RESUME OF LATE RECENT GEOLOGICAL HISTORY OF THE GULF COAST[1]

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Abstract by
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The writers point out differences of opinion held, on the one hand by Gulf Coast geologists and on the other by Dutch geologists regarding the Recent history of sea-level changes. This paper admirably summarizes the evidence gathered by the Gulf Coast workers and offers conclusive evidence that sea-level reached its present stand approximately 5000 years ago and since that time there have been no relative changes such as the drop of 6 meters (19.7 feet) which the Dutch postulate.

Fisk, after extensive studies on the Gulf Coast has recognized two stages in the Recent geologic history. The rising-sea-level stage began about 25,000 years ago with melting of the last Pleistocene glaciers. Gradual rise in the sea-level continued until approximately 5,000 years ago when the second, or standing-sea-level change began.

Studies conducted by Dutch geologists, especially Umbgrove, present the following sequence of events: With the melting of the last Pleistocene glaciers 25,000 years ago, sea-level rose to a maximum about 5,000 years ago but fell again between 3,000 BC and 850 AD by about 6 meters. Following 850 AD there has been a slight rise in sea-level. The present level is considered to stand about 6 meters lower than it did 5,000 years ago. These two theories are graphically presented on Plate 40.

Extensive field evidence has shown that the late Quaternary coastal plain can be divided into two principal physiographic units, the Recent coastal plain and inland from it the late Pleistocene (last interglacial) plain, which have very similar sedimentary histories.

The large Mississippi deltaic plain of southeastern Louisiana with its several sub-deltas, their distributary ridges and interdistributary lowlands has been deposited during the last 5,000 years with sea-level at its present position. Radio-carbon dating and physiographic data support this conclusion. The updip alluvial valley yields a substratum of poorly sorted sands and gravels (rising sea-level deposits) and a finer top stratum deposited by meandering courses contemporaneous with the formation of the several sub-deltas. Similar features occur in all valleys of the Gulf Coast from western Florida to Mexico.

West of the delta an extensive area of mud flat, marsh, and abandoned beach ridges has formed contemporaneously with the deltaic plain. This chenier plain is approximately 12 miles wide and all beach ridges, the oldest inland and the youngest at the coast, vary in elevation from 0 to 12 feet.

[1]GEOLOGIE EN MIJNBOUW (NW. SER.) 16e Jaargang, Pag. 185-194, Juni 1954.
Symposium: Quaternary changes in Level, Especially in the Netherlands.

Major rivers of the Texas coast (Brazos-Colorado and Rio Grande) have constructed huge deltaic plains with features similar to those of the Mississippi delta. Small streams are building deltas at the heads of the bays but at a slower rate.

Interdeltaic sediments on the Texas Coast form a narrow band characterized by barrier islands, lagoons and marshes, and sand dunes. Data suggest that barriers accrete seaward by development of beach ridges up to 12 feet in height at a very slow rate.

Excellent physiographic data on the late Pleistocene surface indicate that it was developed similarly to that of the Recent at standing sea-level during the last Pleistocene interglacial stage. Subsequent to deposition the Pleistocene surface has tilted seaward to plunge under the Recent near the coast and rise above it inland. Had sea-level been up to 19 feet higher during the last 5,000 years, much of the well preserved coastal-plain surface would have been eroded and marine sediments would cover large areas which are of doubtless both deltaic in origin and Pleistocene and Recent in age.

The contact between Recent and late Pleistocene as used by Fisk and the authors of this paper is rather easily recognized. Soft sediments with high water content unconformably overlie Pleistocene clays which were subjected to considerable weathering, oxidation and water loss during a lower stand of sea-level during the last glacial stage.

Evidence presented by the Dutch to explain the Recent sea-level changes can be related to shifting sites of active deltaic sedimentation simultaneously with gradual subsidence and wave erosion of abandoned delta fringes. Physiographic features of the Dutch coast have Recent counterparts on the Gulf Coast which are known to have developed without enstatic sea-level changes.

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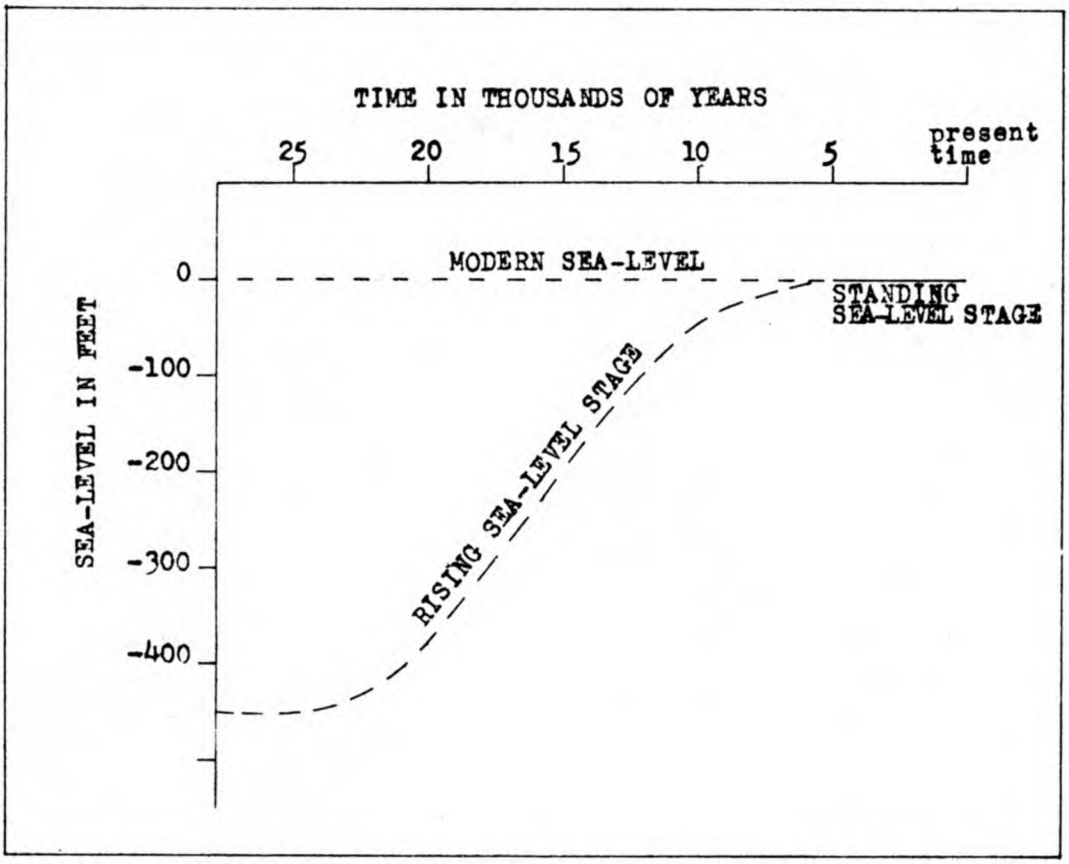
PLATE 40

