THE FIRST PRIVATELY PRODUCED MAP IN NORWAY WITH A GEODETIC REFERENCE FRAME

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A map of the district surrounding the largest lake in Norway was published in 1796 by the Topographical Society of Norway. Their members contributed private funds for this unique map and for the publication of the Topographical Journal, containing multidisciplinary descriptions, including environmental, of many regions of the country. The map was produced by lieutenant Niels S Darre, a military surveyor and cartographer, as a private undertaking in his own home district. The geodetic reference point of the map is the church at Vang; the position of which had been determined by repeated astronomical observations by its vicar, Abraham Pihl. He had been trained as an astronomical observer by professor Thomas Bugge at the Round Tower Observatory in Copenhagen. A supporting latitude determination in Lillehammer is also noted on the map, obtained by Maximilian Hell in 1769 on his return from Vardo in Northern Norway to Vienna after a successful observation of the transit of Venus. The observed magnetic deviation from astronomically determined north is given. The map also identifies a marker of the great flood of the river Glomma in 1789, causing environmental and social devastation. We have digitized the map and compared it to a 67 km × 82 km section of a modern, digitized topographical map of Norway, by transforming the UTM projection to a meridian through the church at Vang. While most features coregister acceptably by visual inspections of the old and new maps, we note geometrical deviations of up to 1 km in the locations of western shorelines.

Keywords: astronomical positioning; cartography; image processing; plane table mapping; triangulation

Introduction

The first systematic mapping of Norway based on a geodetic reference frame was initiated by military interests to prepare defense infrastructure along the Norwegian-Swedish border (Pettersen 2009). Astrogeodetic triangulations were made 1779–1785, and detailed mapping took several more years. The project was extended along the entire coast of Southern Norway 1786–1799 to establish a framework for the production of coastal maps. The intention was to improve the safety of shipping and fisheries along the coast. This was important since it brought tax income to the king and his government in Copenhagen, and because shipping was a key factor in the foreign trade. Map making was a governmental responsibility.
A remarkable contrast to this historical main road is a map published in 1796 of the surroundings of lake Mjøsa, the largest inland lake of Norway. The map was produced, printed, and distributed entirely by private efforts with the ideal intention of contributing to a more detailed description and precise knowledge about a region of Norway. Below we review how the Topographical Society of Norway created the opportunity and the funding. We provide short biographies of the map maker and the printer, and of the astronomical observers who contributed the geodetic reference position and orientation. Finally we discuss cartographic properties of the map and compare it digitally to modern maps of the region.

The Topographical Society of Norway — publisher

The Topographical Society of Norway was founded on 4 August 1791. The by-laws and plan adopted by the eight founding members defined the aim of the society to acquire and distribute new knowledge about Norway by requiring all members to contribute their share. An ordinary member accepted the duty of preparing a topographic description of his district, which might be a parish or a city, or a description of a production facility with full accounts of production volumes and profit. Extraordinary members accepted to prepare a more specialized contribution, for instance limited to their profession. A detailed standard for these papers were adopted, to ensure that they included geographical and historical information, and described the physical conditions and the economic situation. The political description included demographic and property statistics and information on education, superstition, common practices, diseases, natural medicine among people, the official services for religion, school, charity, defense, and infrastructure for travel. The papers were published in the Topographical Journal. The costs were covered by a fund made from an entrance fee of 5 rigsdaler and an annual fee of 3 rigsdaler.

The society had attracted 132 paying members by 1795. In 1793 a total of 600 individuals were subscribers to the Topographical Journal of Norway. 32% were army officers, 28% were civil servants, 19% were clergy, and 21% were private professionals. Among the members was vicar Hans Mathias Abel, grandfather to the talented Norwegian mathematician Niels Henrik Abel, vicar Abraham Pihl, also official astronomer to Norway, and several military officers holding adjunct positions with the Geographical Survey of Norway, e.g. lieutenant Niels Stockfleth Darre. Between 1792 and 1808, 34 volumes of the Topographical Journal were published, totaling 5184 pages. In 1800 the membership included 139 individuals, of which 13% were army officers, 32% civil servants, 40% clergy, and 15% private professionals.

The accounts of 1795 revealed a cumulative income since the start of 2349 rigsdaler, about equally distributed on membership fees and subscriptions. Ten issues of the Journal had been produced at a cost of about 1500 rigsdaler. Printing costs for a map by Niels S Darre was 410 rigsdaler.

The Topographical Journal published several issues each year from 1792 till 1805. In 1808 the membership had reduced to 93. The accounts showed a balance of 485 rigsdaler. These funds were used to publish two more issues, and then the Topographical Society came to a halt after 16 years.