SUMMARY CHART OF THE GEOLOGICAL HISTORY OF CHICAGO

Cenozoic era		The glacial record, and geological processes now at work
Pleistocene period		
	2 million years ago	
Pliocene period		
Miocene period		
Oligocene period		
Eocene period		
	65 million years ago	
Mesozoic era		No rock making in the Chicago region
Cretaceous period		
Jurassic period		
Triassic period		
	225 million years ago	
Paleozoic era		
Permian period		
	275 million years ago	
Pennsylvanian period		Rock making perhaps, but if so the deposits have all been eroded away
	340 million years ago	
Mississippian period		The Chicagoland bedrock records made
Devonian period		
Silurian period		
Ordovician period		
Cambrian period		
	600 million years ago	
Proterozoic era		All rocks beneath the Cambrian in the Great Lakes region date from these eras. The accessible geological record at Chicago begins with the Cambrian.
Keweenawan period		
Huronian period		
Archeozoic era		
Laurentian period		
Kewatin period	over 3 billion yrs. ago	

GEOLOGY OF THE CHICAGO AREA

The entire Chicago area was buried under several thousands of feet of glacial ice that spread over the region from the northeast during the Wisconsinan glaciation—the last major advance of the ice. The glaciers were largely part of the Lake Michigan Lobe (fig. 2) but possibly included the margin of the Saginaw Lobe in the extreme southeast and the Green Bay Lobe in the extreme northwest. The Wisconsinan glaciers spread westward nearly to the Mississippi River and southward to central Illinois, and they eroded the Chicago area so intensely that no deposits of earlier glaciers have been found. It is reasonably certain that glaciers of the Illinoian glaciation, which preceded the Wisconsinan, advanced from the Labradorean Center of accumulation in eastern Canada and covered the Chicago area. Deposits of the Illinoian glaciation buried by younger deposits may remain in some of the bedrock valleys. As deposits of the still earlier Kansan glaciers are present southwest of the Chicago area, the northern edge of a Kansan glacier from the northeast also may have covered part of the region. There is *no* evidence to suggest that glaciers of the earliest glaciation, the Nebraskan, covered the Chicago area.

The glaciers retreated from the Chicago area about 13,500 years ago, by which time Lake Chicago had spread over much of what is now Chicago. Discharge from the lake through the Chicago Outlet to the Illinois Valley continued intermittently until about 3,000 years ago, although a minor discharge may have occurred as recently as 2,000 years ago. When the glaciers melted, a thin deposit of windblown silt (loess) blanketed the area; lakes formed in the depressions, eroded their shores, and made beaches; streams entrenched themselves and began building floodplains; the winds blew sand from the glacial outwash into dunes; vegetation covered the land; and weathering began the process of soil formation.

STRATIGRAPHY

The rock formations in the Chicago area were formed in many ways. Some were deposited in shallow to moderately deep seas that repeatedly invaded the continent. On land, sediments were deposited in rivers, streams, and lakes. Many types of deposits were laid down by melting glaciers and by meltwater flowing from the glaciers. The winds deposited a thin mantle of loess and blew beach sands into dunes.

The common sedimentary rock types in the Chicago area include dolomite, limestone, shale, sandstone, siltstone, and claystone in the bedrock formations, and gravel, sand, silt, and clay in the unconsolidated formations. No igneous and metamorphic rocks are native to the region, except in the deeply buried Precambrian formations, but fragments of these rocks, a few as large as 5 to 10 feet in diameter, were carried into the region by glaciers in such numbers that the common rocks granite, gneiss, schist, basalt, and quartzite — are plentiful along all streams that are actively cutting into the glacial deposits.

BEDROCK STRATIGRAPHY

PRECAMBRIAN ROCKS

The oldest rocks of the Earth are the Precambrian rocks (fig. 5), which are also called "the crystallines" or "the basement rocks." Only one drill hole has penetrated to the Precambrian in the Chicago area. It was drilled 6 miles west of Joliet in the Plainfield Quadrangle (SW¼ NE¼ NW¼ Sec. 20, T. 35 N., R. 9 E., Will Co.) and encountered red granite at a depth of 4,222 feet (Bradbury and Atherton, 1965). If the Precambrian surface has the same dip as the top of the Glenwood-St. Peter Sandstone (fig. 12), it ranges in depth from 2,500 to 3,000 feet along the north boundary line of the area to 5,000 to 5,500 feet deep along the south boundary. It is approximately 4,500 feet deep in the area of the Chicago Loop (Buschbach, 1964). Age determinations of Precambrian rocks in nearby areas indicate that the uppermost, or youngest, Precambrian rocks in the Chicago area are 1 to 1.5 billion years old. Fragments of Precambrian igneous and metamorphic rocks transported by glaciers from Canada are abundant in the glacial drift.

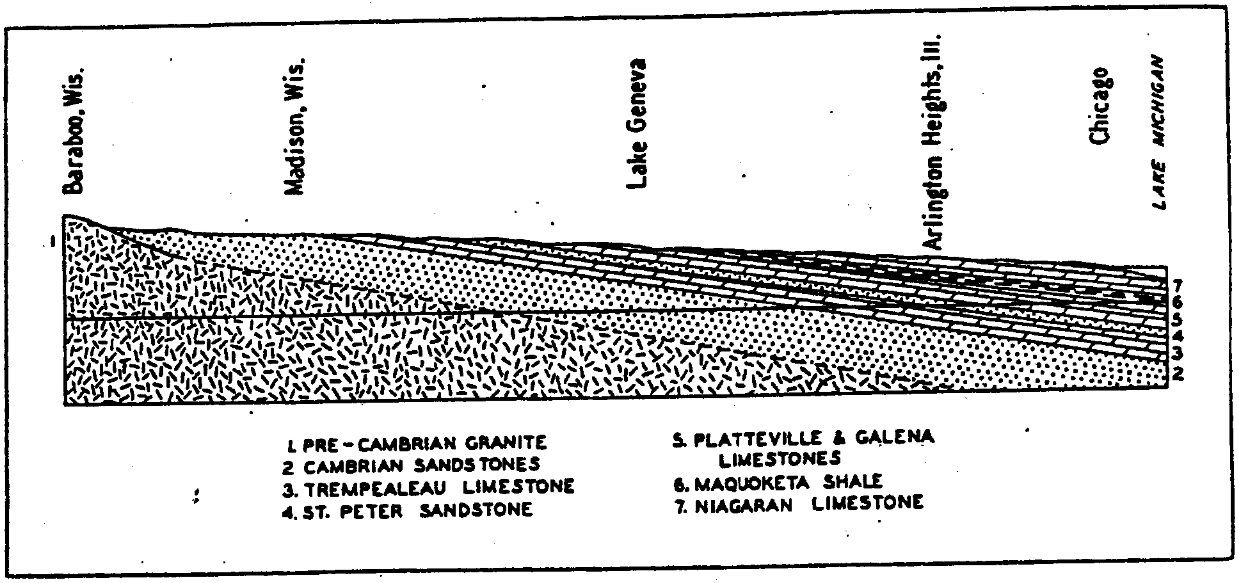

FIG. 70.—Geological cross-section of southeastern Wisconsin and northeastern Illinois.

