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THE FAUNA OF THE ELY GROUP IN THE ILLIPAH AREA OF NEVADA

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ABSTRACT—The fauna of the Ely Group consists largely of a prolific association of spiriferid and productid brachiopods. The association of fossils in the Ely Group is considered to be Atokan to Early Desmoinesian in age. Transitional elements from the Mississippian are rare. *Diaphragmus fasciculatus* (McChesney) occurs above Atokan fusulinids and cannot be considered indicative of only Mississippian age as it generally has been hitherto.

The fauna of the Ely Group in the Illipah quadrangle is described. One genus, five species and one subspecies are described as new. These comprise *Rhipidomella elyensis*, n. sp., *Cranaena minuta*, n. sp., *Antiquatonia elyensis*, n. sp., *Lissomarginifera nuda*, n. gen. and n. sp., *Hustedia rotunda*, n. sp., and *Hustedia miseri gibbosa*, n. subsp.

INTRODUCTION

Stratigraphy

THE fauna of the Ely Group has been studied and described in an effort to determine the age limits of some Pennsylvanian formations in East Central Nevada. Pennsylvanian stratigraphy in the Illipah quadrangle can be summarized briefly as follows. Lawson (1906) named the Ely Limestone; however, he specified no type section, and the limits of the formation have been in question since then. For this study the writer has adopted the term Ely Group of Dott (1955), which is represented in the Illipah region by two formations whose characteristics have been shown graphically by the writer in a previous publication (Lane 1960, p. 115). The Ely Limestone has been restricted to the massive portion some 1500 feet thick which overlies the Chainman Shale and Diamond Peak Quartzite of Mississippian and Pennsylvanian age.

The lower 400 feet of the Ely Limestone contains as many as three prominent cherty bands, each about 50 feet thick, above which lies a succession of relatively less cherty but very massive, grey limestones which comprise the middle third of the formation. About 450 feet below the top of the formation is the top of a silty zone about 80 feet thick which commonly makes a topographic reentrant. The massive limestones above the reentrant commonly contain a noteworthy zone of *Chaetetes* and *Profusulinella*, about 40 feet thick, and then a spectacular zone of silicified fossils above it and about 100 feet below the top of the formation.

An unnamed silty limestone 900 feet thick conformably overlies the Ely Limestone and is separated from the overlying Permian Reipe Spring Limestone of Steele and "Rib Hill" or Reipetown Sandstone of Steele at a disconformity whose presence is indicated by a persistent bed of conglomerate and a notable disparity in age of fossils above and below the conglomerate. A more complete report of the stratigraphy will be published elsewhere.

Procedure

Collections were made from outcrops measured in detail in the Illipah quadrangle in the summers of 1956, 1957 and 1958. Fossils were compared with extensive collections of Carboniferous faunas from the Mid-continent available in the Department of Geology of the University of Southern California. All types, figured specimens, and comparative materials are deposited in the collections of the Department of Geology at the University of Southern California, and bear "USC" numbers in this report to indicate that depository. Likewise, locality numbers refer to the USC locality register.

Acknowledgments

This research represents a portion of a doctoral dissertation submitted to the Faculty of the Department of Geology of the University of Southern California. The problem was suggested by Professor W. H. Easton, who also guided the field work and research. This project was supported by a grant from the Union Oil Company of Cali-

fornia, in addition to which, Dr. J. C. Hazzard of that Company gave permission for the use of the extensive collections, notes, measured sections, and faunal lists pertaining to the Ely Limestone.

THE FAUNA

The Ely fauna is characterized primarily by a prolific association of spiriferid and productid brachiopods.

Lowermost strata are characterized by *Linoproductus* and *Spirifer occiduus* Sadlick, of which the latter is common in the Pottsville Series of Ohio. The coral *Caninia* is present higher in the section, and a tabulate coral, *Chaetetes*, is associated with the fusulinid *Profusulinella* in the upper third of the Ely Limestone. Near the top of the Ely Limestone brachiopods become diverse and abundant. Particularly characteristic are *Punctospirifer campestris* (White), a new species of *Rhipidomella*, and a new marginiferid. This zone of brachiopods locally is silicified in the Illipah quadrangle, in which case a distinct and remarkably preserved fauna can be removed by acidation of the limestone.

