

# Proceedings of the Iowa Academy of Science

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Volume 87 | Number

Article 7

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1980

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### Recommended Citation

Anderson, Wayne I. (1980) "Iowa Geology and the Tri-State Geological Field Conference," *Proceedings of the Iowa Academy of Science*, 87(1), 29-35.

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# Iowa Geology and the Tri-State Geological Field Conference

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The Tri-State Geological Field Conference, initiated in 1933, has met in Iowa on 14 occasions. Guidebooks for these field conferences are important resources for planning geology field trips in Iowa. A summary is provided of each of the Tri-State conferences hosted in Iowa. A.C. Trowbridge, the Iowa representative on the original Tri-State planning committee, was a major contributor to Tri-State conferences.  
INDEX DESCRIPTIONS: Tri-State Geological Field Conference, geological organizations, Iowa geology, A.C. Trowbridge.

The Tri-State Geological Field Conference was an outgrowth of a series of annual field trips sponsored by the Illinois State Geological Survey. In response to a suggestion from W.H. Twenhofel (University of Wisconsin), M.M. Leighton (Chief of the Illinois State Geological Survey) invited geologists from Iowa and Wisconsin to attend the fall field trip of the Illinois State Geological Survey, October 28-29, 1933. The gathering that resulted served as the first Tri-State Geological Field Conference. Attendance at this meeting totaled 52 geologists, with the following institutions represented: University of Chicago, University of Iowa, University of Illinois, Northwestern University, Illinois State Geological Survey, University of Wisconsin, Northern Illinois State Teachers College, and Western Illinois State Teachers College. At the meeting, an executive committee was selected to plan for future Tri-State conferences. The committee consisted of M.M. Leighton of the Illinois State Geological Survey, W.H. Twenhofel representing the University of Wisconsin, and A.C. Trowbridge from the University of Iowa (Weller, 1934).

Twenhofel took responsibility for hosting the 1934 Tri-State in Wisconsin and Trowbridge agreed to plan for the 1935 meeting in Iowa. The 1936 conference was to return to Illinois. Thus, the basic pattern of rotation of the Tri-State meetings developed.

The format of the first Tri-State included an all-day field trip on Saturday and a one-half day trip on Sunday morning, with adjournment by noon. Travel was by car caravan. A Saturday-evening meeting and dinner provided an opportunity to discuss the geology of the field trip area. Nearly all subsequent Tri-State conferences have followed this format. In the 1960's the informal post-dinner discussion of the geology of the field-trip area gave way to more formal after-dinner presentations by invited speakers. During the 1970's some field conferences provided for field trip options.

Attendance at the second Tri-State (1934) increased and included 124 geologists, plus a few visitors. The University of Chicago, Northwestern University, University of Illinois, University of Iowa, Illinois State Geological Survey, and Iowa Geological Survey sent representatives. In addition, many of the smaller colleges of the three states participated. The field party departed Madison, Wisconsin, on Saturday morning, October 21, in 40 cars (Twenhofel, 1934).

By the 1960's, the size of the car caravans exceeded 100 cars and logistics and planning became a real problem. Because of this, bus transportation has been required for the Saturday portion on all Tri-State trips since 1967. Private vehicles continue to be utilized for the Sunday morning trips.

Table 1 provides a summary of selected Tri-State Geological Field Conferences from 1933-1978. Note that no meetings were held during part of World War II (1942-1945). The summary lists dates of the conferences, host institution, location of the field-conference area, general theme, and trip leaders. Only the Tri-State conferences held in Iowa, or related to Iowa geology, are listed.

Guidebooks for the early Tri-States were informal handouts, consist-

ing of only a few pages. By contrast, guidebooks of recent field conferences are more elaborate. (See the 120-page guidebook for the Forty-second Annual Field Conference Guidebook for example.) No matter what their thickness may be, Tri-State guidebooks are important resources in planning geology field trips in Iowa, Illinois, and Wisconsin. A brief summary of the Tri-State conferences that were held in Iowa follows.

## TRI-STATE GEOLOGICAL FIELD CONFERENCES IN IOWA

*Third Annual Tri-State Geological Field Conference* — The third Tri-State was the first to be held in Iowa, November 16-17, 1935. Led by A.C. Trowbridge, University of Iowa, the field conference focused on the general geology of eastern Iowa in Clinton, Jackson, and Dubuque Counties. The field trip started in Clinton and ended in the Dubuque area. The dinner meeting was held at the Canfield Hotel in Dubuque.

