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THE MIDDLE DEVONIAN CHERRY VALLEY LIMESTONE OF EASTERN NEW YORK

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ABSTRACT. The Cherry Valley limestone member of the Middle Devonian Marcellus formation of New York is poorly known in the eastern portion of the state. In the summer of 1950 the author undertook the mapping and location of new outcrops of this limestone member.

As a result, the number of known outcrops in the east has been increased from four to over thirty. The limits of the member and its thickness were determined. The limestone was found to extend across the Berne Quadrangle where outcrops were previously unknown. The known geographic distribution of certain common Cherry Valley cephalopods was extended, and additional specimens of *Agoniatites nodiferus* (Hall) were discovered in a small, restricted lens. *Werneroceras plebeiforme* (Hall) was found to have a much wider geographic range than was previously known.

INTRODUCTION

THE primary purpose of this study was the location of new outcrops and the mapping of the Cherry Valley limestone member of the Marcellus shale in eastern New York, and, secondarily, a study of the fauna and a determination of the limits and thickness of the limestone. Figure 1 shows the extent of the Cherry Valley limestone as studied and described in this report.

The Cherry Valley limestone was originally the "Goniatite" or "Agoniatite" limestone of Vanuxem (1842) in the early geologic survey of New York State. It is noted for its unique assemblage of cephalopods, particularly species of *Agoniatites*. Clarke (1903) proposed the geographic name, Cherry Valley, for the fine exposure of this limestone at Cox's Ravine, ¾ mile northwest of Cherry Valley, Otsego County, New York. Here approximately 5 feet of limestone is considered to be typical of this member of the Marcellus formation of the Middle Devonian Hamilton group. It is unknown west of Flint Creek, at Phelps, New York. It extends eastward for 160 miles across New York State to Onesquethaw Creek, near Clarksville, Albany County. Previous work on the Cherry Valley has been done mainly by Clarke (1901), Grabau (1906), Cooper (1930, 1933), Smith (1935), and Flower (1936, 1943).

PHYSICAL CHARACTER AND EXPRESSION

The Cherry Valley is typically a black, bituminous and impure limestone marked on the outcrop by an orange-red iron stain and hackly fracture. Some layers are coarsely crystalline while others are very fine grained. There is an increase in the pyrite content to the east. On the Berne Quadrangle nodules of pyrite 1/8 to 1/2 inch in diameter are found quite abundantly in the lower layers. When broken, the limestone sometimes yields an odor of petroleum. The thickness varies slightly but in general increases from 0 to 3 feet in western and central New York to 14 to 25 feet in the Berne Quadrangle, where it contains much dark gray, calcareous shale. The limestone is divided into two unequal and somewhat massive parts by a layer of shaly limestone or shale having limestone nodules 2 to 4 inches in thickness. This noduliferous layer was found to be quite persistent throughout the eastern area and proved to be a great aid in the correlation of outcrops.

GENERAL STRATIGRAPHIC RELATIONS

Cooper (1930) proposed the name Union Springs member of the Marcellus formation for the black, carbonaceous, pyri-

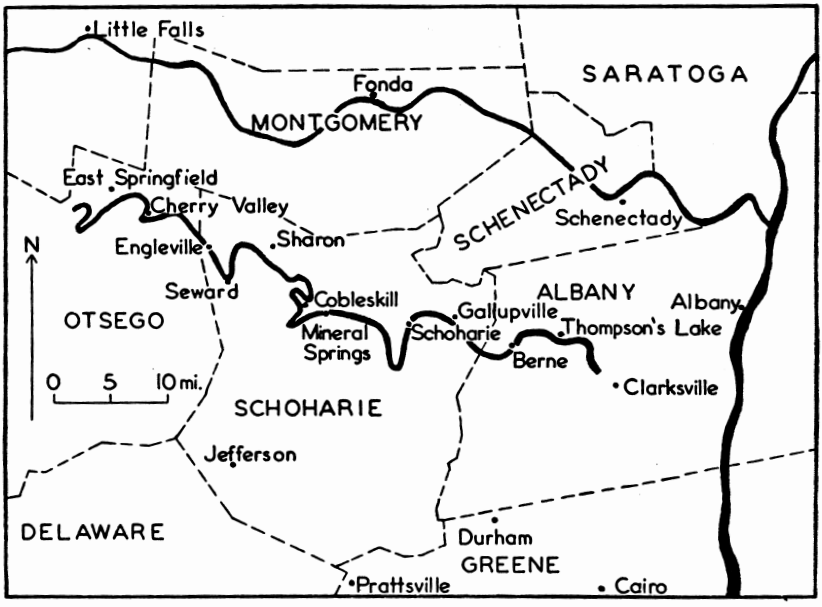


Fig. 1. Map of the eastern portion of the Cherry Valley limestone.

