained in extremely expensive field operations, will not be defeated by the high price of this publication.

Fritz Müller

EARLY AMERICAN HISTORY:
NORSEMEN BEFORE COLUMBUS.
By J. KR. TORNÖE. Norway: Norwegian
Universities Press, 1964. 5½ x 9 inches.
127 pages, 4 plates, 8 text maps, 1 folding
map. N.Kr. 15.00.

In this work M. Tornöe tackles the ever-fascinating riddle that has interested him for thirty years, of where the Norsemen attempted to found settlements in North America. Beginning with the view that the sagas were "mainly fiction" he later accepted them as "based on fact". He has the advantage of much youthful experience with sailing boats in Norse waters and, where others failed, he succeeds in explaining how to "svipt" a sail. He is unlucky in his timing since his book has appeared before Helge Ingstad's report on L'Anse-aux-Meadows but after Gwyn Jones's *The Norse Atlantic Sagas*. The difference between his conclusions and those of Gwyn Jones is striking.

Tornöe believes the sagas "were written about the time of Are Frode (1068-

1148)". Jones more conventionally accepts them as later "workings over of original material" with dates not earlier than 1200 for the *Graenlendinga Saga* and certainly after 1263 for the *Eiriks Saga Rauda*. The two authors also differ in their identification of particular places.

The arguments with which Tornöe supports his conclusions hardly seem convincing. He needs to estimate the distances which Norse seamen covered, and hence their speed of sailing; therefore he cites the *Viking*, a facsimile of the Gokstad ship in which Captain Magnus Andersen sailed from Norway to America in 1893. Andersen tested this vessel against modern sailing ships and "to his great surprise his *Viking* kept pace with most of them", with an average speed of 10 knots per hour. Then Tornöe allows Bjarne Herjolfsson "an average speed of 10 knots" (p. 40) and, by inference, the same for Leif Ericsson (p. 59). But broad and heavy laden merchant ships, like Bjarne's, would not necessarily sail as fast as a light vessel of the Gokstad type; and 10 knots seem improbable. Then as now winds were variable, and a friend, whose merchant voyages under sail total nearer 20 than 10 thousand miles, insists that modern sailing craft could not count on averaging much over 100 miles in 24 hours. Another friend, a yachtsman experienced in New England waters, also questions Tornöe's estimates of average speeds; and any over-estimate of their speeds would exaggerate the length of Norsemen's voyages.

Alternatives must also be eliminated before particular places can be identified from saga descriptions. It can be very difficult to do this, as the *Furdustrandir* show. Forty miles of beach worthy of the name of "Wonderstrands" would seem hard to duplicate. Yet those Tornöe picks on Cape Cod are matched by the beaches in Labrador which Jones prefers. Tornöe's argument that Leiv's sun observation supports the choice of Falmouth, Cape Cod, as the site of his *budir* is insecure too. As the

late T. J. Oleson wrote, this observation is "a broken reed, for there is no agreement as to what *eyktarstaðr* and *dagmalastaðr* mean".

For Tornøe the Skraelings are "Indians", as they have to be with his geographical identifications. Yet the saga descriptions strongly suggest that at least some were Eskimo. Broad faces, low stature and the beard of one described in *Eriks Saga Rauda* collectively seem more Eskimo than Indian. Skin boats are the exception among Indians, but normal among Eskimo. Paddles likened to staves "waved with a noise just like threshing and . . . waved with the sun" still more strongly recall the Eskimo double paddle. Then there were the Skraelings, killed by Karlsefne's men, who "had receptacles in which was beasts' marrow mixed with blood"; Stefánsson identified these as Eskimo for whom caribou marrow suffused with blood is a delicacy.

Stefánsson's verdict supports Jones's opinion that Newfoundland was the site of Vinland; so does other evidence, noted by Jones but omitted by Tornøe. This is found in the maps of Sigurdur Stefánsson and Hans Poulson Resen. The sources from which these maps were drawn are unknown but both show "Promontorium Winlandiae" where Northern Newfoundland should be.

An objection to Newfoundland, noted by Tornøe, is, of course, that grapes do not grow there. But with the grapes is associated wheat; and wheat is an impossibility. Men who could mistake an American grass for wheat might well mistake some other plant for the vine. Ernest Rouleau's checklist of Newfoundland's flora includes a plant which, with its five-pointed leaf, its climbing habit and its clustered fruit, could be so mistaken, namely, Virginia Creeper. Allow the confusion of grape and creeper to be possible, and this objection to Newfoundland as Vinland disappears.

Further points made by Tornøe hardly strengthen his conclusions. They concern the lump of anthracite excavated at Sandnes, Greenland, in 1930 which

he describes as "of the same type which exists in Rhode Island", and the stone arrowhead, also found at Sandnes, which he boldly suggests might be the very one which killed Thorvald. But, according to Jones, the anthracite, "once believed to have come from New England, is now thought to be of European origin"; if so, it is better evidence of the illicit trade of Bristol merchants with Greenland, which can be inferred from Anglo-Danish treaties, than of Norsemen in Rhode Island. And if the Sandnes arrow were indeed the one which killed Thorvald it would cripple Tornøe's thesis, for it is of a quartzite, unknown indeed in Greenland, but indistinguishable from the quartzite of Labrador and it matches specimens excavated by Jørgen Meldgaard at an early Indian campsite beside Northwest River in Labrador.

Convincing or not, Mr. Tornøe's book is still interesting. The questions he tackles can hardly be answered satisfactorily from the literary evidence now available. He may not be found wrong when archaeologists give us the final answer, as we hope they will some day.

GEOGRAPHICAL AND SEXUAL VARIATION IN THE LONG-TAILED JAEGER STERCORARIUS LONGICAUDUS VIEILLOT. By T. H. MANNING. *Biological Papers of the University of Alaska*, No. 7. 1964. Paper, 9 x 6 inches, iii + 16 pages, 3 figures, 3 tables. \$0.50.

Those of us who have followed Tom Manning's copious writings on arctic birds and mammals through the years were not surprised when he tackled the geographical and sexual variation in the Long-tailed Jaeger (*Stercorarius longicaudus*) Vieillot. The taxonomy of this species especially bothered him for a long time. Finally, he took positive steps to do something about it. The opportunity to study the problem came while he was engaged with other work under a Guggenheim Fellowship, which enabled him to examine bird collections