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INVERTEBRATE AND PALEOBOTANICAL FOSSILS COLLECTED IN ELKO COUNTY, NEVADA

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Prepared in cooperation with
United States Geological Survey

This information should be considered preliminary.
It has not been edited or checked for completeness
or accuracy.

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During the course of geologic fieldwork in Elko County, Nevada, many collections of fossils were made, mostly by Roger A. Hope, myself and our assistants, and some by the paleontologists working with us. Most of these fossil collections were studied by paleontologists of the U. S. Geological Survey; a few, however, were referred to other specialists, who prepared reports listing the identifiable fossils present and the ages ascribed to them, where determinable. No attempt was made to collect fossils from all of the sedimentary units exposed in the county, but fossils were sought diligently in isolated exposures of sedimentary rock and especially in those units likely to be confused with other units. Collections made by other geologists working in the county are not included herein, except those submitted by us to U. S. Geological Survey paleontologists, because the identifications of these other collections have been, or presumably will be, published by the original collectors.

The various collections are grouped according to assemblage and age, and are arranged within each unit by collector and in order of year of collection. Such numbers as "62NC33" are field numbers assigned by the geologists or paleontologists; such numbers as "6022-SD" are collection numbers corresponding to samples retained in the permanent collections of the U. S. Geological Survey, either in the United States National Museum, Washington, D. C., at the Federal Center, Denver, Colorado (if prefixed "D"); or in Menlo Park, California (if prefixed "M"). Numbers prefixed "f" refer to the foraminiferal collection in the U. S. National Museum. Names of the paleontologists responsible for the determinations are given below each description. Locations are given by coordinates, in feet, referred to the Nevada (East Zone) State Plane Coordinate system. Most of the localities

were originally plotted on aerial photographs; the coordinates were determined by replotting on the best available topographic map, which, at the time of collection, was in many places a 1:250,000-scale map, four of which cover Elko County: the Wells, Elko, McDermitt, and Winnemucca sheets. As maps at larger scales became available, the collection localities were replotted on these maps, and the coordinate numbers originally assigned to them were revised in accordance with the more precise plotting made possible by the larger scale maps. The names of the quadrangles on which the localities were plotted are also given with the fossil descriptions.

All the collections from rocks of the western assemblage are listed together, except that those from certain limestone bodies of mappable extent in the western assemblage are listed separately because of the uniqueness of the faunas.

The several units of the eastern assemblage are listed in the order of decreasing age, as are units of the overlap assemblage of Roberts and others (1958). The division between the overlap assemblage and the earlier facies is a temporal as well as a geologic one-units of Mississippian or younger are placed in the overlap assemblage; however, it must be realized, in eastern Elko County, the autochthonous rocks of the overlap assemblage are generally carbonates composed of fine clastic materials. Coarser clastic rocks are also present, but most of these rocks are believed to be generally allochthonous and to have been displaced eastward and, in some places, southward on thrusts younger than the Roberts Mountains thrust. In western Elko Coutny, coarse clastic rocks are dominant in some formations of the overlap assemblage.

The dates of the reports by the various paleontologists are appended to their names; those who are still living have had an opportunity to revise their reports. Four paleontologists, Helen Duncan, W. H. Hass, J. W. Huddle, and C. W. Merriam, have died since the last of their reports. The term "overlap assemblage" is <u>not</u> synonymous with "transitional assemblage". To attempt to substitute one for the other would set Nevada geology back by 25 years.

PALEOZOIC ERA

WESTERN ASSEMBLAGE

Ordovician, Silurian, and Devonian Systems

Field No.	Collection	Location	Quadrangle
60NC21	D687-CO	(coordinates, Nevada E. zone)	Owyhee
Collector			
R. R. Coats		E. 381,800 ft, N. 2,554,500 ft	

0.6 mi NNE. of junction of Cobb and Van Duzer Creeks on southwest side of valley.

Climacograptus? aff. *C. brevis* Elles and Wood

Glyptograptus? sp.

Orthograptus? sp.

Preservation is too poor for generic identification, probably Middle Ordovician, but the two small biserial specimens may belong to one of the small Silurian species of *Climacograptus*. At least it is not a Lower Ordovician lot.

R. J. Ross, Jr.

September 28, 1960

Field No.	Collection	Location	Quadrangle
60NC89	---	(coordinates, Nevada E. zone)	California Mountain
Collector		E. 392,250 ft	
R. R. Coats		N. 2,450,600 ft	

SW1/4NW1/4 sec. 2, T. 41 N., R. 53 E.