The entire fauna (table I) contains forty-nine genera, a somewhat meager number in comparison with some other Pennsylvanian faunas. However, the Ely Limestone is richly fossiliferous. Systematically the genera are distributed as follows: Foraminifera, four genera and four species; corals, five genera and four species; one conulariid; bryozoans, two genera and two species; brachiopods, twenty-one genera and twenty-seven species; molluscs, thirteen genera; trilobites, one genus; worms, one genus; crinoids, one genus. One genus, five species and one subspecies are described as new.

A comparison of the Ely fauna with other Pennsylvanian faunas indicates an Early Pennsylvanian age. The fauna differs from the Morrowan in several aspects. Primarily there are fewer residual species from the Mississippian in the Ely fauna than in the Morrowan. Mather (1915, p. 78) listed eighteen genera and twenty species which he considered to be residual in the Morrowan of Oklahoma and Arkansas. In the Ely Limestone there are three, *Punctospirifer transversus* (McChesney), *Diaphragmus fasciculatus* (McChesney) and *Cranaena mi-*

nuta. The last is described as a new species, but the genus is usually considered to be Mississippian.

Hustedia miseri Mather is associated with fossils of Morrowan age in the central states. A subspecies of *H. miseri*, here described as new, occurs above Atokan fusulinids, however, and cannot be considered as indicative of Morrowan age.

There are only three species in common with the Redoak Hollow fauna which Elias (1957, p. 526) considered to be transitional between the Mississippian and Pennsylvanian with a slightly more Mississippian aspect than Pennsylvanian. These species are *Punctospirifer transversus*, *P. campestris* and *Diaphragmus fasciculatus*.

Crinoids and blastoids are common in the Morrowan of Oklahoma and Arkansas, whereas they are notably lacking in the Ely fauna. Beds of crinoidal debris and columnals do occur in the Ely Limestone, but they do not comprise a significant portion of the fauna. Only one crinoid calyx is present in the Ely collections, and there are no blastoids.

Little had been known of Springeran (earliest Pennsylvanian) megafaunas until Elias published in 1957-58 on the Redoak Hollow Formation of Southern Oklahoma. The only species described by Elias which have been found in the Ely group can be considered as residual Mississippian forms. It is possible that some of the Springeran of the Midcontinent is equivalent to some rocks which have been assigned to the Morrowan in the Cordilleran area, but the Ely fauna of the Illipah region does not contain fossils clearly indicative of either Springeran or Morrowan age.

It would appear that the Ely fauna is distinctly Early Pennsylvanian, and higher than Morrowan. The presence of residual forms from the Mississippian is considered (because of their association with veritable Pennsylvanian species) to indicate an extended range for these older species rather than to indicate a Mississippian age for part of the Ely Limestone. Moreover, the presence of these Mississippian forms does not necessarily indicate a transitional stage between Mississippian and Pennsylvanian, as the species comprise a small fraction of the total number of the species in the fauna.

							18
1. Chester	4. Atoka	7. Relative abundance					
2. Springer	5. Des Moines	C = Common	R = Rare				
3. Morrow	6. Missouri	A = Abundant					
							1 2 3 4 5 6 7
<i>Textularia</i> sp.		X	X	X	X	X	R
<i>Millerella</i> sp.		X	X	X	X	X	C
<i>Profusulinella</i> aff. <i>P. regia</i> Thompson				X	X	X	A
<i>Fusulinella devexa</i> Thompson				X	X	X	R
<i>Chaetetes favosus</i> Moore and Jeffords				X	X	X	A
<i>Syringopora</i> sp.		X	X	X	X	X	C
<i>Caninia torquia</i> (Owen)				X	X	X	C
<i>Lophophyllidium</i> aff. <i>L. proliferum</i> (McChesney)				●	X	X	C
Conulariid		X	X	X	X	X	R
<i>Archimedes</i> sp.		X		●	X	X	R
<i>Rhombopora lepidodendroides</i> Meek				X	X	X	C
<i>Orbiculoidea capuliformis</i> (McChesney)				●	X	X	C
<i>Rhipidomella elyensis</i> n. sp.				●	X	X	A
<i>Schizophoria resupinoides</i> (Cox)				X	X	X	C
<i>Dielasma bovidens</i> (Morton)				X	X	X	R
<i>Cranaena minuta</i> n. sp.				●	X	X	C
<i>Rhynchopora magnicosta</i> Mather				X	X	X	R
<i>Wellerella</i> sp.				X	X	X	C
<i>Derbyia</i> aff. <i>D. haesitans</i> Dunbar and Condra				●	X	X	C
<i>Chonetina flemingi</i> (Norwood and Pratten)				●	X	X	R
<i>Diaphragmus fasciculatus</i> (McChesney)		X		●	X	X	R
<i>Dictyoclostus americanus</i> Dunbar and Condra				X	X	X	C
<i>Antiquatonia hermosana</i> (Girty)				●	X	X	C
<i>Antiquatonia elyensis</i> n. sp.				●	X	X	C
<i>Lissomarginifera nuda</i> n. gen. and n. sp.				●	X	X	C
<i>Linoproductus magnispinus</i> Dunbar and Condra				●	X	X	C
<i>Linoproductus prattenianus</i> (Norwood and Pratten)				●	X	X	C
<i>Spirifer occiduus</i> Sadlick				X	X	X	C
<i>Neospirifer triplicatus</i> (Hall)				●	X	X	C
<i>Crurithyris planoconvexa</i> (Shumard)				X	X	X	R
<i>Hustedia rotunda</i> n. sp.				●	X	X	A
<i>Hustedia miseri</i> subsp. <i>gibbosa</i> n. subsp.				●	X	X	A
<i>Cleiothyridina orbicularis</i> (McChesney)				X	X	X	C
<i>Composita argentea</i> (Shepard)				●	X	X	C
<i>Composita subtilita</i> (Hall)				X	X	X	R
<i>Punctospirifer campestris</i> (White)				X	X	X	A
<i>Punctospirifer transversus</i> (McChesney)		X		X	X	X	R