Featured topics included: Silurian and Ordovician stratigraphy, Pleistocene geology, and drainage changes of the Mississippi and Little Maquoketa Rivers. The type sections of the Spechts Ferry Member of the Decorah Formation and the Dubuque Member of the Galena Formation were studied.

The November meeting dates were the latest ever used for a Tri-State. This is probably explained by the fact that Trowbridge, the trip leader, was a principal leader of another field trip that year, the Ninth Annual Field Conference of the Kansas Geological Society in the Upper Mississippi Valley (one of the most ambitious field conferences ever held).

*Sixth Annual Tri-State Geological Field Conference* — Pennsylvanian stratigraphy and exposures of the Dakota Formation were featured on the sixth Tri-State conference, October 29-30, 1938, in Madison, Guthrie, and Polk Counties. Lewis Cline, Iowa State College, led the trip, with the assistance of H. Garland Hershey, Iowa Geological Survey. Field discussions focused on the relationship of Iowa's Pennsylvanian rocks to similar strata in nearby states. H.R. Wanless and J.M. Weller (in Illinois) had recently revived the theory of cyclical deposition for Pennsylvanian strata, and R.C. Moore and his associates in Kansas were having remarkable success in tracing thin stratigraphic units over wide areas. Thus, geologic work in Illinois and Kansas provided a stimulus for workers in Iowa to attempt to interpret Iowa's Pennsylvanian rock record in terms of depositional models developed in nearby states.

The annual dinner, priced at 85 cents per plate, was held in Younkers Tea Room in Des Moines. After dinner, an informal discussion was held on the geology of the field-trip area. A.C. Trowbridge, State Geologist of Iowa, presided.

*Ninth Annual Tri-State Geological Field Conference* — October 11-12, 1941, saw Lewis Cline again serving as Tri-State director. The

1941 meeting involved the geology of southeast Iowa (Muscatine to Keokuk). Mississippian stratigraphy was a focal point of the trip. In addition, Devonian and Pennsylvanian were studied, as were Nebraskan, Kansan, and Illinoian glacial deposits.

The annual business meeting, at the Hotel Iowa in Keokuk, included a discussion of the field-trip area. As at previous Iowa Tri-States, A.C. Trowbridge served as discussion leader.

*Twelfth Annual Tri-State Geological Field Conference* — General geology of northeast Iowa was the theme when the field conference visited Iowa, October 23-24, 1948. Staff members of the Iowa Geological Survey and the U.S. Geological Survey at Iowa City (K.E. Anderson, W.E. Hale, C.M. Jeffords, C.W. Lane, and J.B. Cooper) served as leaders for the field excursion that started in Lansing and ended at Bellevue State Park. The annual dinner meeting was held at the Immanuel Congregational Church in Dubuque. Stops on the field trip included: Cambrian and Ordovician stratigraphy, limonite exposures at Iron Hill, physiographic features at Pikes Peak State Park, and Silurian stratigraphy (Figures 1 and 2).

*Fifteenth Annual Tri-State Geological Field Conference* — Leo Thomas, Iowa State, was leader of the field trip activities for the 15th Tri-State, October 11-12, 1951. Chalmer Roy, also of Iowa State, served as conference chairman. The Devonian and Mississippian of north-central Iowa were featured. Starting at Nora Springs, the Tri-State caravan traveled to Waterloo on Saturday, where the annual meeting was held at the Hotel President. The conference ended at noon on Sunday, near Central City.

*Eighteenth Annual Tri-State Geological Field Conference* — A.K. Miller and W.M. Furnish, both of the University of Iowa, were trip leaders. Stratigraphy and paleontology of Ordovician, Silurian, and Devonian formations were studied. Starting near Farley in northeast Iowa, the Saturday trip (October 16, 1954) included stops near Graf, McGregor, and Elgin.

The annual banquet and business meeting, held at the Saint Charles Hotel in Charles City, involved a discussion of some old business — a substitute name for "Tri-State." Apparently, no action was taken, for the name "Tri-State" is still utilized. Two presentations were featured



Figure 1. 1948 Tri-State Geological Field Conference at McGregor Ravine section, Highway 13, west of McGregor, Iowa (photo from a slide taken by Herb Hendriks).