tiferous and very fissile shale between the Onondaga and Cherry Valley limestones. The upper portion of the Union Springs shale is characterized by numerous calcareous concretions and thin limestone layers. These limestone bands become more abundant westward but die out to the east. The member extends from Union Springs, Cayuga County, the type section, eastward to Schoharie and across the Berne Quadrangle. It contains the pelagic *Styliolina* fauna typical of the black mud phase. According to Cooper, the Union Springs is 17 feet thick at the type section. It is 35 to 40 feet thick at Cherry Valley and 70 feet at Schoharie. Tracing of the Cherry Valley limestone across the Berne Quadrangle now permits more accurate estimates of the thickness of the Union Springs in the extreme eastern portion of its outcrop, where it is approximately 80 to 90 feet thick.

The westward thinning and disappearance of the Union Springs beyond Cayuga Lake suggests a merging of the Cherry Valley with the top of the Onondaga limestone. Clarke and others have regarded the upper 50 feet of the Onondaga limestone of the west as contemporaneous with the Union Springs shale in the east (Goldring, 1935, p. 212). Further study of the western Cherry Valley is needed to determine this point.

Overlying the Cherry Valley limestone is the Chittenango shale (Cooper, 1930), a jet-black, fissile shale extending from Union Springs to Schoharie. It is nearly barren of fossils and non-calcareous except for its basal portion near the contact with the Cherry Valley. South of Chittenango Falls it is 120 feet thick, and Cooper indicates that its thickness increases to 150 feet in the Unadilla Valley and to approximately 185 feet near Schoharie (Goldring, 1943, p. 238).

Cooper and Goldring (in Goldring, 1943, p. 247) established the correlation of the Cherry Valley limestone with the Stony Hollow sandstone. The Stony Hollow is a fine-grained, calcareous sandstone easily recognized by its compactness, resistance to erosion, and strong jointing. When fresh it has a dark gray color, but it weathers to a light gray, punky sandstone by leaching of the lime. It was named by Cooper (in Goldring, 1943, p. 247) for the exposures at the entrance to Stony Hollow, 3 miles northwest of Kingston, where it is 75 to 80 feet thick. It extends from Port Jervis northward to Onesquethaw Creek where thin limestone layers indicate its

gradation laterally into the Cherry Valley. The Onesquethaw section, starting approximately 165 feet above the Onondaga, reveals 11 feet of pyritiferous sandstone overlain by 9 to 10 feet of dark, weaker shales somewhat pyritiferous in the lower portion, topped by 5 feet of limestones similar to the typical Cherry Valley and containing *Agoniatites vanuxemi* (Hall). The total thickness of the Cherry Valley (or Stony Hollow) here is approximately 25 feet.

By this correlation the Bakoven shale (Chadwick, 1933) of the Hudson Valley, underlying the Stony Hollow, is established as the equivalent of the Union Springs shale. This is a thin-bedded black shale, with sandy Cardiff-type shale in the upper portion, averaging 140 to 200 feet in thickness (Goldring, 1943, pp. 241, 244), and carrying a fauna similar to that of the Union Springs.

Previous to the correlation of the Stony Hollow with the Cherry Valley all the shales in the Berne Quadrangle from the Onondaga limestone to the *Meristella* bed at the base of the Otsego shale were termed the Berne member (Cooper, 1933), including undifferentiated Union Springs, Cherry Valley, and Chittenango members, and, according to Cooper and Goldring, are 282 feet thick at East Berne (Goldring, 1935, p. 189; 1943, p. 238). However, the correlation of the Stony Hollow with the Cherry Valley necessitated a redefinition of the Berne member. Cooper redefined the Berne as the shales between the Cherry Valley horizon and the *Meristella* bed and estimated it to be 100 to 150 feet thick (in Goldring, 1943, p. 249). His estimate is evidently based upon the thickness of the Union Springs (or Bakoven) in Onesquethaw Creek and is too low. As was noted above, the thickness of the Union Springs throughout the major portion of the Berne Quadrangle is 80 to 90 feet. Thus, allowing for the combined thicknesses of the Union Springs and Cherry Valley (the latter being 14 to 25 feet thick), the restricted Berne member would appear to be 170 to 190 feet thick on the Berne Quadrangle.