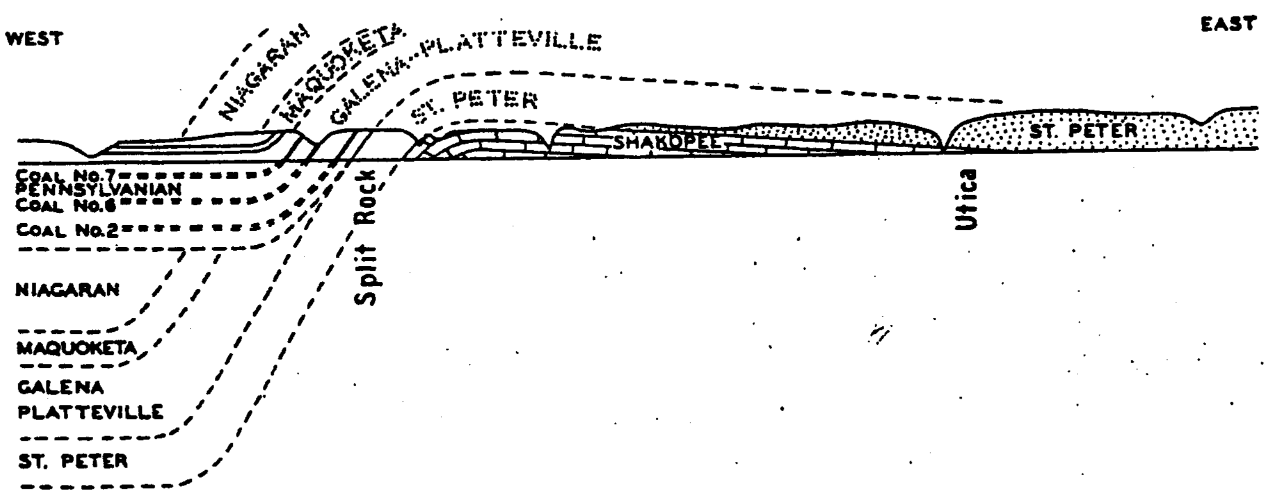

FIG. 73.—Diagrammatic cross-section of the LaSalle anticline along the north bluff of Illinois River.

Definitely known positions of formations are drawn with full lines, inferred positions of formations below the present surface are shown by dashed lines, and their former positions across the eroded portion of the anticline are shown by dashed lines and dotted names.

The Pennsylvanian (coal-bearing) rocks on the west were deposited horizontally across the anticline after an early erosion period, were themselves deformed by a second arching of the anticline, and were in turn eroded off the crest.

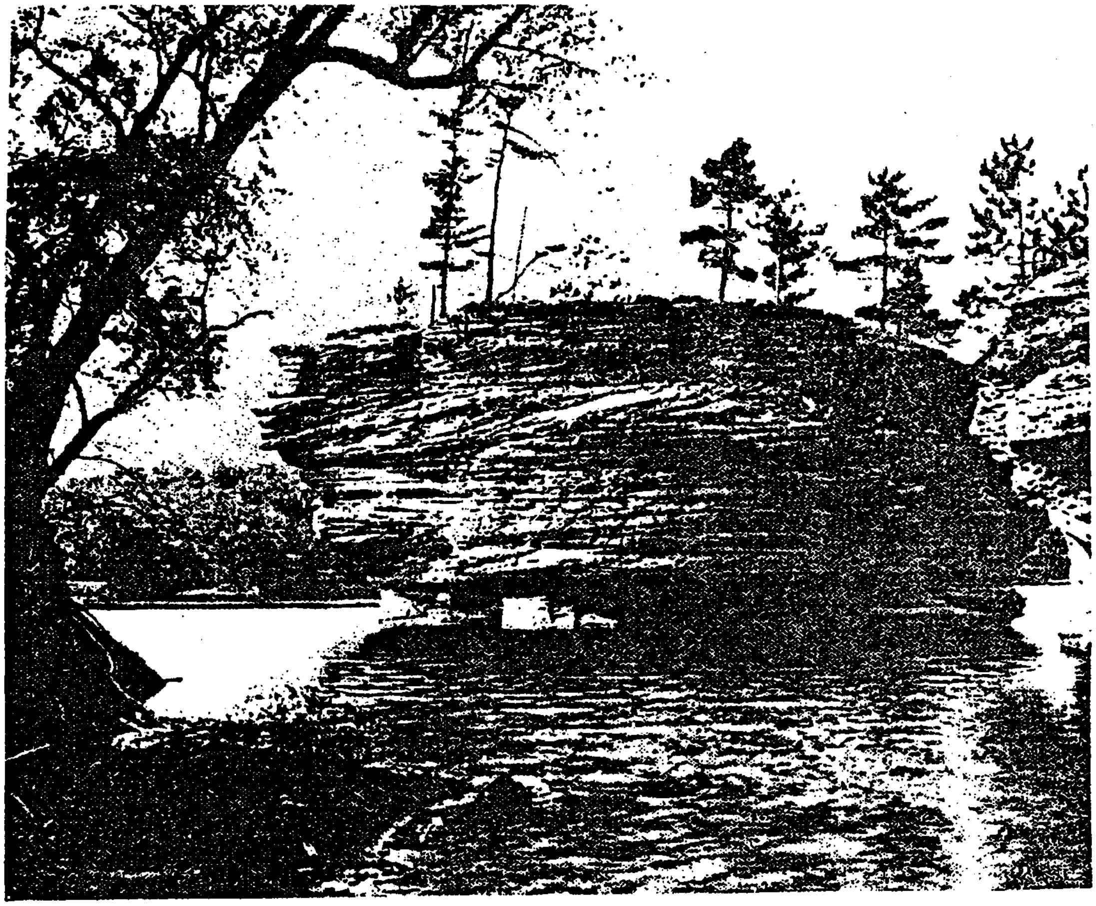

Fig. 72.—Cross-bedding in Cambrian sandstone, Dells of Wisconsin River.