Figure 2. Stop 2 of 1948 Tri-State, Highway 9, west of Lansing, Iowa, at contact between Cambrian and Ordovician formations (photograph courtesy of Paul J. Horick).

at the dinner meeting: H. Garland Hershey, Iowa Geological Survey, discussed the "Redfield Gas-Storage Project," a project to store natural gas in Lower Paleozoic strata in the subsurface near Redfield in Dallas County (central Iowa). Richard Hoppin, University of Iowa, reported on the occurrence of an unusual structure in the Precambrian basement near Manson in northwest Iowa. The Manson structure, interpreted as possibly a volcanic neck, then, is now considered by many to represent an ancient meteorite-impact crater.

Sunday morning (October 17, 1954) was spent collecting the abundant fauna of the Devonian Lime Creek Formation near Rockford. The Rockford locality has been a favorite Tri-State stop having been utilized by the 1951, 1966, 1969, and 1972 Tri-States, also. As the guidebook for the 1954 Tri-State states of the Rockford locality: "Of free fossils, there are enough to spare."

*Twenty-first Annual Tri-State Geological Field Conference* — Southeast Iowa (Burlington-Keokuk vicinity) was visited on the 1957 Tri-State, October 12 and 13. Hosted by the Iowa Geological Survey, with assistance from the U.S. Geological Survey (Iowa City), the field conference was concerned primarily with Mississippian stratigraphy. Charles Brown served as conference chairman; Russell Campbell and Fred Dorheim were the principal field-trip leaders. At the dinner meeting, Mississippian stratigraphy was discussed by Lowell Laudon (University of Wisconsin), Charles Collinson (Illinois State Geological Survey), Thomas Beveridge (Missouri Geological Survey), and A.C. Trowbridge (University of Iowa). Particular attention was paid to problems of correlation and to the Kinderhookian Series.

*Twenty-fourth Annual Tri-State Geological Field Conference* — Mississippian carbonate rocks received the attention of participants of the 1960 Tri-State, October 8-9. The conference was hosted by Iowa State University with Leo Thomas serving as trip leader. Stops were made at, or near, Humboldt, Fort Dodge, Alden, Iowa Falls, and Le Grand to study the Mississippian units of north-central Iowa. Limestone facies of the Gilmore City and Hampton Formations received special attention. A Sunday morning stop in Le Grand provided an opportunity to see the exquisite crinoid and starfish collections of B.H. Beane.

*Twenty-seventh Annual Tri-State Geological Field Conference* — Bioherms and biostromes in the Silurian and Devonian of eastern Iowa served as the focal point of the 1963 Tri-State, October 26-27, (Figure 3). William Furnish, University of Iowa, led the trip, with assistance from Eugene Hinman (Cornell College).

At the annual meeting, held in the Memorial Union, University of Iowa, Dean Chalmer J. Roy, Iowa State University, reported on the



Figure 3. View of dipping flank beds of a Silurian bioherm at stop 5 of 1963 Tri-State Geological Field Conference, Brady Quarry in Cedar County.

“Earth Science Curriculum Project.” The Earth Science Curriculum Project (ESCP), a curriculum for eighth or ninth grade earth science courses, was sponsored by the American Geological Institute. Chalmer Roy played a major role in the initiation and development of the curriculum project. These curricular materials are now widely used throughout the United States.

At the same meeting, Dr. Isadore Zietz, U.S. Geological Survey, discussed “The Midcontinent Gravity High.” The Midcontinent Gravity High extends diagonally in a northeast-southwest belt across central Iowa. Understood now as an ancient rift zone underlain by dense rocks of the type exposed in the Lake Superior region, the gravity high was still being actively investigated in 1963. The Tri-State meeting provided a forum for discussion of this new facet of Iowa geology.

The Sunday-morning portion of the trip provided an opportunity to visit two famous fossil localities: Palo Quarry for Devonian blastoids and the “hog lot” locality near Scotch Grove, where the Silurian slipper coral occurs.