THE CHERRY VALLEY LIMESTONE IN EASTERN NEW YORK

Stratigraphy.—Figure 2 is a chart showing stratigraphic sections of the Cherry Valley limestone in eastern New York. All of these outcrops are waterfalls in small stream beds. Fifteen exposures studied were suitable for accurate measure-

ment. Three of these were previously known, one of them the type section. The datum plane of these sections is the base of the noduliferous shaly layer between the two main limestones of the Cherry Valley.

The upper limit of the Cherry Valley limestone is drawn at the contact of the uppermost massive limestone layer with the overlying black shales of the Chittenango. In the few outcrops exposing this contact, as at Seward or Mineral Springs, the basal portion of the Chittenango is calcareous but has no noticeable bands of limestone.

Determination of the exact lower limit of the Cherry Valley was first attempted by Flower (1943). He concentrated his efforts on two outcrops, the type section at Cherry Valley and an outcrop near Stockbridge, Madison County. At the type section the first massive limestone layer (counting from below) having the typical fauna and lithology of the Cherry Valley occurs at the brink of the falls (Cooper, 1933). Some distance beneath this layer occurs a thin limestone band containing *Werneroceras plebeiforme* (Hall). Immediately above the *Werneroceras* bed are dark shales containing *Agoniatites nodiferus* (Hall). Flower was able to locate the *Werneroceras* zone at Stockbridge but failed to find *A. nodiferus*. The *Werneroceras* zone contains such species as *Styliolina fissurella* Hall, *Lunulicardium marcellense* Vanuxem, *Tornoceras* sp., *Panenka ventricosa* Hall, and a bellerophontid gastropod (Flower, 1943, p. 16). On the basis of position, lithology, and fauna of this limestone layer he placed it in the Union Springs shale, and the lower boundary of the Cherry Valley at the base of the massive limestone layer at the crest of the falls.

The westernmost outcrop studied by the writer is at Pine Cobble Hill, on Continental Road, 1.7 miles southwest of East Springfield (fig. 2, section 1). This outcrop was discovered by Cooper (1933) and is 4 miles west of the type section. The Cherry Valley here contains several more shaly layers than at the type section but the two main divisions, separated by a thin noduliferous layer, can be recognized. Fourteen inches below the lowest layer having typical Cherry Valley lithology occurs an argillaceous limestone about 6 inches thick containing *W. plebeiforme*. This suggested that the *Werneroceras* zone is persistent and might be useful in determining the base of the Cherry Valley, and, indeed, it has proved to

be most useful. The *Werneroceras* zone was found at three more outcrops east of the type section (fig. 2, sections 12, 24, and 33) where specimens were found in place. At three more (sections 15, 19, and 30) its position can be estimated with a fair degree of accuracy. At most of these localities the *Werneroceras* zone is approximately one foot beneath the lower division of the Cherry Valley. Found with this cephalopod are *Proetus haldemani* Hall (quite abundant), *Loxonema* cf. *minuscula* (see Clarke, 1901, p. 122) and *Stereoelasma rectum* (Hall).

In the Berne Quadrangle the *Werneroceras* zone is an invaluable aid in determining the lower limit of the Cherry Valley. At the Thompson's Lake outcrop (fig. 2, section 33) the *Werneroceras* zone is no longer a limestone layer. Here two large calcareous concretions enclosed in black, fissile shale yielded 13 specimens of *Werneroceras plebeiforme*, together with *Camarotoechia prolifica* (Hall), *Palaeoneilo constricta* (Conrad), *Nucula bellistriata* (Conrad), *Bembexia capillaria* (Conrad), *Trepospira rotalia* (Hall), *Naticonema lineata* (Conrad), and an unidentified orthoconic cephalopod. The 9-inch limestone layer 11 feet above the *Werneroceras* horizon is interpreted as the base of the Cherry Valley limestone at this locality. This limestone is overlain by 13½ feet of dark-gray, calcareous shale with three limestone layers of which at least the uppermost contains *Agoniatites vanuxemi* (Hall). Above this occurs 4½ feet of limestone having typical Cherry Valley lithology which may be separated into two divisions by the noduliferous layer. Thus 18½ feet of shales and limestones are here considered as Cherry Valley. The section in Onesquethaw Creek, two miles southeast, is quite similar and has already been discussed. The *Werneroceras* zone was not located here but it may exist in the form of concretions as at Thompson's Lake.

