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L. A. Thomas
Iowa State College

C. A. Balster
Iowa State College

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Micropaleontological Zones in Iowa

By L. A. THOMAS and C. A. BALSTER

Micropaleontological studies in the Iowa geologic section have been gaining impetus in the past few years, but no previous attempt has been made to assemble the accumulated information. The value of microfossils in defining and correlating stratigraphic units is generally accepted. This paper is a compilation of existing information in an attempt to establish preliminary faunal zones. Where diagnostic fossils for the various zones were not indicated by the original author we have chosen them according to relative abundance and unique occurrence, if possible. In some instances inadequate data limit the application of this method, and require listing of a larger part of the assemblage than would otherwise be necessary.

Available data permit zoning of the Ordovician, Devonian, and Pennsylvanian, as shown on the following charts.

CAMBRIAN, ORDOVICIAN, SILURIAN

Cambrian strata have yielded no microfossils.

All formations of the Ordovician contain recognized microfossil zones with the exception of the St. Peter and Galena. The Brainard and Ft. Atkinson members of the Maquoketa appear to be barren. The McGregor, Pecatonica, and Glenwood members of the Platteville formation, and the Willow River and Root Valley members of the Prairie du Chien are similarly lacking in microfossils. Assemblages found in other stratigraphic units of the Ordovician are shown.

Youngquist (1947) reported the occurrence of scolecodonts and conodonts in the Alexandrian strata of the Silurian. However, no microfossils have been described from this system.

DEVONIAN

Iowa State College collections, from the Cedar Valley formation (Coralville member), contain conodonts which may constitute a distinct assemblage. Stauffer has described the conodont assemblage from the Cedar Valley in Minnesota, but those of Iowa remain to be studied.

Youngquist (1945) described a conodont assemblage from strata in the vicinity of Middle Amana and tentatively referred it to a position between the Shell Rock and Lime Creek formations. The

Table 1
ORDOVICIAN

Formation	Member	Zone Index
	Brainard	
	Ft. Atkinson	
	Clermont	Macrocyproides clermontensis Spivey Bythocypris furnushi Spivey
Maquoketa	Elgin	Primitia gibera Ulrich Primitia belleuensis Spivey Primitia milleri Spivey Zygobolboides grafensis Spivey Zygobolboides iowensis Spivey Bythocypris batesi Spivey
Galena	Dubuque Stewartville Prosser	
Decorah	Ion	Bollia subaequata Ulrich Schmidtella incompta Ulrich Primitia cf. P. mammata Ulrich Bollia unguuloidea Ulrich Punctaparchites ovatus Kay Bassleratia typa Kay Dilobella typa Kay Conchoprimitia symmetrica Kay
	Guttenburg	Oistodus abundans Branson and Mehl Winchellatia lansingensis Kay Winchellatia longispina Kay Schmidtella brevis Kay Macronotella multipunctata Kay
Platteville	Spechts Ferry	Cyrtioniodus complicatus Stauffer Cyrognathus primis Stauffer Lonchodus spinuliferus Stauffer Oistodus curvatus Branson and Mehl Ozarkodina concinna Stauffer Paltodus elegans Stauffer Phragmodus cognitus Stauffer Prioniodus cristulus Stauffer
	McGregor Pecatonica Glenwood	
St. Peter		
	Willow River Root Valley	
Prairie du Chien	Oneota	Acodus oneotensis Furnish Acontiodus iowensis Furnish Clavohamulus densus Furnish Drepanodus subarcuatus Furnish Paltodus variabilis Furnish Loxodus bransoni Furnish

value of the assemblage is not yet proved because of its questionable position.

Charophytes, foraminifera, and conodonts comprise the microfossil assemblages that supplement the zoning of the Cerro Gordo member of the Lime Creek formation. The charophytes and foraminifera have been described by Peck (1934) and Cushman and Stainbrook (1943), respectively. Youngquist (personal communication) has informed us that the conodonts from the Lime Creek are being studied.

Udden (1899) described the Sweetland Creek formation as those "shales unconformably overlying the Cedar Valley limestone and unconformably underlying the Coal Measures," exposed on Sweetland Creek east of Muscatine. At the type locality there are two distinct conodont assemblages, designated "upper" and "lower" on the chart. The shales containing these assemblages are separated by a limestone ledge. The upper assemblage is closely related to that of the Maple Mill (Thomas 1949). The lower assemblage is closely related to that described from the North Liberty section by

Table 2

UPPER DEVONIAN

Formation	Member	Zone Index
Up. Sweetland Creek	Maple Mill	Palmatolepis perlobata Ulrich and Bassler
		Polygnathus semicostata Branson and Mehl
Low.	(N. Liberty Sect.)	Ancryoides spp.
		Abundant Bryantodus
		Abundant Nothognathella
	Sheffield	Palmatolepis permarginata Stauffer
		Polygnathus decorosa Stauffer
		Polygnathus brevicornis Youngquist and Peterson
		Abundant Icriodids
State Quarry	Owen	
Lime Creek	Cerro Gordo	Endothyra? gallowayi Thomas
		Trochiliscids
		Conodonts (Not described)
	? Juniper Hill	
Shell Rock		Prioniodus basilicus Youngquist
		Mehlina irregularis Youngquist
		Bryantodus amanensis Youngquist
		Ancyrodella buckeyensis Stauffer
Cedar Valley		Icriodus postiflexus Branson and Mehl?

Youngquist (1947a), and from the Sheffield by Youngquist and Peterson (1947). This indicates to us that the conodont assemblages of the Maple Mill and upper Sweetland Creek comprise a distinct faunal unit. The lower Sweetland Creek, Sheffield and North Liberty sections show distinct faunal affinities which indicate the correlations shown on the chart.

MISSISSIPPIAN

Conodonts are the only microfossils described from this system. The English River and Prospect Hill conodonts have been described by Thomas (1949) and Youngquist (1949). Additional conodonts from the Osage group, Wassonville, and St. Louis formations are being studied (Youngquist, personal communica-

Table 3
PENNSYLVANIAN

	Tarkio	Triticites ventricosu			
Virgil series	Wabaunsee group	Burlingame		Dumbarinella	
		Deer Creek	T. plummeri		T. cullomensis
	Shawnee group	Oread			
	Douglas group				
Missouri series	Pedee group			T. nebrascensis	
	Lansing group				
Missouri series	Kansas City group	Drum Westerville	T. Collus T. burgessae	T. irregularis	
	Pleasanton				
Des Moines series	Pawnee		Fusulina stookeyi and F. eximia		
	Mystic		F. mysticensis, F. megista		
	Higginsville		F. lucasensis		
	Black Jack		F. girtyi		
Des Moines series	White Breast coal				
	Seahorne		Fusulina pumilla		
	Munterville		F. leei		
Lower Cherokee			Fusilinella		

tion). Need of additional work on the Mississippian microfossils is clearly evident.

PENNSYLVANIAN

Faunal zoning of the Pennsylvanian system is rather well defined and widely accepted. Recognized group boundaries are based on faunal breaks. The Lower Cherokee-Des Moines series boundary is defined by the discontinuance of *Fusilinella* and the appearance of *Fusilina*. The boundary between the Des Moines and Missouri series is marked by the first appearance of *Triticites* in the Missourian rocks.

Available information does not permit zoning of the Iowa Pennsylvanian on a basis of ostracods and conodonts as has been done in other areas.

CONCLUSIONS

This study indicates the Iowa section to have several well-defined micropaleontological zones. The necessity of additional information to facilitate complete zoning is apparent.

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DEPARTMENT OF GEOLOGY
IOWA STATE COLLEGE
AMES, IOWA