TABLE I.—Ranges of diagnostic fossils of the Ely limestone. X indicates reported occurrence. ● indicates species in the Ely limestone not previously reported in the *Profusulinella* zone.

Of the brachiopods, which comprise a major portion of the fauna, many have definite affinities with described Desmoinesian species. *Composita argentea* (Shepard) and *Linoproductus prattenianus* (Norwood & Pratten) are not reported below the Desmoinesian, and several others referred to hereafter in the Faunal Analysis are characteristic of Desmoinesian and Missourian strata. The fusulinids presumably comprise the strongest line of evidence as to the age of the Ely Group. *Fusulinella* and *Profusulinella* in the upper portion of the Ely Limestone indicate Atokan to possibly Early Desmoinesian age for that part of the Ely fauna.

Except for the cephalopods of the Winslow formation of Arkansas and Oklahoma, there is little to characterize Atokan megafaunas of the Midcontinent. The Atokan of the Great Basin is characterized by the association of productid and spiriferid brachiopods as seen in the Ely Limestone in the Illipah quadrangle. *Spirifer occiduus*, *Linoproductus* spp., *Punctospirifer campestris*, *Hustedia rotunda*, *H. miseri gibbosa*, *Rhipidomella elyensis* and *Lissomarginifera nuda* comprise a distinctive association of brachiopods. These fossils occur in association with the coral *Chaetetes favosus* and the fusulinids *Fusulinella devexa* and *Profusulinella*.

FAUNAL ANALYSIS

Foraminifera are comparatively rare in the Ely Limestone. They were observed in only two zones near the top of the sequence. In these two zones, however, they are abundant. The first of these two zones is the *Chaetetes-Profusulinella* faunizone. Specimens of *Profusulinella* in this zone have affinities with *P. regia* Thompson. The genus ranges from lower to Middle Atokan. *Fusulinella devexa* Thompson occurs stratigraphically above the *Chaetetes-Profusulinella* zone and has a range from Middle Atokan to Middle Desmoinesian.

Both *Textularia* and *Millerella* are present in the fusulinid zones of the upper portion of the Ely; however, they are not referred to any species and are not diagnostic as genera. *Textularia* is extremely rare and *Millerella* only slightly less rare.

Tabulate corals are represented by two genera, *Chaetetes* and *Syringopora*. The

latter of these is common from the early Paleozoic through the Permian. *Chaetetes*, however, is a distinctive coral and is locally a useful one. In the Midcontinent *Chaetetes* is particularly common in strata of Desmoinesian age (Dunbar & Condra, 1932, p. 245). In the Illipah quadrangle *Chaetetes* occurs with *Profusulinella* of Atokan age and is present below the highest occurrence of *Spirifer occiduus* which is indicative of Early Pennsylvanian age. *Chaetetes favosus* Moore and Jeffords occurs in two distinct horizons in the Illipah quadrangle. It is present in the *Chaetetes-Profusulinella* zone in the upper third of the Ely Limestone. A second zone occurs 320 feet above the massive Ely Limestone in thin-bedded limestones which comprise a formation that the writer proposes to name in a later publication.