Structure.—Throughout the area studied the Cherry Valley limestone has a regional dip of approximately 110 feet per mile to the southwest. Excepting a low fold in the limestone at the type section, described by Flower (1936, p. 6), no other major structural features were noted in the Cherry Valley. At five of the outcrops studied a very interesting structural feature was observed in the upper portion of the Union Springs shale. For a distance of 34 miles from Onesquethaw Creek

westward to Seward there is a zone of crumpled black shale which varies in thickness and position. Figure 2 shows the occurrence of this disturbed zone. A slight indication of this zone exists farther west at the type section of the Cherry Valley. The zone is evidently continuous and appears to be limited to the upper Union Springs. The shales are folded and broken and have a shiny, slickensided appearance. Concretions in the shales are tilted. The folds are sharply truncated above and below by normal, flat-lying black shales. In some places the crumpled zone is found immediately beneath the *Werneroceras* limestone. Slickensides trending NW-SE were found just beneath the limestone at such places. About an inch of black, powdered shale was found at Seward between the limestone and the crumpled shale. Several hypotheses could be advanced to explain the origin of this crumpled shale zone, but none appears to be very satisfactory.

Fauna.—The origin and preservation of the Cherry Valley fauna was discussed by Flower (1936) in the first of two papers on the Cherry Valley cephalopods published in the *Bulletins of American Paleontology*. In the same paper he set forth the conditions under which the Cherry Valley limestone was deposited. In the second paper (Flower, 1943) he noted the position of the fauna in the limestone. For details on these points the reader is referred to these papers.

The fauna of the Cherry Valley limestone is listed in table 1, which also shows the known distribution of all species at the present time. In addition to these Cooper (in Goldring, 1943, p. 248) reports a *Pentamerella* sp. and a *Dechenella* sp. as occurring in the Cherry Valley. Some points may be made concerning the distribution of several common Cherry Valley forms. *Striacoceras typum* (Saemann) was found to extend only as far as the extreme western border of the Berne Quadrangle. *Agoniatites vanuxemi* (Hall), reported by Flower (1943, pp. 6, 11) as not extending to Schoharie, was found to continue eastward across the Berne Quadrangle to Onesquethaw Creek. This would seem to indicate that *A. vanuxemi* was a near-shore species despite Flower's supposition to the contrary (Flower, 1936, p. 13). However, it must be remembered that these eastern occurrences may be due to empty conchs floating about after death.