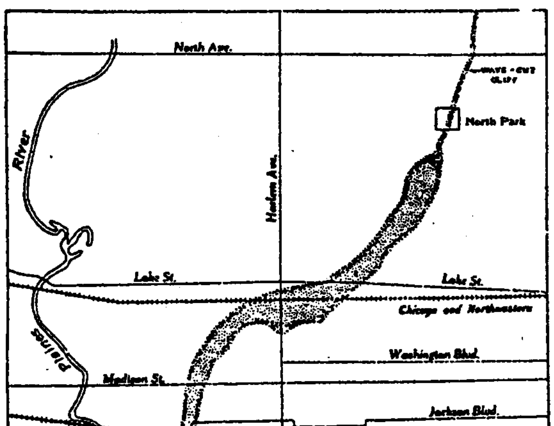

Fig. 80.—Sketch map of Oak Park spit, Glenwood stage of Lake Chicago.

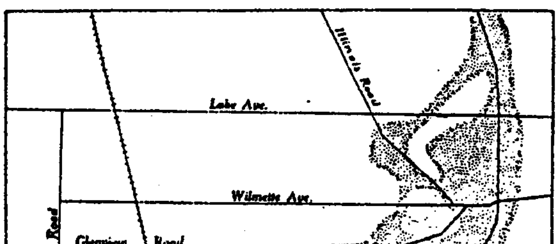

Fig. 81.—Sketch map of Wilmette spit, Glenwood stage of Lake Chicago.

Time Stratig. System	Series	Stage	Rock Stratigraphy Megagroup	Group	Formation	Graphic Column	Thickness (Feet)	Kinds of Rock
QUAT.	PLEIS.				(See fig. 15)		0-350	Till, sand, gravel, silt, clay, peat, marl, loess
PENN.	DESM.			Kewanee	Carbondale		0-125	Shale, sandstone, thin limestone, coal
					Spoon		50-75	As above, but below No. 2 Coal
MISS.	VAL.				Burl.-Keokuk		0-700	Limestone — Only in Des Plaines Disturbance
	KIND.				Hannibal			Shale, siltstone — Only in Des Plaines Disturbance
DEV.	UP.				Grassy Creek		0-5	Shale in solution cavities in Silurian
SILURIAN	NIAGARAN		Hunton		Racine		0-300	Dolomite, pure in reefs; mostly silty, argillaceous, cherty between reefs
					Waukesha		0-30	Dolomite, even bedded, slightly silty
					Joliet		40-60	Dolomite, shaly and red at base; white, silty, cherty above; pure at top
	ALEX.				Kankakee		20-45	Dolomite; thin beds; green shale partings
					Edgewood		0-100	Dolomite, cherty, shaly at base where thick
ORDOVICIAN	CIN.	RICH.		Maquoketa	Neda		0-15	Oolite and shale, red
					Brainard		0-100	Shale, dolomitic, greenish gray
					Ft. Atkinson		5-50	Dolomite, green shale, coarse limestone
		MAY. / ED.			Scales		90-120	Shale, dolomitic, gray, brown, black
	CHAMPLAINIAN	TRENT.	Ottawa	Galena	Wise Lake		170-210	Dolomite, buff, pure
					Dunleith			Dolomite, pure to slightly shaly; locally limestone
					Guttenberg		0-15	Dolomite; red specks and shale partings
		BLACKRIVERAN		Platteville	Nachusa		0-50	Dolomite and limestone, pure, massive
					Grand Detour		20-40	Dolomite and limestone; medium beds
					Mifflin		20-50	Dolomite and limestone, shaly, thin beds
					Pecatonica		20-50	Dolomite, pure, thick beds
				Ancell	Glenwood		0-80	Sandstone and dolomite, silty; green shale
					St. Peter		100-600	Sandstone, medium and fine grained; well rounded grains; chert rubble at base
	CANADIAN		Knox	Prairie du Chien	Shakopee		0-70	Dolomite, sandy; oolitic chert; algal mounds
					New Richmond		0-35	Sandstone, fine to coarse
					Oneota		190-250	Dolomite, pure, coarse grained; oolitic chert
					Gunter		0-15	Sandstone, dolomitic
CAMBRIAN	CROIXAN	TREMP.			Eminence		50-150	Dolomite, sandy
					Potosi		90-220	Dolomite; drusy quartz in vugs
		FRAN.			Franconia		50-200	Sandstone, glauconitic; dolomite; shale
					Ironton		80-130	Sandstone, partly dolomitic, medium grained
		DRESBACHIAN			Galesville		10-100	Sandstone, fine grained
					Eau Claire		370-570	Siltstone, dolomite, sandstone and shale, glauconitic
			Potsdam		Mt. Simon		1200-2900	Sandstone, fine to coarse; quartz pebbles in some beds
PRE-CAM.								Granite