Of the tetracorals, *Caninia torquia* (Owen) is the most abundant. This coral was originally described from the Beil Limestone (Missourian) of Nebraska. It has since been widely reported throughout the Pennsylvanian. In this area it ranges from the middle of the Ely to the middle of the unnamed formation just mentioned.

Another coral is referred questionably to the genus *Caninia*. In reality the coral represents a transition between *Triplophyllites* and *Caninia*. The appearance is much like that of a *Caninia* with a narrow dissepimentarium. The taxonomic position of such a coral is unclear. It could be an advanced Mississippian *Triplophyllites* or a primitive Pennsylvanian *Caninia*.

Lophophyllidium is present in the Ely fauna but occurs only rarely. The ones that are present are exceptionally large for the genus. They have affinities with *L. proliferum* from the Pennsylvanian of Illinois; however, they are much too large to be referred to that species.

Archimedes represents one of the residual elements of Mississippian age present in the Pennsylvanian Ely. Mather (1915, p. 66) cited *Archimedes* in Pennsylvanian rocks from Arkansas and Oklahoma. However, he reported it no higher than the Brentwood Limestone of Morrowan age. Other occurrences of *Archimedes* in the western states are exceedingly rare. Condra & Elias (1944) report *Archimedes* from the Oquirrh (Penn-

sylvanian) of Utah. Sadlick has collected *Archimedes* from the Chester, Springer, Morrow and Des Moines also in Utah (Echols, 1948). *Archimedes* sp. from the Ely Limestone occurs along with *Fusulinella devexa* of Atokan-Desmoinesian age which indicates an extended range for the genus rather than Mississippian age for the outcrop. *Archimedes* is rare in the Ely Limestone.

Rhombopora lepidodendroides Meek is abundant throughout the Ely and is common in many Pennsylvanian rocks.

Inarticulate brachiopods are uncommon in the Ely fauna. Only a few specimens of *Orbiculoidea capuliformis* (McChesney) were collected from the lower part of the section. This species is reported by Dunbar & Condra (1932, tab. D) from the Lansing Group in Nebraska, and McChesney's species is from the Desmoinesian. The presence in the Ely Limestone represents an extended range downward for this species.

Orthid brachiopods are represented by only two genera, but one of these, *Rhipidomella*, is locally abundant. The other, *Schizophoria*, is represented by only one species and a few specimens. The *Rhipidomella* is described as a new species, differing from typical Pennsylvanian *Rhipidomella*s. *Rhipidomella carbonaria* (Swallow) is a small species; *R. nevadensis* (Meek) is a very large and gibbous species. *Rhipidomella elyensis* is distinctly larger than *R. carbonaria* and smaller and less gibbous than *R. nevadensis*. Dott (1955, p. 2227) reported *R. nevadensis* from the Ely Group (Tonka Formation); however, this writer has not seen typical *R. nevadensis* in the Ely Limestone in the Illipah quadrangle. Rather it is present in pre-Ely strata of Pennsylvanian age and may indicate Morrowan age whereas *R. elyensis* represents Atokan age.

Dielasma bovidens (Morton) is present but rare in the collections of the Ely fauna. Of more significance is the presence of the small terebratulid, *Cranaena*. This genus is one of the residual Mississippian forms and occurs in the uppermost Ely in great abundance. The species, described here as new, is very small. It was first thought that the myriad small shells represented immature terebratulids. However, the presence of gerontic characteristics in many specimens indicates

that they are mature. The interiors of these minute *Cranaenas* show quite a bit of variation from the typical forms. This variation is most likely to result from resorption of the brachiophore, a phenomenon noted in living terebratulids. Thus, all variants were described as one species.

Strophomenoids are represented by two genera and two species. The first of these, *Derbyia*, has affinities with *D. haesitans* Dunbar & Condra from the Missourian Series of Nebraska. It occurs in thin layers containing mats of *Derbyia* in the lower Ely in beds similar to the "*Derbyia* ledges" described by Dunbar & Condra (1932, p. 110). *Chonetina flemingi* (Norwood & Pratten) originally described from the Kansas City Group of Missouri is the only other strophomenoid, and it is rare. The rarity of *Chonetina* may result from ecological factors, as this genus occurs more commonly in argillaceous sediments than in pure limestone such as is present in the Ely Limestone.