*Thirtieth Annual Tri-State Geological Field Conference* — Iowa Geological Survey staff members Fred Dorheim and Donald Koch led this field conference, October 15-16, 1966. Emphasis was on the Cedar Valley, Shell Rock, and Lime Creek Formations (all Devonian). Koch discussed Devonian strata of the conference area at the annual meeting, held at the Holiday Inn in Mason City.

*Thirty-third Annual Tri-State Geological Field Conference* — “The Many Faces of Geology” provided a focus for the 1969 field conference, hosted by Iowa State University. Carl Vondra and Lyle Sendlein were conference coordinators. Applications of soil science and geophysics to geologic problems in central Iowa were demonstrated. Mississippian stratigraphy and Pleistocene units were also studied. The annual meeting, held in Ames, featured a presentation by Robert V. Ruhe, Department of Agronomy, Iowa State University.

Travel by bus was required for the Saturday trip. The Sunday schedule provided for optional fossil-collecting trips: 1) the Ste. Genevieve Formation (Mississippian) in central Iowa 2) the Lime Creek Formation (Devonian) at Rockford, or 3) the Cedar Valley Formation (Devonian) near Palo.

*Thirty-sixth Annual Tri-State Geological Field Conference* — General geology was featured at the 1972 Tri-State, hosted by the University of Northern Iowa, October 7-8, 1972. This was Northern Iowa’s first venture at hosting the Tri-State, as a geology program had not been available there until the late 1960’s. Wayne Anderson, assisted by the staff of the Earth Science Department, served as conference coordinator and trip leader. Travel by bus was required on the Saturday trip, which included stops near Cedar Falls to view the Silurian-Devonian unconformity, the Cedar Valley Formation, Casey’s Paha, and the

Waterloo landfill. Three trips were provided on Sunday, with choice of: 1) Lime Creek Formation (fossil collecting), 2) Silurian scenery in northeast Iowa, or 3) Duane Arnold Nuclear Power Plant.

Sam Tuthill, State Geologist and Director, Iowa Geological Survey, provided the program at the annual meeting, held on the University of Northern Iowa campus. Tuthill reviewed current projects of the Iowa Geological Survey.

*Thirty-ninth Annual Tri-State Geological Field Conference* — The University of Iowa served as host (October 11-12, 1975) and provided three trip options: 1) Devonian limestone facies (Cedar Valley and State Quarry Limestone), near Iowa City (led by P. Heckel and G. Klapper), 2) strip mine reclamation, near Oskaloosa in central Iowa (led by L. Drake and T. Ririe), or 3) Ordovician structure and mineralization in northeast Iowa, including the historic Mineral Creek lead mines (led by G. Ludvigson and G. McCormick).

The annual banquet, held on the University of Iowa campus, was followed by a tour of Trowbridge Hall, the recently-remodeled facilities of the Geology Department. Certain of the trips were repeated (Sunday, October 12) for participants who wished to participate in a second trip. P.H. Heckel served as conference coordinator and guidebook editor.

*Forty-second Tri-State Geological Field Conference* — The 1978 conference was hosted by the Iowa Geological Survey, with Raymond B. Anderson serving as conference chairman. Options were again available for Saturday trips. Choices included: 1) Plum River Fault Zone and Silurian-Devonian stratigraphy in east-central Iowa (led by B. Witzke, G. Ludvigson, B. Bunker, and M. Bounk) 2) the Iowa Erosion Surface (led by G. Hallberg, T. Fenton, G. Miller, and A. Lutenecker) (Figure 4), or 3) applied geology, Cedar Rapids area (S. Grant, R. Anderson, F. Dorheim). Trip 3 was not conducted because of insufficient registrants. On Sunday the options were: 1) geomorphology and basal Maquoketa stratigraphy, Dubuque area (led by J. Prior and R. Heathcote), or 2) geology and history of the Stone City area (led by F. Dorheim and R. Anderson).

The annual banquet, on the campus of Kirkwood Community College, Cedar Rapids, featured a presentation by Carl Vondra, Iowa State University — “Ancient Environments and Early Man at Lake Turkana, Kenya.” Vondra reported on stratigraphic analysis and synthesis that he and others (including some graduate students at Iowa State) had done to support Richard Leakey’s work in Africa.



Figure 4. Robert Ruhe, hand extended, explains origin of features on the Iowa Erosion Surface at stop 3 of 1978 Tri-State, Benton County.

