

# b15 The once four named Pleistocene Glacial Stages < tills >

In lapidary inscriptions, a man is not upon oath. —Samuel Johnson.<sup>1</sup>

Two major schemes of harmonization [of Scripture and geology] were developed and refined during the nineteenth century: these were the gap and day-age interpretation of Genesis 1. —Davis A. Young.<sup>2</sup>

A. Bernardi in 1832 envisaged Europe covered by ice. This was to explain: “How rock fragments originating in the north came to where one finds them strewn and in mounds in Northern Germany and neighboring lands.”<sup>3</sup> For that time, Louis Agassiz’s botanist/poet friend Karl Schimper in 1837 coined the term *Eiszeit* (ice age). Earlier, apposed to such, Agassiz had studied existing glaciers and their products: erratic boulders, glacially scoured, striated and polished bedrock, glacial moraines, and glacially modified landscape. However in 1837 he issued his famous “Neuchâtel Discourse” volta-face. Materials formerly mapped as diluvium he reclassified as till and glacial outwash.<sup>4</sup>

In Britain, James Geikie in 1877 presented evidence of two glacial stages.<sup>5</sup> In America, N. S. Shaler in 1889 presented evidence in New England of at least two ice sheet advances.<sup>6</sup> In Europe, Albrecht Penck and Eduard Bruckner in 1909 noted remnants of four sets of river terraces in the outwash gravels in the northern foothill valleys of the Alps. These terraces can be correlated by their hydraulic heights. In Penk’s scheme, each accorded to a major advance of an otherwise diminishing ice sheet and so youngest is the lowest and oldest is the highest. These Alpine glacial stages named after streams (Danube tributaries) in the vicinity of Munich, Germany, are youngest to oldest: **Würm** (Lower Terrace of the Iller river), **Riss** (Higher Terrace of the Iller river), **Mindel** (Younger Deckenac Terrace, the next to highest terrace), **Gunz** (Older Deckenac Terrace, the highest terrace).<sup>7</sup>

In North America, careful mapping and correlation of till deposits was that at least four major and some evidence of many smaller and shorter duration episodes of ice sheet advance (glacial) and retreat (interglacial) occurred during the Pleistocene. Although the advancing ice sheet often obliterated earlier depositional episodes these sometimes survive because frozen drift and paleosoils behaved like bedrock when advancing ice overrode them or because frozen at the time weathered older tills are incorporated as boulders in the younger tills. The Holocene warm time and Pleistocene glacials (named for U.S. Midwestern States recognized in the classic areas studied south and southwest of the Great lakes) and interglacials (named for Counties and Towns in the Midwest) are:<sup>8</sup>

NORTH AMERICAN STAGES		Durations in years	Ended years ago	Named by	Type locality
Holocene		10,000			
Wisconsin glacial	Late	25,000	10,000	T. C. Chamberlin, 1895	State
	Middle	30,000	35,000		
	Early	14,000	65,000		
Sangamon interglacial		53,000	79,000	F. Leverett, 1898	Sangamon Co., Illinois
Illinoian glacial		200,000	132,000	F. Leverett, 1898	State
PRE-ILLINOIAN		Approx. durations	302,000		
Yarmoth interglacial		300,000		F. Leverett, 1898	Yarmouth, Iowa State
<b>Kansan glacial</b>		400,000		T. C. Chamberlin, 1895	State
Aftonian interglacial		200,000		T. C. Chamberlin, 1895	Afton Junction, Iowa State
<b>Nebraskan glacial</b>		1,200,000+		Bohumil Shimek, 1909	State