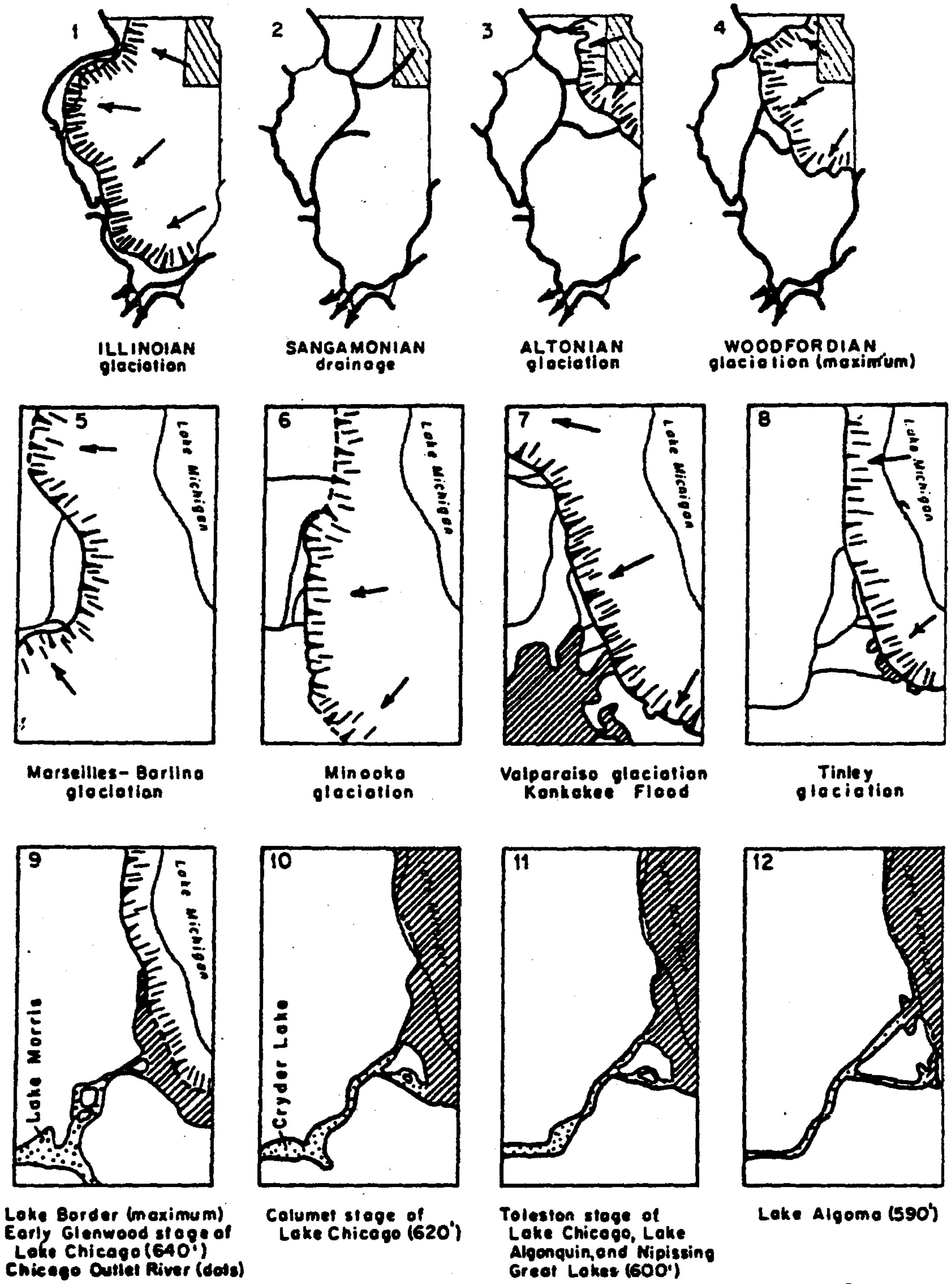

Fig. 18 - Sequence of events in the glacial history of the Chicago area (1 through 4 cover Illinois, 5 through 12 the area of this report).

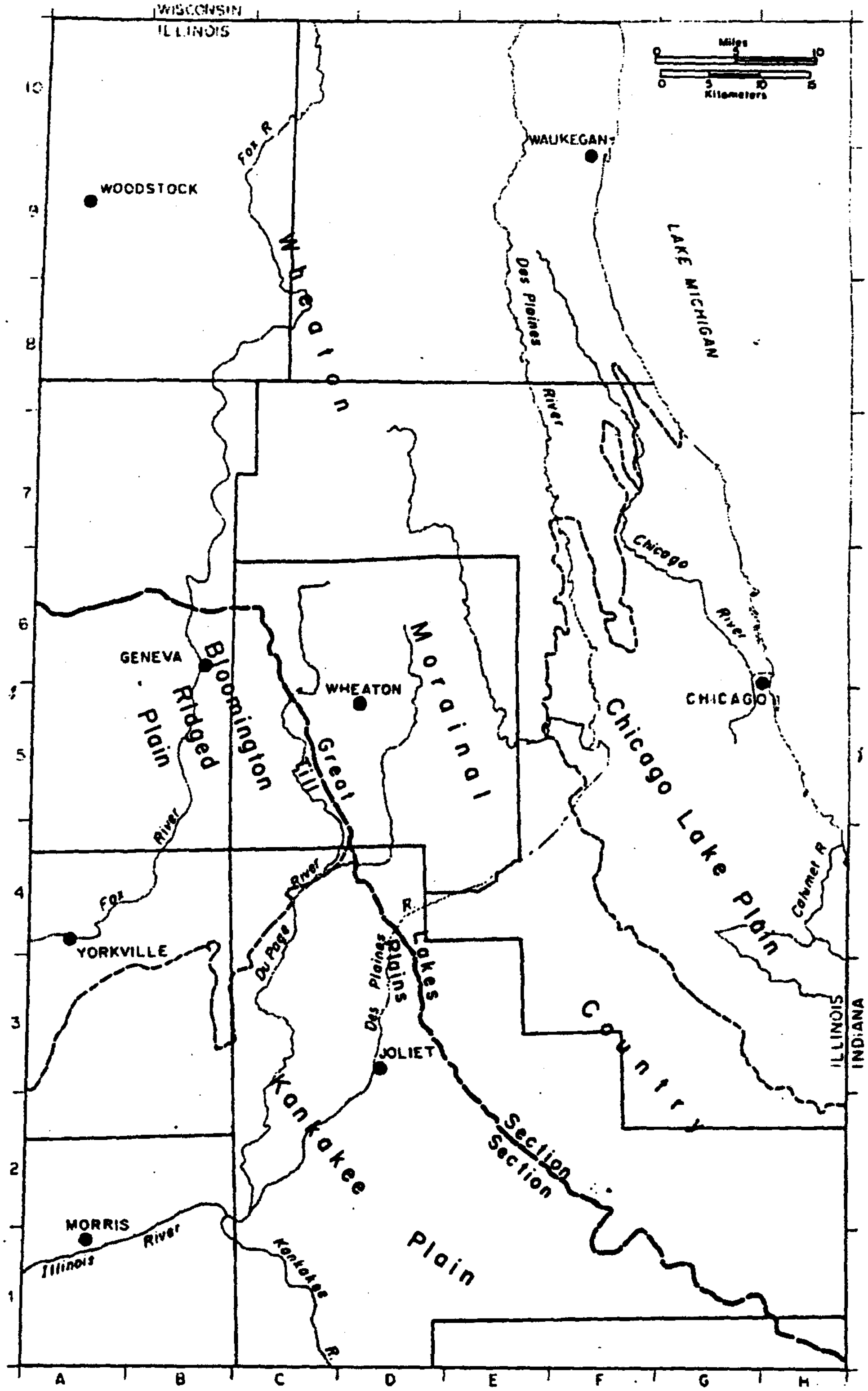

Fig. 22 - Physiographic divisions in the Chicago area.