Table 1. Selected Tri-State Geological Field Conferences, Host Institution, General Theme(s), and Principal Trip Leader(s)

Conference	Date	Host Institution	Location	General Theme(s)	Principal Trip Leader(s)
1st	Oct. 28-29, 1933	Illinois State Geological Survey	upper Illinois Valley, near La Salle, Illinois	Ordovician and Pennsylvanian stratigraphy, La Salle anticline, and Pleistocene deposits	M.M. Leighton, J.M. Weller, H.B. Willman, L.E. Workman
2nd	Oct. 20-21, 1934	Univ. of Wisconsin	south-central Wisconsin	Cambrian, Ordovician, and Silurian stratigraphy; Precambrian of the Baraboo region; Pleistocene deposits and landscape features	W.H. Twenhofel, L. Durand, A. Leith, G.O. Rausch, R.R. Shrock, F.W. Thwaites
3rd	Nov. 16-17, 1935	Univ. of Iowa	eastern Iowa	Silurian and Ordovician stratigraphy, Pleistocene geology, drainage changes of Mississippi and Little Maquoketa Rivers	A.C. Trowbridge
6th	Oct. 29-30, 1938	Iowa State College (now Iowa State Univ.)	south-central Iowa	Pennsylvanian stratigraphy and cyclic deposition, Dakota Formation (Cretaceous)	L.M. Cline
9th	Oct. 11-12, 1941	Iowa Geological Survey	southeast Iowa	Devonian, Mississippian, and Pennsylvanian stratigraphy; Nebraskan, Kansan, and Illinoian glacial deposits	L.M. Cline
(1942-1945) no conferences during World War II					
12th	Oct. 23-24, 1948	Iowa Geological Survey	northeast Iowa	general geology of northeast Iowa; Cambrian, Ordovician, and Silurian stratigraphy	K.E. Anderson, W.E. Hale, R.M. Jeffords, C.W. Lane, J.B. Cooper
15th	Oct. 11-12, 1951	Iowa State College (now Iowa State Univ.)	north-central Iowa	Devonian stratigraphy	L.A. Thomas, C.J. Roy
18th	Oct. 16-17, 1954	Univ. of Iowa	northeast Iowa	Ordovician, Silurian, and Devonian stratigraphy and paleontology	A.K. Miller, W.M. Furnish
20th	Oct. 13-14, 1956	Wisconsin Geological Survey & U.S.G.S. (Platteville)	southwest Wisconsin	Upper Mississippi Valley Zinc-Lead District	G.F. Hanson, T. Mullens, J. Carlson, E. Brown, J. Witlow A. Broughton, J. Steuerwald
21st	Oct. 12-13, 1957	Iowa Geological Survey	southeast Iowa	Mississippian stratigraphy	C.N. Brown, R. Campbell, F. Dorheim. P. Horick, R. Northrup, O. Van Eck, M. Smith
24th	Oct. 8-9, 1960	Iowa State Univ.	north-central Iowa	Mississippian carbonate facies	L.A. Thomas
27th	Oct. 26-27, 1963	Univ. of Iowa	eastern Iowa	bioherms and biostromes in the Silurian and Devonian	W.M. Furnish, E.E. Hinman
28th	Oct. 17-18, 1964	Illinois State Geological Survey	western Illinois	Mississippian stratigraphy	Charles Collinson
30th	Oct. 15-16, 1966	Iowa Geological Survey	northern Iowa	Devonian stratigraphy	F. Dorheim, D.L. Koch