This collection contained some scraps of small smooth trilobites of Ordovician aspect. The insoluble residue contained abundant acrotretids of a peculiar type, similar to some described by G. A. Cooper from Middle Ordovician rocks. Rube may be able to put a name on the trilobites. There is little doubt as to the Ordovician age of the collection.

A. R. Palmer

July 8, 1964

Field No.	Collection	Location	Quadrangle
60NC104	---	(coordinates, Nevada E. zone)	Owyhee 15'
Collector		E. 365,800 ft,	
R. R. Coats		N. 2,550,500 ft	

This is a very significant collection. The insoluble residue of this limestone contained the only observable fossils in the collection. This collection includes some of the best preserved remains of small bivalved phyllocarid arthropods that I have seen. Most of the shells have the peculiar habit of curling up after they are shed, or their owners die, which presents a puzzling appearance when seen on a broken rock surface. I have seen such fossils only from Lower Ordovician rocks in the Marathon area, Texas, in chert at the base of the Ordovician section in eastern Alaska, and in a collection by R. J. Roberts (his 54F40) from the NW1/4 sec. 20, T. 24 N., R. 49 E., Eureka County, Nev. Roberts' collection contained a graptolite, but our records don't show whether it was Ordovician. However, unless you have strong reasons to the contrary, I think your collection is probably Ordovician, most likely Lower Ordovician. I have sent some specimens to W. D. Ian Rolfe of Glasgow, Scotland, for possible additional comments he may want to make. He is our only phyllocarid specialist; if he provides some new information, I will pass it on to you.

A. R. Palmer

July 8, 1964

Field No.	Collection	Location	Quadrangle
60NC118	D686-CO	(coordinates, Nevada E. zone)	Mountain City
Collector		E. 398,350 ft,	
R. R. Coats		N. 2,570,000 ft	

Graptolites are very scrappy and small, but this may not be the result of poor preservation. This fauna may simply be characterized by small and immature specimens. What the ecologic meaning may be, I am not certain. Identifications are tentative.

Conodont, bar with denticles

Corynoides? sp.

Cryptograptus? sp.

Didymograptus? sp.

Isograptus cf. *I. domosus* Harris

Age: Llanvirnian or approximately lower Middle Ordovician of U.S. usage. Zones of *Isograptus* and *Hallograptus etheridgei* (Zone 7 of Elles and Wood).

R. J. Ross, Jr.

September 28, 1960

Field No.	Collection	Location	Quadrangle
65NC94	---	(coordinates, Nevada E. zone)	Mountain City
Collector		E. 396,500 ft	
R. R. Coats		N. 2,572,400 ft	

Sta. 1113--about 0.5 mi up Mill Creek from its junction with Owyhee River.

The specimens in this collection are molds and not certainly identifiable. There are 12 examples of a conodont that is probably a Periodon, and one distacodid. Probably the rock is Lower or Middle Ordovician.

J. W. Huddle

November 23, 1965

Field No.	Collection	Location	Quadrangle
65RJ28	D1632-CO	(coordinates, Nevada E. zone)	Coal Mine Basin
Collector		E. ft	
R. J. Ross, Jr.		N. ft	

Vinini Formation--SE1/4 sec. 4, T. 38 N., R. 56 E.,

Climacograptus sp.

tubuliferus Lapworth

Dicellograptus or *Dicranograptus* sp. (disjointed uniserial parts)

Glyptograptus sp. (same as sp. in USGS colln. D480e CO)

Orthograptus calcaratus Lapworth

quadrimucronatus Hall

cf. *O. truncatus* var. *intermedius* Elles and Wood

Retiograptus pulcherrimus Keble and Harris

Age: The age of this collection is late Caradocian (zone of *Orthograptus quadrimucronatus*) and it is correlative with the lower beds of the Hanson Creek Formation as mapped on the west side of Antelope Valley and correlative with upper parts of the Vinini and Valmy Formation of the western assemblage.

The occurrence of *Orthograptus calcaratus* is important here. This widely recognized "guide fossil" occurs in precisely the assemblage it should; Ross and Berry (1963) reported it in U.S. Geological Survey Bulletin 1134, where it was stated to be limited to a different zone in the Basin Ranges of California.

R. J. Ross, Jr.

Field No.	Collection	Location	Quadrangle
65RJ30	D1633-CO	(coordinates, Nevada E. zone)	Coal Mine Basin
Collector		E. ft,	
R. J. Ross, Jr.		N. ft,	

200 ft NE. of field No. 65-RJ-28, SE1/4 sec. 4, T. 38 N., R. 56 E.