A comparison of papers by Clarke, Flower, and Miller

TABLE I.
GEOGRAPHIC DISTRIBUTION OF THE CHERRY VALLEY FAUNA

CEPHALOPODA	ERIE COUNTY	CANANDAIGUA LAKE	FLINT CREEK, PHELPS	WOOD'S QUARRY, UNION SPRINGS	SKANEATELES QUADRANGLE	MANLIUS	STOCKBRIDGE	E. SPRINGFIELD	CHERRY VALLEY	ENGLEVILLE	SEWARD	SHARON	LAWYERSVILLE	WARNERVILLE	COBLESKILL	MINERAL SPRINGS	SCHOHARIE	GALLUPVILLE	BERNE	BERNE QUADRANGLE	THOMPSON'S LAKE	ONESQUETHAW CREEK
ACLEISTOCERAS ? DILATATUM																	2,3					
A. FISCHERI						2,3,9																
A. JONESI							3,4															
AGONIATITES FLOWERI						1,3	1,2,3															
A. INTERMEDIUS				2,3																		
A. VANUXEMI	2,9	2	9	2,9	7	1,2,9	1,2	R	2,9 R	R	P	R	R			R	9? R	R		R	R	R
CASTEROCERAS ALTERNATUM						2,3,6,9	2,3		2,3								2,3,5,9					
CENTROCERAS MARCELLENSE				2		2,9	2										2,5		2			
DIADEMOCERAS PALMERI							II															
DIAGOCERAS APTUM				2,3	2,3	2,3,9	2,3										2,3					
LOBOBACTRITES CLAVUS							1,2		2								1,2			1,2		
LYRIOCERAS DUBIUM						2,3,9																
L. LIRATUM						2,9																
MICHELINOCERAS NOVEBORACENSE						9																
M. ? SWARTHI				2,3			2,3															
M. ? UNICONSTRICTUM						9																
MICRONOCERAS GIBBOSUM							2										2					
NEPHRITICERAS BUCINUM						2,9																
OVOCERAS CONSTRICTUM						2,3	2,3										2,3					
O. OVIFORME				4		2,3,9	4										2,3,5,9					
PALMEROCERAS FUSTIS						2,9											2,3,5					
POTERIOCERINA SOLIDA						2,9																
SPYROCERAS GENEVA									2													
S. NUNTIUM						2														-		
STRIACOCERAS KIONOCEROIDES							2,3															
S. TYPUM		2		2	2,7	2,9	2	R	2 R	R	R		R	R	R?	R	2,5	R		2		
TETRANODOCERAS TRANSVERSUM				2	2	2	2		2								2					
TORNOCERAS (PARADOCERAS) DISCOIDEUM				2		1,2,3	2										1,2,5,9			2		
T. (TORNOCERAS) UNIANGULARE	1?				1																	
VERTICOCERAS CONRADI						2,3,9											3,5,9					
V. ERECTUM						3	4										2,3					
V. SP.																	2					
MISCELLANEOUS																						
AULOPORA SP.									4									R	R			R
AMBOCOELIA CF. NANA									9													
LEIORHYNCHUS LIMITARE					7	6,9		R	4	R			R	R		R	R	R				
L. MYSIA																	5					
SCHUCHERTELLA CHEMUNGENSIS VAR. ARCTOSTRIATA														R								
CHAENOCARDIOLA CURTA						9																
LUNULICARDIUM CURTUM						6																
L. RUDE																	5					
PANENKA VENTRICOSA						6,9				R							5					
EUOMPHALUS PLANODISCUS						6,9,10																
LOXONEMA DELPHICOLA						6,9				R												
MACROCHILINA ONONDAGAENSIS						6,9			4													
PLEUROTOMARIA RUGULATA						6		R		R				R			10 R					
COLEOLUS ACICULATUM						10		R	4	R						R						
C. SP.									4													
STYLIOLINA FISSURELLA					7																	
MESOTHYRA ? SP.						9																
PROETUS HALDEMANI						6			4,9													
ARTHRODIRAN PLATES					7	6																

KEY
1. MILLER 1938
2. FLOWER 1936
3. KINDLE & MILLER 1939
4. FLOWER 1943
5. GRABAU 1906
6. WILSON 1903
7. SMITH 1935
9. CLARKE 1901
10. HALL 1860
11. FLOWER 1949
R. REPORTED BY THE AUTHOR

indicates some confusion as to the exact positions at the type locality of the *Werneroceras* zone and the *Agoniatites nodiferus* horizon. Flower (1936, pp. 6, 11, 76, and personal communication) states that *A. nodiferus* occurs in the writer's noduliferous shaly layer, which divides the sequence of thick, massive layers of limestone into two divisions, i.e., within the Cherry Valley limestone itself. *Werneroceras* is said to occur "below the lower layer." On the other hand, Miller (1938, pp. 48, 60-61), Clarke (1901, pp. 121-122) and Flower (1943, pp. 17-19) indicate that *A. nodiferus* occurs immediately above the *Werneroceras* zone below the base of the Cherry Valley. Further confusion arises from the fact that the type section is atypical, there being several more limestone layers in the upper Union Springs than at other localities.

As mentioned in the preceding portion of this paper, the *Werneroceras* zone occurs 14 inches below the base of the Cherry Valley at Pine Cobble Hill, 4 miles west of the type section. However, *A. nodiferus* was not found at this locality, where the lithology of the *A. nodiferus* horizon, accepting the second sequence described above, has changed to a thin-bedded, barren shale. At the type section the author found *A. nodiferus* immediately above the *Werneroceras* limestone, as indicated in figure 2, section 7. Several specimens of *Agoniatites nodiferus* were found immediately below the lower massive layer of the Cherry Valley at Engleville and at Seward, 7.5 miles southeast of the type section. These occurred in a shaly limestone layer 12 inches thick. The next lower layer proved to be the *Werneroceras* limestone. Eastward to Mineral Springs the *Werneroceras* zone remains approximately one foot beneath the base of the Cherry Valley. The intervening shales are thin-bedded, break into small blocks, and are barren. From this it appears that *Agoniatites nodiferus* (Hall) is confined to a lens of shale a short interval below the base of the Cherry Valley in the vicinity of the type section. This lens disappears a few miles westward and thins eastward, finally disappearing just east of Seward (fig. 2).

