The Reclamation of the Zuiderzee
Author(s): P. H. Schoute
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The main fact, conceded by all who have studied the subject, is, that there is such a thing as the evolution of continents, the heights and hollows of the Earth's crust having become greater with the lapse of time. And all, also, concede that the present ocean basins represent regions where subsidence has predominated over elevation, while the continental area is that in which elevation has been more active than depression. Thus the actual level of the sea is an accident depending on the volume of its water and the inequalities of the crust, equal variations in which, on the hypothesis of constant volume in the ocean, may have led to very different emergence or submergence of the border areas according to the angle of the slope. At present the coast-line lies nearly mid-way on the flattest expanse of the continental margin, so that a given increase or decrease in the volume of the ocean would cover or lay bare the largest possible area of land.

THE RECLAMATION OF THE ZUIDERZEE.

By Professor P. H. SCHOUTE, of Groningen.

The question of the reclamation of land now covered by the Zuiderzee is no new one, but it is only recently that a thoroughly practicable scheme has been matured for the accomplishment of this great engineering feat. In 1886 a Committee was appointed to consider and report upon the question under the chairmanship of Mr. A. Buma, who had frequently urged this matter upon the attention of the Government. The result of the deliberations of this Committee has been published in the form of eight memoirs, in which the whole question is thoroughly discussed in all its bearings. The first memoir deals with general principles, discussing the best position and direction for the main dyke which shall shut off communication with the sea, and sketching a general plan of the engineering works to be effected. The commercial and strategical aspects of the proposed changes are also fully considered. The three succeeding memoirs are more technical in their treatment of the engineering problems. The means of protection against floods and the maintenance of navigable channels after the seclusion of the sea are entered into in some detail. In the fifth the best form of construction for the main dyke, with its sluices and other works, is minutely discussed, and the whole question of land reclamation by different methods is gone into. The sixth memoir is confined to a delineation of the present condition of the Zuiderzee, its depth, salinity, and the volume and velocity of the rivers which enter it. The seventh memoir has to do with the geological aspects of the scheme, discussing the nature of the sea-bed; and in the last the new plans are compared with former proposals for the same purpose.

As the subject is one of considerable geographical importance, on
account of the magnitude of the proposed works, I shall endeavour to summarise the leading facts embodied in the voluminous report just referred to.

The proposal is not merely to run a dam across the mouth of the Zuiderzee and reclaim the whole of the enclosed area, but rather to reclaim certain large tracts along the margin of the enclosed part of the sea, leaving in the centre a tract of fresh water, the Yssel Lake, from which wide navigable channels will radiate to the important towns. The plan of reclaiming part of the area without secluding the sea was examined and rejected. The general plan of the proposed works may be seen from the accompanying map, and the proposed process of gradual reclamation is shown in the series of small maps beneath it. The general geological features of the sea-bed are shown on the larger map, where it will be observed that the fertile clay regions of the present sea-bed are marked out for reclamation, while the uncultivable stretches of sand are left as the bottom of the future Yssel Lake.

While the main interest of the proposed works is concentrated on the reclamation of the sea-bed within the great dyke, the plans contemplate the linking together of the islands of Texel and Vlieland, and doubling the area of the new island thus formed by reclamining on the eastern side. It is also proposed to unite the West Frisian islands—Terschelling, Ameland, Schiermonnikoog, and others—to each other and reclaim the shallow sea inlets which separate them from the Friesland and Groningen shore, thus greatly reducing the length of the coast-line and greatly increasing the area of the country.

The main dyke is to run from the mainland of North Holland, through the island of Wieringen on the west to the village of Piaam in Friesland on the east. This dyke (including the island) will have a length of 18 miles, and it is by no means an unimportant matter that the protection of these 18 miles will relieve from the necessity of protection the whole 165 miles of Zuiderzee coast-line, which has at present to be watched and strengthened. A very important function of the great secluding dyke is to reduce the range of the rise of water with storms. No corresponding serious increase in the storm-level of the water outside the great dyke is likely to result, and it is considered that the danger of a serious flood in the case of the bursting of the right bank of the Prussian Upper Rhine would not be perceptibly increased.

With respect to the important question of the outflow of land water very careful observations have been made. It is found that the amount of water to be dealt with from the outflow of the Yssel, the other streams, the surrounding polders and the Zuiderzee itself stand in the proportions of 174, 111, 45, 36. It has been calculated that sluices with a depth of 13 feet, and a combined width of 1000 feet will amply suffice for evacuation sufficient to maintain the level of the projected Yssel Lake at the desired point. The evacuation of the existing polders
will be improved by the works, and their irrigation in the case of exceptionally dry summers will be very much facilitated, as the new Yssel Lake, unlike the present Zuiderzee, will be filled with fresh water.