Amplexograptus sp.

Glyptograptus sp.

Orthograptus? sp.

Age: This collection is too small and poor to tell very much about its age. It is upper Caradocian, but the precise zone cannot be determined.

R. J. Ross, Jr.

March 17, 1966

Field No.	Collection	Location	Quadrangle
65RJ32	D209-SD	(coordinates, Nevada, E. zone)	Coal Mine Basin
Collector		E. ft,	
R. J. Ross, Jr.		N. ft	

NE1/4SW1/4 sec. 9, T. 38 N., R. 56 E.

Monograptus cf. *M. dubius* (Suess)

testis var. *inornatus* Elles

Age: Silurian-late Wenlockian--probably Zone 31 (*Cryptograptus lundgreni*) of Elles and Wood

W. B. N. Berry per

R. J. Ross, Jr.

March 18, 1966

Field No.	Collection	Location	Quadrangle
65RJ33	D1657-CO	(coordinates, Nevada E. zone)	Coal Mine Basin
Collector		E. ft,	
R. J. Ross, Jr.		N. ft	

NE1/4 sec. 8, T. 38 N., R. 56 E. Unnamed formation.

Acontiodus robustus Hadding	4
Coelocerodontus sp.	1
Drepanodus subrectus (Branson and Mehl)	1
Drepanodus n. sp. D	10
Oistodus sp. A.	3
Oistodus sp. B.	3
Oistodus sp. C.	8
Paltodus sp.	3
Periodon aculeatus Hadding	
falodus element	4
parcordylodus element	3
ligonodina element	4
ozarkodina element	4
hibbardella element	1
Pteracontiodus n. sp.	
symmetrical element	8
twisted element	19
assymmetrical element	15

(This species was reported as a new genus and new species in colln. D1495-CO in field No. SW644D).

Scolopodus giganteus Sweet and Bergstrom	5
varicostatus Sweet and Bergstrom	6

The collection is probably early Middle Ordovician, as indicated by the presence of the two species of *Scolopodus*, *Pteracontiodus*, and *Drepanodus* n. sp. D. It is probably equivalent to the lower part of the Antelope Valley at Limestone Ikes Canyon.

J. W. Huddle

April 21, 1967

Field No.	Collection	Location	Quadrangle
68NC62	6683-CO	(coordinates, Nevada E. zone)	Mount Blitzen
Collector		E. 298,500 ft,	
R. R. Coats		N. 2,392,000 ft	

Loc. 1795, (SE1/4 sec. 8, T. 40 N., R. 50 E.).

The following species were recovered from the acetic acid residue:

Acodus sp.	1
Ambalodus? n. sp.	1
Cyrtoniodus sp.	1
Drepanodus sp.	1
Hibbardella sp.	1
Prioniodina sp.	2
Walliserodus cf. *W. debolti* (Rexroad)	3

This is a new fauna to me, and I am not sure of its age. *W. debolti* was described by C. B. Rexroad from the Brassfield Limestone in the Cincinnati region, but Serpagli (1967) has reported it from the Middle Ordovician in Europe and North America. I am inclined to think that this is an Ordovician fauna, but it could be Early Silurian.

J. W. Huddle

December 18, 1968

Field No.	Collection	Location	Quadrangle
69NC20	---	(Coordinates, Nevada E. zone)	Mahala Creek W.
Collector		E. 387,000 ft,	
R. R. Coats		N. 2,382,300 ft	

Sec. 3, T. 39 N., R. 53 E.

Oneotodus sp.	1
Scolecodont	2
Ostracode, not identifiable	1

Oneotodus ranges from Ordovician to Devonian.

J. W. Huddle

October 15, 1970

Field No.	Collection	Location	Quadrangle
69NC69	---	(Coordinates, Nevada E. zone, E. 389,850 ft, N. 2,382,600 ft	Mahala Creek W.
Collector			
R. R. Coats			

Sec. 3, T. 39 N., R. 53 E.

Belodina sp.	1
Drepanodus suberectus Branson and Mehl	3
Ozarkodina sp.	2
O. sp.	1
Panderodus sp.	3

This collection is probably Middle or Late Ordovician.

J. W. Huddle

October 15, 1970

Field No.	Collection	Location	Quadrangle
69NC77	---	(Coordinates, Nevada E. zone)	Mahala Creek W.
Collector		E. 387,100 ft	
R. R. Coats		N. 2,376,800 ft	

Sec. 10, T. 39 N., R. 53 E.