In order to clarify the succession of beds at the type section the author has indicated them on plate 1 and lists them below with his own thickness figures opposite those of Clarke (1901, pp. 121-122) for comparison. It may be noted that according to the limits determined and used in this report *A. nodiferus* is, strictly speaking, a Union Springs species.

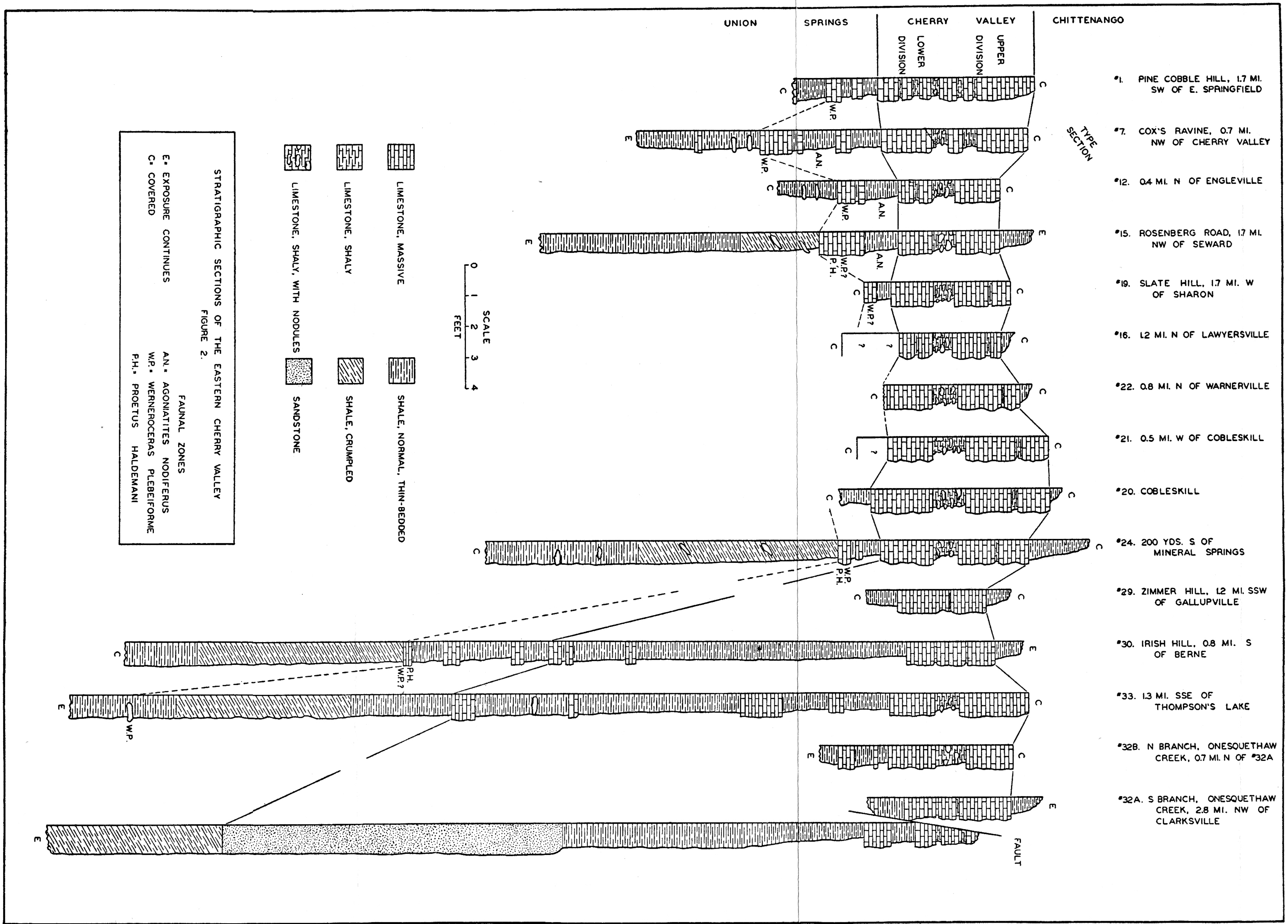
Layer	Clarke	Rickard
Limestone, upper division of the Cherry Valley	7′ 2″*	20″
Shale	—	5–6″
Limestone, gray, nodular with *Ambocoelia*	16″	5–6″
Shale, with concretions (nodules)	16″	6–7″
Limestone, top of falls, lower division of the Cherry Valley	6″	19″
Shale, barren, fissile	4″	12″
Limestone, with *Agoniatites* sp.	8″	5–6″
Shale, *Agoniatites nodiferus* zone	4′ 9″**	13″
Limestone, or series of shale and limestone, *Werneroceras* zone at base	17″	17″
Heavy black shale with large concretions	6′ 5″	22″
Limestone, thin, dark	—	3″
Shale, black, thin-bedded	—	—