The new scheme provides for the maintenance of all the important navigational features of the Zuiderzee. The actual navigation both by sail and steam is very great. Amsterdam, which supplies most of the trade, is yearly visited from the Zuiderzee by forty-six thousand sailing ships of nearly one million tons capacity, and by over eight thousand steamers, of an aggregate of 320,000 tons. When the great dyke is completed, water-communication between the outer sea and the Yssel Lake will be kept up by two canals. The first of these will lead from the open sea at Harlingen along the Frisian sea-dyke and through the east end of the Great Dyke to the Yssel Lake. The second canal will lead from the sea to the Yssel Lake across the island of Wieringen, and, as the lake will be kept in navigable connection with the principal trade towns now open to the Zuiderzee, sea-borne traffic will remain very much in its present state. The fisheries will, however, naturally suffer by the change from salt to fresh water.

The proposed seclusion dyke would require at least eight years for completion, the four inner dykes, and the polders they would enclose, twenty-four years more; and it would be undesirable for several reasons to occupy less time. The expense of the great seclusion dyke is estimated at about £3,500,000, and the four great reclamation works in the interior will cost about £12,300,000 more, a total cost of about £16,000,000. Against this must be set off the value of a little more than 530,000 acres of reclaimed land, of which nearly 500,000 acres may be expected to prove fertile. It is considered inexpedient to bring more than 25,000 acres of new land into the market each year; and of the estimated cost of £33 per acre, it would be fair to expect assistance from Government to the extent of a fourth part in respect of the improved condition of the kingdom with regard to danger from the sea. A fair rent for the reclaimed land may fairly be expected, probably £2 per acre, yielding annually an interest of over £1,000,000, when the reclamation is complete. The immense amount of employment for engineers and labourers, who at present have not sufficient occupation, must of itself be a national benefit.

Professor Telders of Delft gives, as his opinion of the scheme, that it is very difficult, but quite possible with Government aid. He considers that the construction of the secluding dyke will be more than repaid by the consequent cheapening in the reclamation of the Zuiderzee coast-lands, their ready evacuation or irrigation, and the establishment of direct railway communication between North Holland and Friesland. The outlay for roads, and possibly also for national defence, will be increased, but not out of proportion to the benefit secured.
Recently (September 8th, 1892) the Dutch Government has appointed a new Committee to report upon the scheme worked out by the Committee of 1886 (Zuiderzee-vereeniging). Of this new Committee, the Minister of Trade, Mr. C. Lely, is president.

MAP OF THE WORLD, 1542.*

The original of this map is in the Royal Library of Stockholm, and is described in an accompanying pamphlet, by E. W. Dahlgren, as being drawn on three sheets of parchment, which together measure 1440 × 790 millimetres. The present reproduction is a facsimile in everything except the colouring, the ornamental border, and the inscription. As regards the general appearance and arrangement of the map, a reduced copy, which is also furnished, can be consulted. It will there be seen that the globe has been projected on the plane of the Equator, and divided into thirty-six gores, each of which measures 10° of longitude; but from the ornamental border and inscription, it is evident that it was not the intention of the author that it should be cut up and used as a covering for a globe. A scroll which runs the whole length of the map bears the following inscription:—

"Nova verior et integra totius orbis discretto nunc primum in lucem edita per Alfonsum de Sancta Cruz Cesaris Charoli V. archicosmographum. A.D. MDXLII."

In the lower left-hand corner there is a dedication to the Emperor, surrounded by an ornamental border. As Santa Cruz participated in Sebastian Cabot's unsuccessful expedition of 1526, the object of which was to take the same course as Magellan, but which did not extend farther than the Rio de la Plata, it would naturally be expected that in that part of South America the most important information would be found. The results of this voyage had however already appeared on Ribero's two maps of 1529, and in this respect Santa Cruz's map has nothing of additional importance to present. It may however be remarked that we here for the first time find the name Rio de la Plata, and that the name Buenos Aires, which also occurs here for the first time, shows a knowledge of Pedro de Mendoza's expedition of 1535, when that city was founded.

The coast of Africa is evidently drawn from the charts of the beginning of the sixteenth century, such as the Cantino map of 1502. The mapping of the British Isles, Western Europe, and the Mediterranean exhibit, in a form modified to suit the projection, the coast-

* Map of the World, by the Spanish cosmographer, Alonzo di Santa Cruz, 1542. Reproduction in phototypic facsimile, by the printing office of the Swedish Staff-General, with explanations by E. W. Dahlgren, Stockholm, 1892.