## FIELD CONFERENCES AND IOWA GEOLOGY

33

31st	Oct. 14-15, 1967	Augustana College	Rock Island area	Mississippi River Arch, stratigraphic and structural relationships	R. W. Edmund, R.C. Anderson
33rd	Oct. 18-19, 1969	Iowa State Univ.	central Iowa	applied geology, geophysics, soil science, Pleistocene deposits, Mississippian stratigraphy; choice of three options for Sunday morning, involving fossil collecting in Devonian or Mississippian strata	C.F. Vondra, L.V.A. Sendlein
36th	Oct. 7-8, 1972	Univ. of Northern Iowa	north-central Iowa	general geology, Silurian and Devonian stratigraphy, Pleistocene deposits and landscape features, environmental problems; choice of three options for Sunday morning: fossil collecting (Devonian), Silurian stratigraphy and geomorphology, or nuclear power plant	W.I. Anderson
39th	Oct. 11-12, 1975	Univ. of Iowa	east-central,	a) Devonian limestone facies <i>or</i>	P.H. Heckel, G. Klapper,
			south-central,	b) strip mine reclamation <i>or</i>	L. Drake, T. Ririe,
			northeast Iowa (three trips)	c) Ordovician structure and mineralization (trips repeated on Sunday)	G.A. Ludvigson, G.R. McCormick
40th	Oct. 9-10, 1976	Western Illinois Univ.	west-central Illinois	general geology, Mississippian and Pennsylvanian stratigraphy, Illinoisian till and outwash	W.A. McCracken, H.W. Cook
42nd	Oct. 14-15, 1978	Iowa Geological Survey	east-central Iowa	a) Plum River Fault zone and Silurian-Devonian stratigraphy <i>or</i>	B. Witzke, G. Ludvigson, B. Bunker, M. Bounk
				b) The Iowan Erosion Surface <i>or</i>	G. Hallberg, T. Fenton, G. Miller, A. Lutenegegar
				c) applied geology problems, Cedar Rapids area Sunday morning: Choice of:	S. Grant, R. Anderson, F. Dorheim, M. McAdams
				d) geomorphology and Ordovician stratigraphy, <i>or</i>	J. Prior, R. Heathcote
				e) Silurian of Stone City area	F. Dorheim, R. Anderson

## OTHER TRI-STATE CONFERENCES

Brief mention is made of 4 additional Tri-State field conferences because they relate to Iowa geology (see Table 1). The 20th Annual Tri-State Geological Field Conference, held in southwest Wisconsin (October 13-14, 1956), focused on the Upper Mississippi Valley Zinc-Lead District, and information in the guidebook may be of interest, even though zinc-lead mining is no longer practiced in Iowa. Lead mining, of course, was an important activity in the vicinity of Dubuque in the late 1800's and early 1900's.

The 28th Tri-State (October 17-18, 1964) included stops in the Nauvoo-Warsaw area of Illinois, across the Mississippi River from Montrose and Keokuk, Iowa. Geology of the Keokuk area is discussed in the guidebook. "Digging Keokuk Geodes" was the subject of Jack Hayes' talk at the annual Tri-State dinner meeting that year. In his presentation, Hayes summarized information on the occurrence of geodes and suggested models to explain their origin.

The 31st Annual Tri-State Geological Field Conference (October 14-15, 1967), hosted by Augustana College of Rock Island, Illinois, included three stops in Iowa, all near Muscatine: 1) Wyoming Hill, (Pennsylvanian stratigraphy), 2) type locality of Sweetland Creek Shale (Devonian), and 3) Wildcat Den State Park (Pennsylvanian strata and mass movement). The field trip featured the Mississippi River Arch as its major theme.

The 40th Tri-State visited western Illinois (October 9-10, 1976). The guidebook for this conference contains information on the Keokuk Formation in its "type" area and discusses the origin and occurrence of geodes in the Keokuk and Warsaw Formations of Iowa, Illinois, and Missouri. In addition, the drainage development of the Mississippi Valley is discussed.

## HISTORICAL NOTES

Guidebooks of the Tri-State Geological Field Conference also con-

tain interesting historical notes. A few examples follow. Stop 8 of the 1941 Tri-State (p. 11), near Denmark in Lee County, pointed out the birthplace homes of two distinguished geologists, Frank Leverett and Francis M. Van Tuyl. The homes were located across the road from each other, hardly a random distribution.

Frank Leverett, born in 1859, received the Bachelor of Science degree from Iowa Agricultural College (now Iowa State University) in 1885 and later was awarded an honorary Doctorate of Science from the University of Michigan in 1930. After a year of teaching in the public schools (1878-1879) and three years of teaching natural sciences at the Denmark (Iowa) Academy (1880-1883), Leverett entered the U.S. Geological Survey. There, he made significant contributions to Pleistocene geology. Leverett's work was fundamental in establishing part of the glacial and interglacial chronology of the Midwest, a chronology that is well represented near his boyhood home in southeast Iowa. Upon retirement from the Geological Survey, Leverett served as a lecturer in glacial geology at the University of Michigan.