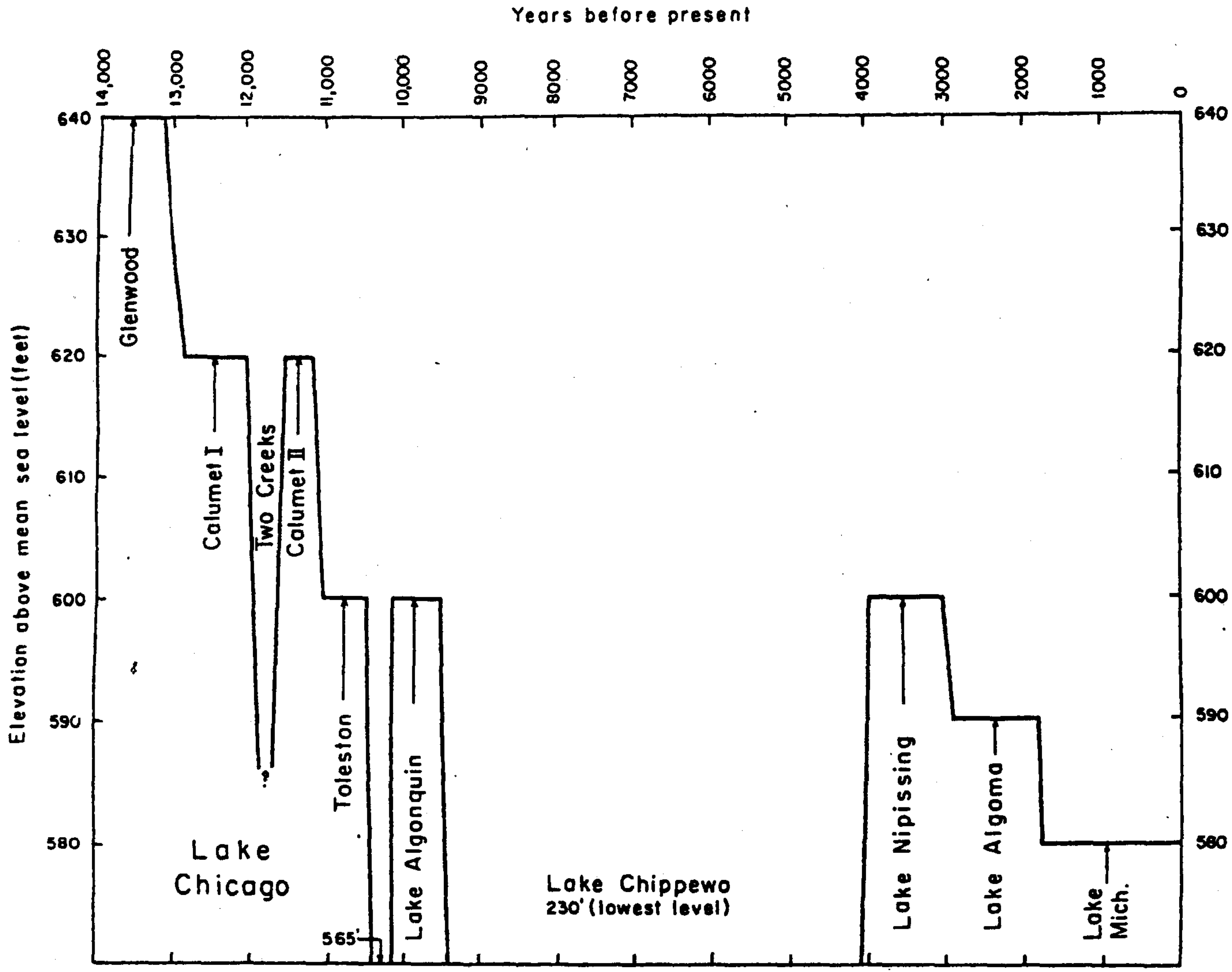

Fig. 19 - Elevation and ages of the glacial lakes in the southern part of the Lake Michigan Basin.

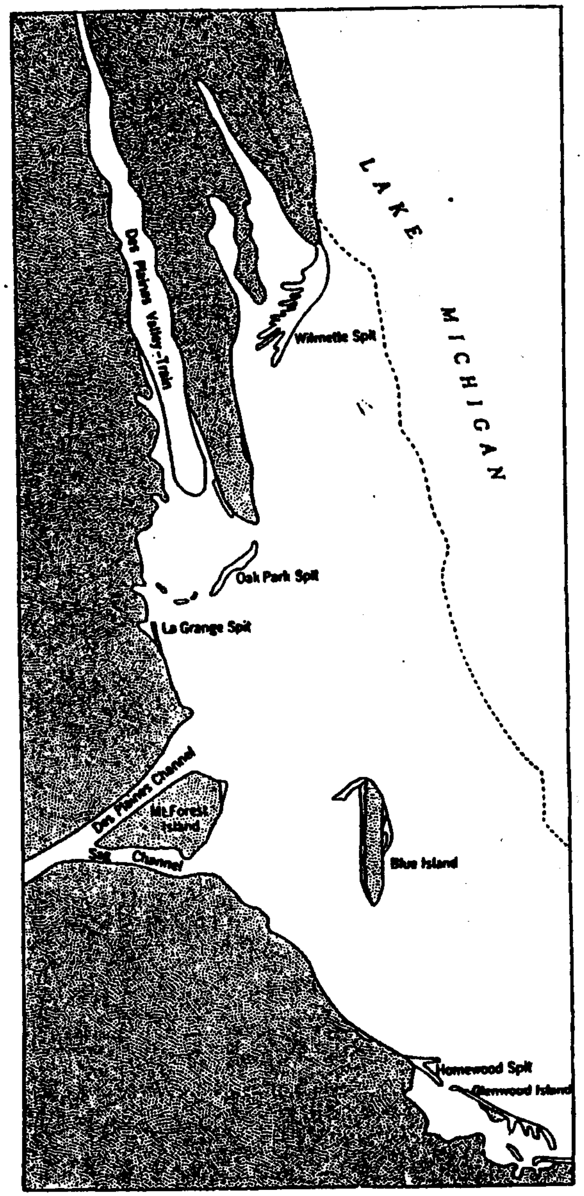

FIG. 85.—Sketch map of the Chicago region during the Glenwood stage of Lake Chicago.