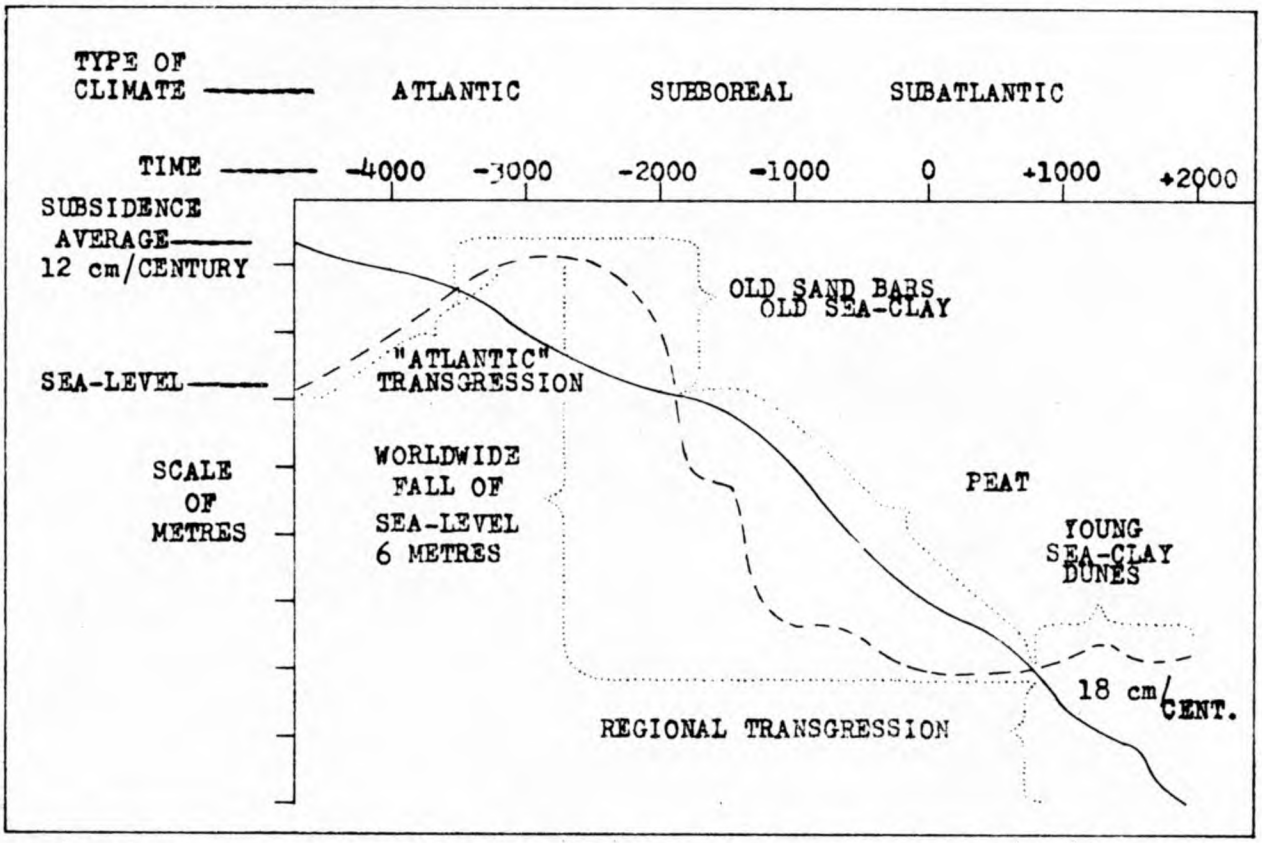
Plate 40A Fisk's History of Recent Sea-Level Changes.

Plate 40B Umbgrove's History of Recent Sea-Level Changes.

Both plates reproduced from Geologie En Mijnbouw, June, 1954.



Graphic representation of Fisk's conclusions regarding history of sea-level changes since last ice age.



Graphic representation of the supposed movements of sea-level and subsidence of the bottom (in Holland). After Umbgrove (1950).