* Clarke evidently has made a large error here because of the fold in the Cherry Valley described by Flower (1936, p. 6).

** Should be 12″; see Flower, 1936, p. 6.

It may also be noted here that *Werneroceras plebeiforme* (Hall) has a much greater geographic range than was formerly believed. It has been found at Stockbridge by Flower, at Cherry Valley by several authors, and at East Springfield, Engleville, Seward?, Mineral Springs, and Thompson's Lake by the writer. This is a range of 80 miles east-west with no indication that it may not range farther.

On two of the specimens of *Agoniatites nodiferus* (Hall) found at Seward both sides are preserved. This is unusual for Cherry Valley ammonoids as the rate of deposition was sufficient to preserve both sides only in rare instances. Study of these has shown that the nodes which distinguish it from *A. vanuxemi* appear to alternate in position on either side of the living chamber. One specimen is unique in two ways. First, the lateral outline of the aperture is well preserved and the deep hyponomic sinus is easily discerned. Second, in addition to a series of five nodes approximately ⅓ of the distance from the umbilical shoulder to the abdominal angle, there is a sixth on the umbilical shoulder at the base of the living chamber, as shown on the original illustration of *Agoniatites nodiferus* (Hall) in Hall, 1888, *Paleontology of New York*, volume 7, plate CXXVII, figure 7. There is also a great deal of similarity between this specimen of *A. nodiferus* and *Agoniatites intermedius* Flower. *A. intermedius* is an even rarer species of *Agoniatites*, only one specimen being known. Some doubt arises as to whether *A. intermedius* is actually a separate species or merely an individual variant of *A. nodiferus*.



CHITTENANGO
CHERRY VALLEY
UPPER DIVISION
LOWER DIVISION
SPRINGS
UNION
#1. PINE COBBLE HILL, 1.7 MI. SW OF E. SPRINGFIELD
#7. COX'S RAVINE, 0.7 MI. NW OF CHERRY VALLEY
TYPE SECTION
#12. 0.4 MI. N OF ENGLEVILLE
#15. ROSENBERG ROAD, 1.7 MI. NW OF SEWARD
#19. SLATE HILL, 1.7 MI. W OF SHARON
#16. 1.2 MI. N OF LAWYERSVILLE
#22. 0.8 MI. N OF WARNERVILLE
#21. 0.5 MI. W OF COBLESKILL
#20. COBLESKILL
#24. 200 YDS. S OF MINERAL SPRINGS
#29. ZIMMER HILL, 1.2 MI. SSW OF GALLUPVILLE
#30. IRISH HILL, 0.8 MI. S OF BERNE
#33. 1.3 MI. SSE OF THOMPSON'S LAKE
#32B. N BRANCH, ONESQUETHAW CREEK, 0.7 MI. N OF #32A
#32A. S BRANCH, ONESQUETHAW CREEK, 2.8 MI. NW OF CLARKSVILLE
FAULT
A.N.
W.P.
W.P.?
P.H.
SCALE
0 1 2 3 4
FEET
LIMESTONE, MASSIVE
LIMESTONE, SHALY
LIMESTONE, SHALY, WITH NODULES
SHALE, NORMAL, THIN-BEDDED
SHALE, CRUMPLED
SANDSTONE
STRATIGRAPHIC SECTIONS OF THE EASTERN CHERRY VALLEY
FIGURE 2.
FAUNAL ZONES
E= EXPOSURE CONTINUES
C= COVERED
A.N.= AGONIATITES NODIFERUS
W.P.= WERNEROCERAS PLEBEIFORME
P.H.= PROETUS HALDEMANI