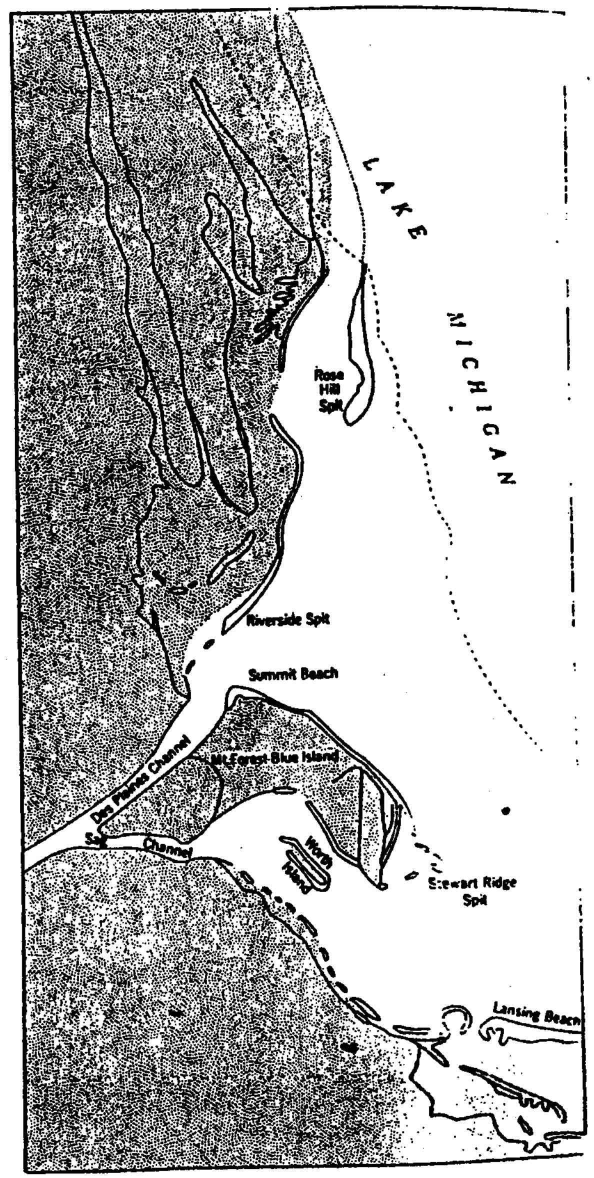

FIG. 86.—Sketch map of Chicago region during the Calumet stage of Lake Chicago.

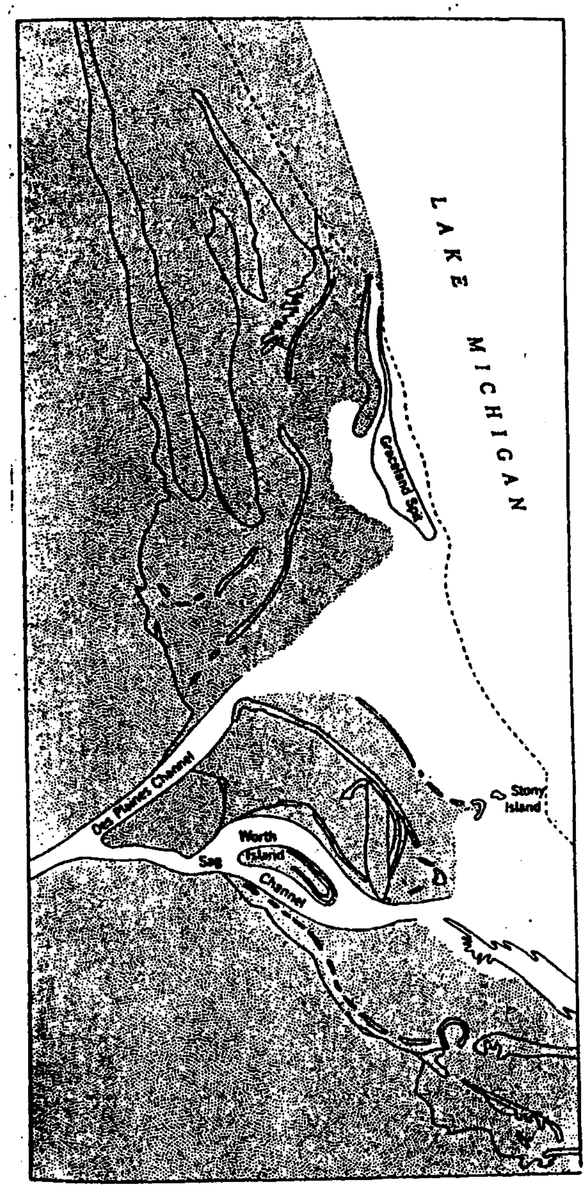

FIG. 87.—Sketch map of the Chicago region during Toleston stage of Lake Chicago.