Productid brachiopods comprise a major portion of the fauna. Many of these are typical Desmoinesian fossils. *Linoproductus magnispinus* Dunbar & Condra, however, was described by the authors from the Americus Limestone of latest Pennsylvanian age. Its presence in the Ely Limestone extends the range downward considerably. *Dictyoclostus americanus* Dunbar & Condra has a wide range although it is especially common in the Upper Pennsylvanian. *Antiquatonia hermosana* (Girty) is one of the most common productids present. It is widespread in rocks of Early Pennsylvanian age in the Cordilleran region, but its exact range has not been ascertained. A new species of *Antiquatonia* is smaller than typical representatives of the genus. It is also common, both in basal beds and in the upper part of the Ely. An unusual marginiferid is described as new. This new genus, *Lissomarginifera*, is typically non-costate even in specimens with spines preserved. It is common in the silicified fauna of the upper portion of the Ely Limestone.

One specimen of *Diaphragmus fasciculatus* (McChesney) was collected from the unnamed sequence above the Ely Limestone. Thus, *Diaphragmus* occurs above the *Chaetetes-Profusulinella* zone which is definitely

Atokan in age. In fact, *Diaphragmus fasciculatus* occurs in the upper *Chaetetes* zone above *Fusulinella* and is presumably Desmoinesian in age. *Diaphragmus* can therefore be a residual form from the Mississippian; however, Desmoinesian is apparently the youngest age recorded for this fossil. The presence of *Diaphragmus* this late in the Pennsylvanian Period considerably lessens the value assigned to it as an indicator of Mississippian age in the Great Basin by Nolan, Merriam, & Williams (1956, pp. 60,61) and by Hose & Repenning (1959, p. 2173).

The spirifers, including three superfamilies, are the most common fossils in the Ely fauna. Spirifericae are represented by *Spirifer occiduus* Sadlick (formerly commonly recorded as *Spirifer occidentalis* Girty) which is widely distributed in the Lower Pennsylvanian and occurs commonly in the lower part of the Ely Limestone; by *Neospirifer triplicatus* (Hall,) typically represented in the Kansas City Group; and by *Crurithyris planoconvexa* (Shumard), described from the Lawrence Shale of Kansas. The last species is rare in the Ely Limestone, as it is usually associated with argillaceous deposits.

Rostrospiricae are abundantly represented. Two species of *Hustedtia* are described as new, and both are common in the silicified fauna of the upper part of the Ely. *Hustedtia rotunda* n. sp. is a rotund form as opposed to elongate shape of most *Hustedtias*. The other *H. miseri* subsp. *gibbosa*, more nearly resembles *H. miseri* Mather but differs primarily in the angularity of the costae and the gibbosity of the valves.

Cleiothyridina orbicularis (McChesney) is also a common rostrospirifer. It ranges from the bottom to the top of the Ely sequence and is common in Pennsylvanian rocks elsewhere in the United States.

Punctospiricae are represented by one genus and two species. *P. transversus* (McChesney) is a rare, residual species from the Mississippian. Only one specimen is present in the collection. *P. campestris* (White) is the most abundant single species in the fauna. It ranges from the lower third of the sequence to the top where there is a flood of *Punctospirifer campestris* in a silicified zone.

Molluscs comprise only a small fraction of the Ely fauna. Where they are present, they are almost always minute. A large *Euomphalus* occurs with *Fusulinella devexa*, but all other molluscs are small. Some of them may be mature, and some of them may have selectively been sorted by currents. If these small specimens are mature, they may have some ecological significance; however, their stratigraphic value is insignificant.

FAUNAL SUMMARY

The fauna of the Ely Group represents the first complete Pennsylvanian megafauna described from the Cordilleran region. Atokan faunas are described and figured together for the first time.

Atokan faunas of the region are characterized by an assemblage of brachiopods and fusulinids as occur in the Ely Group. The Atokan-Desmoinesian boundary is established in the interval between *Chaetetes-Profusulinella* zone and the occurrence of a *Fusulinella* zone near the top of the restricted Ely Limestone. *Chaetetes*, abundant in the Desmoinesian of the Midcontinent, is associated with Atokan fusulinids in the *Chaetetes-Profusulinella* zone, and also occurs in a higher zone of presumed Early Desmoinesian age. Ninety feet above this zone is a silicified zone containing a prolific association of brachiopods characteristic of the upper Ely Limestone. One hundred and eighty feet above the silicified zone there is a zone of Early Desmoinesian *Fusulinella*. It is within this interval of 270 feet that the Atokan-Desmoinesian boundary must be placed. *Chaetetes* also occurs in a higher zone of apparent Early Desmoinesian age, in the unnamed formation above the restricted Ely Limestone.