Francis M. Van Tuyl was born in 1887. The geologic setting of Van Tuyl's boyhood environs (the Mississippian outcrop belt of southeast Iowa) must have had an influence on his career interests. He chose geology as his major course of study and went on to earn the A.B. (1911) and M.S. (1912) degrees in geology from the University of Iowa and the Ph.D. degree in geology from Columbia University (1915).



Figure 5. A.C. Trowbridge (1885-1971). Trowbridge served as Iowa's representative on the original Tri-State committee and served as leader of the first Tri-State held in Iowa.

Today, Francis Van Tuyl is still remembered for his contributions to the literature on the stratigraphy and paleontology of the Mississippian formations of Iowa and for important papers on the origins of dolomite, chert, and geodes. Most of his distinguished geological career was spent at Colorado School of Mines, where he served as professor and Head of the Department of Geology from 1919 to 1953.

Notes relating Iowa geology to the construction industry are fairly common in Tri-State guidebooks. In the guidebook for the 1952 Tri-State (p.6), one learns that a large glacial erratic from Blackhawk County was quarried for stone to build the First Presbyterian Church and parsonage in Waterloo. A single boulder yielded sufficient stone for the project.

We learn (p. 10, 1963 Tri-State guidebook) that the first buildings at Cornell College, Mt. Vernon, were erected in 1852 from dolomite from the Stone City quarries. The stone was transported across the then uninhabited prairies by ox team and wagon.

Page 17 of the same guidebook provides information on construction of the Old State Capitol building on the University of Iowa campus. Built originally as a territorial capitol, Old Capitol was constructed in the late 1830's from stone quarried in and near Iowa City. Construction began with stone (Cedar Valley Formation) quarried within the city limits of Iowa City. When this stone "ran out," a quarry was opened near North Liberty. Stone from this quarry (State Quarry) was used to complete the construction of Old Capitol. The stone was barged down the Iowa River and then hauled to the building site by oxen.

The 1964 guidebook (p. 12) gives historical information concerning the Mississippi River channel in southeast Iowa. Prior to construction of Lock and Dam No. 19 at Keokuk, a 45-foot fall existed in the river between Montrose and Keokuk. This treacherous stretch, known as the "Lower Rapids" or "Des Moines Rapids" (from the mouth of the Des Moines River below Keokuk), was a major impediment for early river traffic on the Mississippi. The rapids flowed entirely over chert beds (Montrose Chert) of the lower Keokuk Formation. These beds now underlie the foundation of the Keokuk dam.

#### A.C. TROWBRIDGE AND TRI-STATE

A.C. Trowbridge (Figure 5), the Iowa representative on the executive committee that organized the Tri-State Geological Field Conference, should be recognized as the "Father of Tri-State," at least as far as Iowa's involvement is concerned. Trowbridge, or "Trow" as he was known to colleagues, planned and conducted the 1935 Tri-State conference, the first Tri-State held in Iowa (Table 1). He contributed to a number of other Tri-States as well (1938, 1941, 1948). Trowbridge served as both Director of the Iowa Geological Survey and Head of the Geology Department at the University of Iowa (1934-1947) during a substantial span of the period of his active involvement in Tri-State field conferences (1933-1952).

Trowbridge was field-oriented and actively interested in Midwest geology, so Tri-State participation was a natural for him. Educated at the University of Chicago (1903-1911) under the tutelage of such name geologists as T.C. Chamberlin, Rollin D. Salisbury, and J.P. Iddings, Trowbridge joined the Department of Geology at the University of Iowa in 1911 upon the death of Samuel Calvin.

Trowbridge had conducted summer field courses for the University of Chicago while a graduate student and instructor there (1907-1911). These summer field courses were conducted near Baraboo and Devils Lake, in Wisconsin.

Soon after coming to Iowa, Trowbridge initiated field courses. During the summers of 1913 and 1914, field courses were offered in northeast Iowa. These courses involved river travel. Tents, cots, stoves, cooking utensils, dishes, food, geological equipment, a flat-boat, instructor, students, and cook were loaded on a Mississippi River

packet boat at Dubuque and unloaded at Lansing in Allamakee County. From there, students, working in pairs, "mapped" their way downstream along the bluffs of the Mississippi. The base camp was moved downriver by flatboat. Students from both the University of Chicago and the University of Iowa participated in the camps.