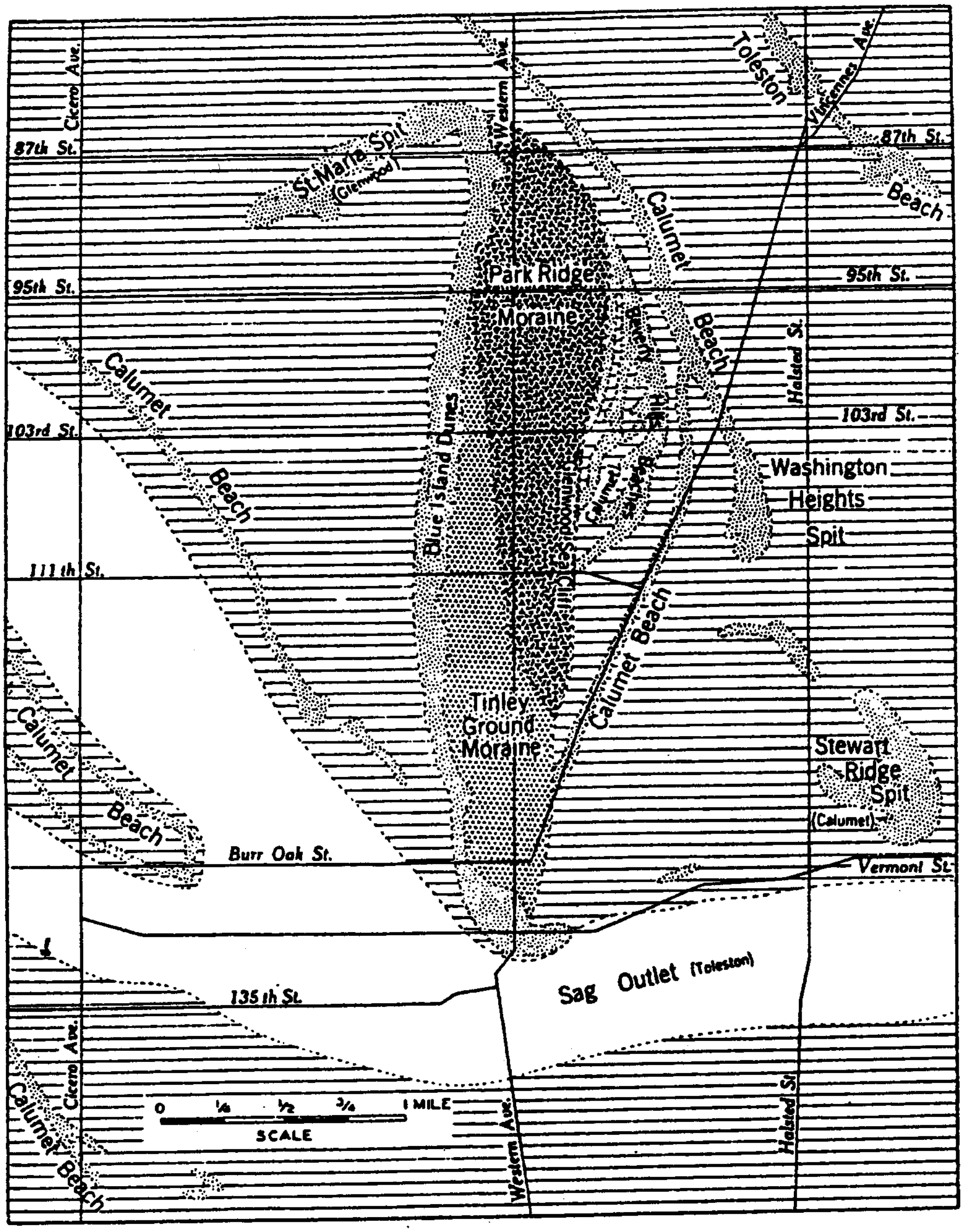

FIG. 82.—Sketch map of Blue Island and associated features, various stages of Lake Chicago.

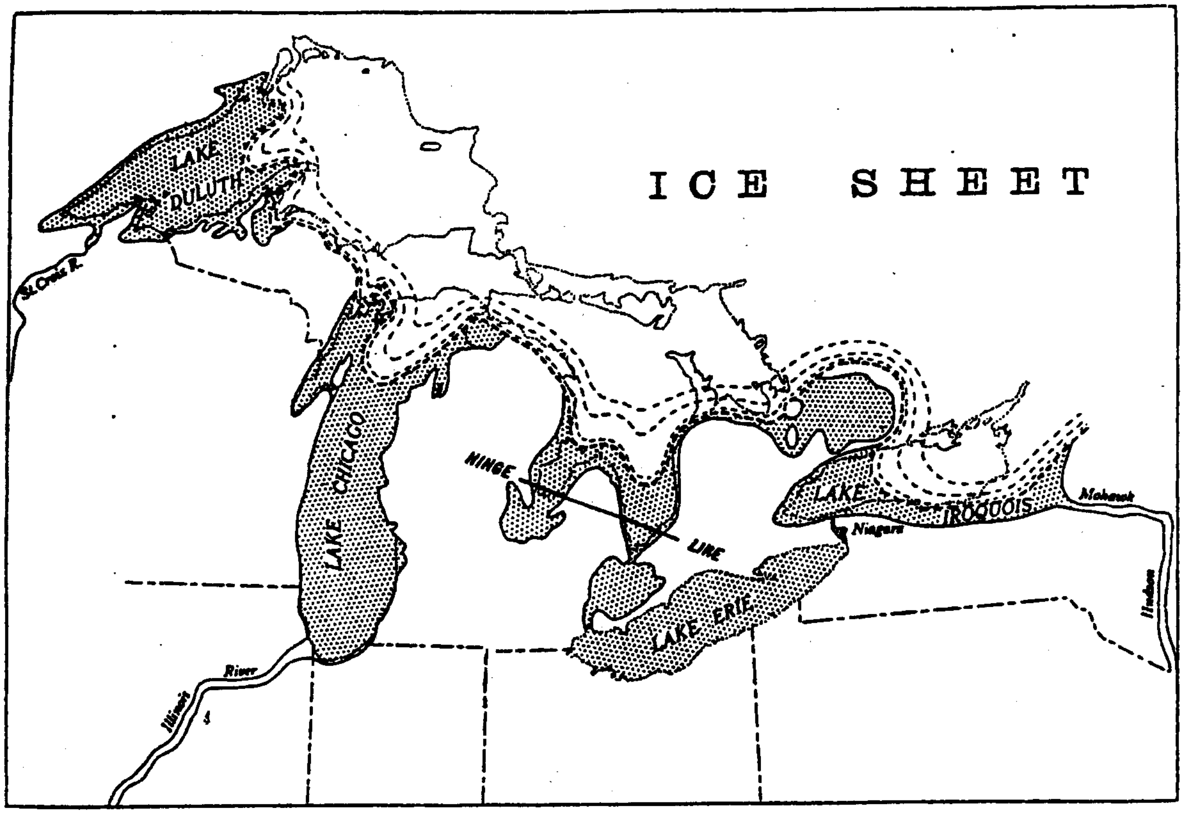

FIG. 88.—The Great Lakes region during the Toleston stage of Lake Chicago and the first stage in the development of the gorge below Niagara Falls. (Partly after Leverett and Taylor, U. S. Geological Survey, Mon. LIII, Pl. XIX.)