Analysis of the Ely fauna is based on fossils collected from outcrops measured in detail and compared with other Pennsylvanian faunas. One genus, five species and one subspecies are described as new.

SYSTEMATIC DESCRIPTIONS

Order FORAMINIFERA

Family TEXTULARIDAE d'Orbigny
Genus TEXTULARIA Defrance, 1824

TEXTULARIA sp.

Pl. 125, fig. 6

Numerous biserial foraminifers occur in

both the upper and lower *Chaetetes* zones. Initial chambers are planispiral, and later chambers are biserially arranged. The stratigraphic range of *Textularia* in the Ely Limestone is unknown, inasmuch as thin sections were prepared only for rocks known to contain fusulinids.

Locality.—310.

Family FUSULINIDAE Moller
Genus MILLERELLA Thompson, 1942
MILLERELLA sp.
Pl. 125, fig. 5

Minute tests ascribed to the genus *Millerella* occur in thin sections ground from middle Ely rocks. The figured specimen is from the *Chaetetes-Profusulinella* faunizone.

Locality.—310.

Genus PROFUSULINELLA Rauser-
Cernoussova & Beljaev, 1936
PROFUSULINELLA aff. *P. REGIA*
Thompson, 1948
Pl. 125, figs. 3, 4

Profusulinella from the Ely Limestone is compared with Thompson's species from Powwow Canyon, Texas. The Ely specimens are similar in size, shape and the number of volutions but appear to be more broadly fluted toward the polar extremities than *P. regia*. *Profusulinella* in the Ely Limestone is

restricted to the *Chaetetes-Profusulinella* zone; however, they are quite abundant in that zone.

Locality.—310.

Genus FUSULINELLA Moller, 1877
FUSULINELLA DEVEXA Thompson, 1948
Pl. 125, figs. 1, 2

Fusulinella devexa Thompson, 1948, p. 94; pl. 32, fig. 6, 10; pl. 35, figs. 1-15; pl. 36, figs. 7-10, 12-17.

Description.—Shell rather large for the species, lateral slopes concave and polar ends are bluntly rounded. Axis of coiling is straight, and septal fluting is pronounced poleward although fluting continues in towards the proloculus. Chomata well developed. Tunnel angle 29° in a specimen 3.8 mm. in length.

Locality.—317.

Phylum COELENTERATA
Class ANTHOZOA
Subclass TABULATA

Family CHAETETIDAE Edwards & Haime
Genus CHAETETES Fischer, 1829

CHAETETES FAVOSUS Moore & Jeffords,
1945

Text-figs. 1-3

Chaetetes favosus Moore & Jeffords, 1945, p. 191, figs. 207, 208.

EXPLANATION OF PLATE 125

- FIGS. 1, 2—*Fusulinella devexa* Thompson. 1, longitudinal section, USC 5024, X20; 2, transverse section, USC 5025, X20.
3, 4—*Profusulinella* aff. *P. regia* Thompson. 3, Longitudinal section, USC 5026, X20; 4, transverse section, USC 5027, X20.
5—*Millerella* sp. Transverse section, USC 5028, X30.
6—*Textularia* sp. A transverse section somewhat off center, (specimen lost), X25.
7—*Syringopora* sp. View of the surface of a colony, USC 5029, X1.
8, 9—*Orbiculoidea capuliformis* McChesney. 8, Pedicle valve, USC 5030, X1; 9, external mold of a brachial valve, USC 5031, X1.
10-16—*Rhipidomella elyensis*, n. sp. 10-14, Pedicle valve, brachial valve, anterior, posterior and side view of the holotype, USC 5032, X1; 15, pedicle interior showing muscle scars, USC 5034, X1; 16, brachial interior, USC 5035, X1.
17-19—*Schizophoria resupinoides* (Cox). Brachial exterior, pedicle exterior and anterior view showing dental lamellae and median septa, USC 5037, X1.
20—*Rhipidomella nevadensis* (Meek). Pedicle interior showing muscle scars, USC 5038, X1.
21-24—*Wellerella* sp. Pedicle exterior, anterior showing plicate anterior commissure, brachial exterior and side view, USC 5039, X3.
25—*Chonetina flemingi* (Norwood & Pratten). Pedicle exterior, USC 5041, X1.
26, 27—*Derbyia* aff. *D. haesitans* Dunbar & Condra. 26, Pedicle interior showing high median septum, USC 5042, X1; 27, pedicle exterior, USC 5043, X1