The field camp was moved back to the Baraboo area in 1915 because of the greater diversity of geologic features provided. For a couple of years, the two Universities continued to cooperate with summer field camp, but in time each University decided to offer its own courses. In all, Trowbridge conducted 30 such field courses of one-month duration, and several hundred students were introduced to geologic field procedures in such endeavors.

Trowbridge's involvement in field activities was evident in his other teaching assignments, too. He required a geology trip for his introductory classes at Iowa. A favorite trip involved an all-day Saturday trip from Iowa City to the North Liberty area. The trip involved travel by trolley and a hike of four to five miles.

This background information is introduced to demonstrate that Trowbridge was strongly committed to the study of geology as a field science. He also believed that students should become familiar with local geology. Trowbridge's views were in accord with the goals and objectives of the Tri-State Geological Field Conference, so it is not surprising that he was an active participant.

#### ACKNOWLEDGEMENTS

Herb Hendriks, Cornell College, and Paul Horick, Iowa Geological Survey, provided photographs. William Furnish, University of Iowa, provided valuable information based on his attendance at many past Tri-State conferences. Furnish is also responsible for securing and compiling a complete set of Tri-State summaries, handouts, and guidebooks for the geology library of the University of Iowa, materials which were utilized in the preparation of this summary. Katherine Dimitracopoulos and Mary Hogan, University of Northern Iowa, provided assistance. Brian Glenister, University of Iowa, provided the photograph of A.C. Trowbridge.

#### REFERENCES

- Tri-State Geological Field Conference, 1935, Clinton, Jackson, and Dubuque Counties, Iowa: Third Annual Field Conference Guidebook, 10 p.
- , 1938, Madison, Dallas, Guthrie, and Polk Counties, Iowa: Sixth Annual Field Conference Guidebook, 23 p.
- , 1941, Southeast Iowa: Ninth Annual Field Conference Guidebook, 19 p.
- , 1948, Northeast Iowa: Twelfth Annual Field Conference Guidebook, 28 p.
- , 1951, Devonian of north-central Iowa: Fifteenth Annual Field Conference Guidebook, 21 p.
- , 1954, Northeastern Iowa: Eighteenth Annual Field Conference Guidebook, 17 p.
- , 1956, Upper Mississippi Valley Zinc-Lead District: Twentieth Annual Field Conference Guidebook, 22 p.
- , 1957, Southeast Iowa: Twenty-first Annual Field Conference Guidebook, 44 p.
- , 1960, North-central Iowa: Twenty-fourth Annual Field Conference Guidebook, 25 p.
- , 1963, Bioherms and biostromes in the Silurian-Devonian of eastern Iowa: Twenty-seventh Annual Field Conference Guidebook, 24 p.
- , 1964, Western Illinois: Twenty-eighth Annual Field Conference Guidebook, 30 p.
- , 1966, Devonian of northern Iowa: Thirtieth Annual Field Conference Guidebook, 45 p.
- , 1967, The Mississippi River Arch in the Greater Rock Island Area: Thirty-first Annual Field Conference Guidebook, 64 p.
- , 1969, The many faces of geology: Thirty-third Annual Field Conference Guidebook, 76 p.
- , 1972, General geology in the vicinity of northern Iowa: Thirty-sixth Annual Field Conference Guidebook, 80 p.
- , 1975, Thirty-ninth Annual Field Conference Guidebook, 59 p.
- , 1976, West-central Illinois: Fortieth Annual Field Conference Guidebook, 69 p.
- , 1978, Geology of east-central Iowa: Forty-second Annual Field Conference Guidebook, 120 p.
- TROWBRIDGE, A.C., 1959, *Memoirs of A.C. Trowbridge* (unpublished): University Archives, University Library, University of Iowa, 12 p.
- TWENHOFEL, W.H., 1934, The Second Annual Tri-States Geological Field Conference in the Upper Mississippi Valley: *Science*, v. 80, no. 2086, p. 521-592.
- WELLER, J.M., 1934, Tri-State Geological Field Conference of the Upper Mississippi Valley: *Science*, v. 79, no. 2039, p. 80-82.