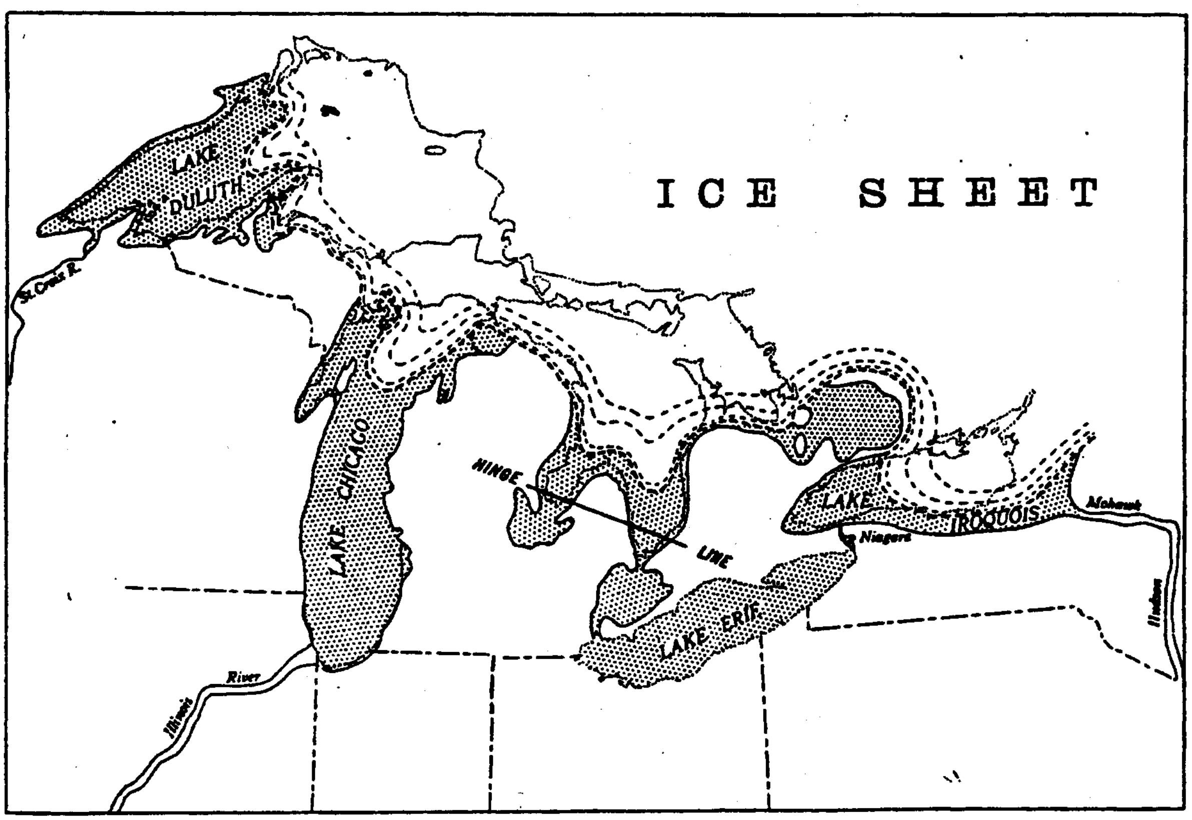

FIG. 88.—The Great Lakes region during the Toleston stage of Lake Chicago and the first stage in the development of the gorge below Niagara Falls. (Partly after Leverett and Taylor, U. S. Geological Survey, Mon. LIII, Pl. XIX.)

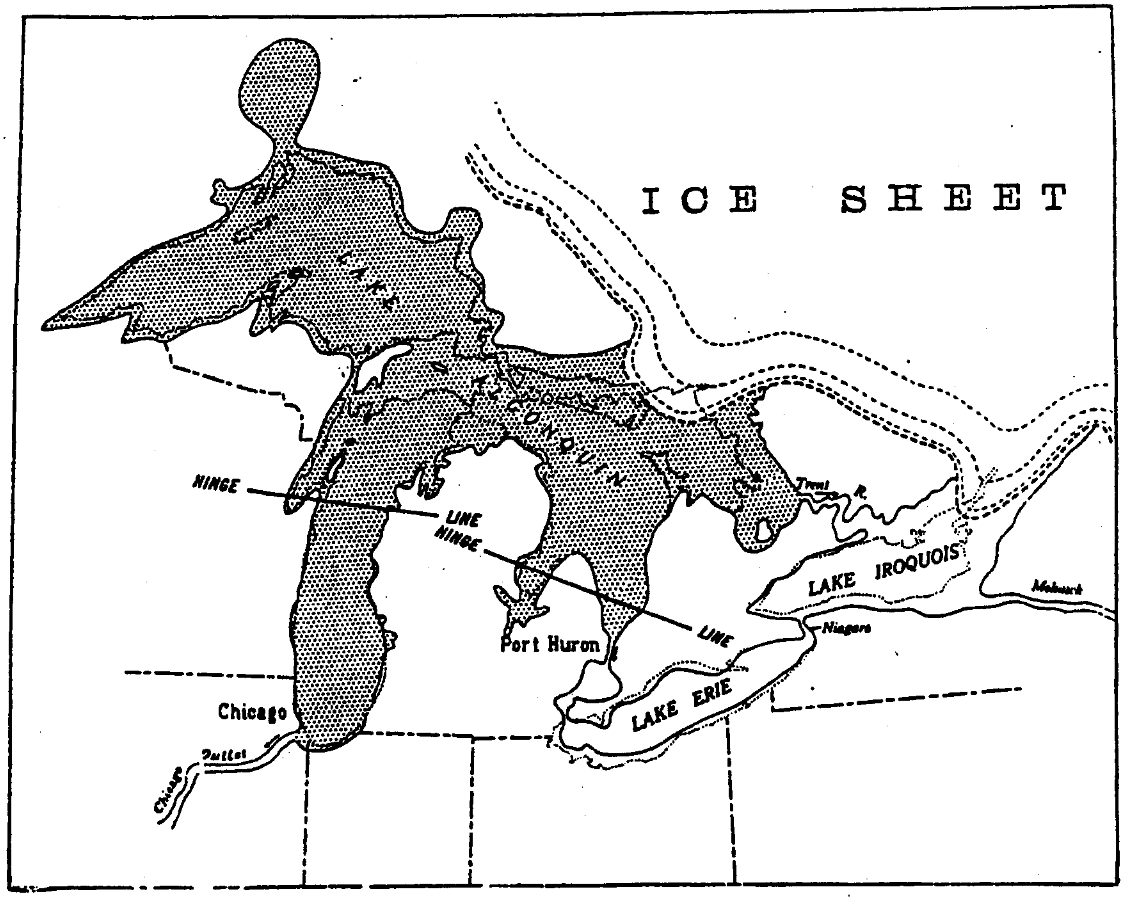

Fig. 89.—Lake Algonquin with three outlets. (After Leverett and Taylor, U. S. Geol. Survey Mon. LIII, Pl. XXI.)

LAKE CHICAGO