Fig. 2

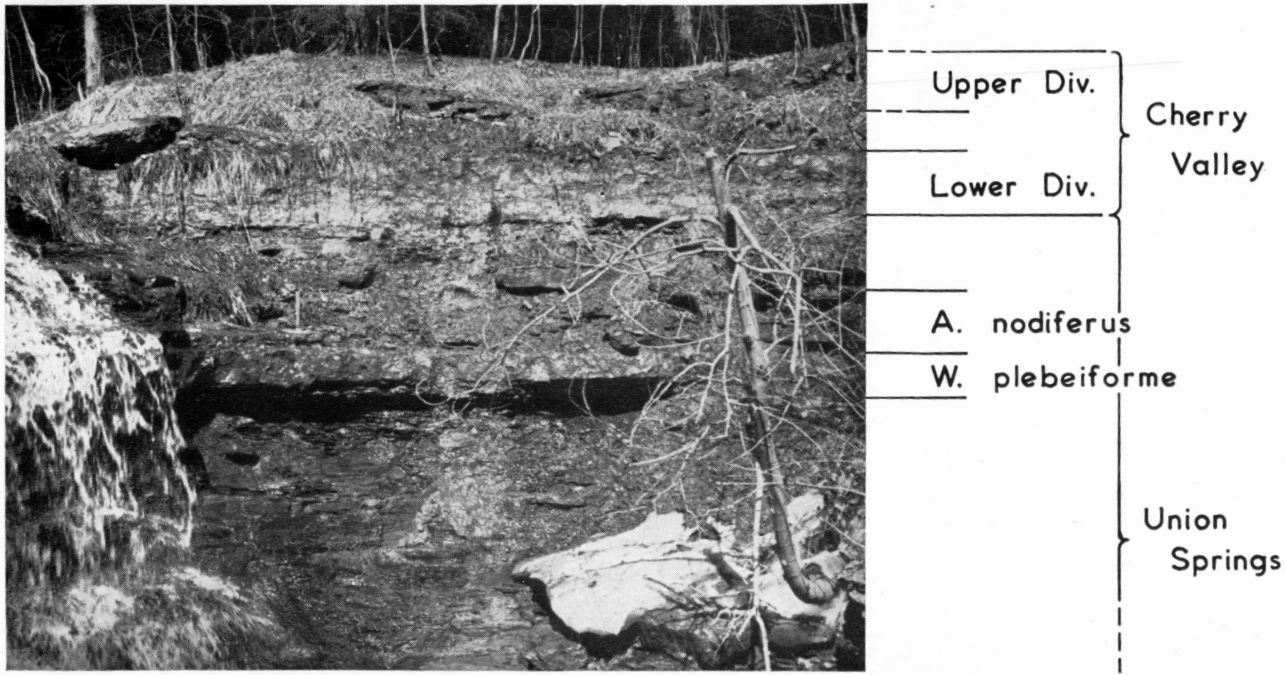


Plate 1. Type section of the Cherry Valley member, Cox's Ravine, near Cherry Valley, N. Y.

CONCLUSION

At the type section of the Cherry Valley limestone in Cox's Ravine, ¾ mile northwest of Cherry Valley, New York, the succession of beds exposed consists of the upper Union Springs, including the *Werneroceras* zone and, immediately above it, the *Agoniatites nodiferus* horizon, and the full thickness of the Cherry Valley limestone, the latter being 4 feet 8 inches thick. The lower contact of the Cherry Valley is drawn at the base of the massive limestone forming the brink of the waterfall. *Agoniatites nodiferus* apparently occurs only in a small, restricted lens of shale between the Cherry Valley and the *Werneroceras* zone in the vicinity of the type section. This lens disappears within 4 miles westward and extends not over 8 miles eastward. The interval between the *Werneroceras* zone and the base of the Cherry Valley is approximately one foot at all other localities excepting those in the Berne Quadrangle.

The Cherry Valley limestone extends farther east than was previously known and has been found at 19 new localities in Schoharie and Albany counties. Thus a greater opportunity exists to collect the cephalopods for which this limestone is noted. The thicknesses of several members of the Marcellus formation in the Berne Quadrangle can now be estimated as follows: Union Springs 80 to 90 feet, Cherry Valley 14 to 25 feet, "restricted" Berne 170 to 190 feet, in ascending order.

ACKNOWLEDGMENTS

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All specimens of the Cherry Valley fauna found by the author are now in the collection at Cornell University, Ithaca, New York.

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