Drepanodus sp.	1
Oistodus sp.	1
Ozarkodina sp.	1

Probably Ordovician, but it might be younger.

J. W. Huddle

October 15, 1970

Field No.	Collection	Location	Quadrangle
70NC13	7788-SD	(coordinates, Nevada E. zone)	Lake Mountain
Collectors		E. 320,975 ft,	
R. R. Coats		N. 2,323,650 ft	
L. D. Cress			

Palmatolepis glabra leptus Ziegler and Huddle	3
perlobata? Ulrich and Bassler	1

These conodonts are found only in Upper Devonian rocks and indicate a Fammenian age.

J. W. Huddle

October 18, 1971

Field No.	Collection No.	Location	Quadrangle
70NC139	7104-CO	(Coordinates, Nevada E. zone)	North Fork
Collector		E. 447,650 ft	
R. R. Coats		N. 2,457,300 ft	

Sta. 943, sec. 33, T. 42 N., R. 55 E.

Drepanodus robustus Hadding	
drepanodiform element	7
oistodiform element	7
Periodon aculeatus Hadding	
ozarkodiform element	13
ligonodiform element	15
cordylodiform element	8
falodiform element	5
trichonodelliform element?	1
"*Oistodus*" *multicorrugatus* Harris	6
Scolopodus sp.	1

This fauna is Middle Ordovician.

J. W. Huddle

October 18, 1971

Field No.	Collection	Location	Quadrangle
71NC138	D2316-CO	(Coordinates, Nevada E. zone)	Tuscarora
Collectors		E. 380,080 ft,	
R. R. Coats		N. 2,440,200 ft	
L. D. Cress			

Vinini(?) Formation. SW1/4 NW1/4 sec. 16, T. 41 N., R. 53 E.

Climacograptus sp. (possibly C. bicornis)

Dicellograptus sp.

Orthograptus quadrimucronatus Hall

Age: Zone of O. *quadrimucronatus* = zone 14 of Berry.

R. J. Ross, Jr.

Nov 19, 1971

Field No.	Collection	Location	Quadrangle
71NC150	D2317-CO	(Coordinates, Nevada E. zone)	Reed Station
Collectors		E. 397,100 ft,	
R. R. Coats		N. 2,333,400 ft	
L. D. Cress			

Vinini Formation.

Amplexograptus? sp. (a very small species)

Cryptograptus? sp.

Isograptus caduceus var. cf. *maxima* Harris

This is not Silurian. It is Middle Ordovician. Probably zone 8 or 9 of Berry.

R. J. Ross, Jr.

Nov 19, 1971

Field No.	Collection	Location	Quadrangle
71NC151	D2318-CO	(coordinates, Nevada E. zone)	Reed Station
Collectors		E. 397,500 ft,	
R. R. Coats		N. 2,333,250 ft	
L. D. Cress			

Vinini Formation.

Dicellograptus gurleyi Lapworth (very nice specimen)

Dicranograptus sp. (possibly *D. nicholsoni* var. *whitianus*)

Age: Zone of *C. bicornis* = zone 12 of Berry (Caradocian).

R. J. Ross, Jr.

November 19, 1971

Field No.	Collection	Location	Quadrangle
71NC155	D2319-CO	(coordinates, Nevada E. zone)	Reed Station
Collectors		E. 389,000 ft,	
R. R. Coats		N. 2,329,000 ft	
L. D. Cress			

Vinini (?) Formation.

Dichograptid fragments, tiny scraps

Although this collection has a field assignment of Silurian, I would guesstimate Ordovician and not very Late Ordovician. The material is very scrappy. There are probably three different graptolites and all are dichograptids; I find no virgula in any specimen to suggest a monograptid.

R. J. Ross, Jr.

November 19, 1971

Field No.	Collection	Location	Quadrangle
71NC189	D2323 CO	(coordinates, Nevada, E. zone)	Tuscarora

Collectors

R. R. Coats

L. D. Cress

E. 382,800 ft,

N. 2,456,100 ft

Vinini Formation.

Hundreds of fragments of dichograptid graptolites and individual siculae

Age: Ordovician, older than zone 11 of Berry.

R. J. Ross, Jr.

November 19, 1971

Field No.	Collection	Location	Quadrangle
72RJ8	___	(coordinates, Nevada E. zone)	Reed Station
Collector		E. 390,250 ft,	
R. J. Ross, Jr.		N. 2,333,900 ft	

Limestone chips, very thin bedded unit, from hill slope above limestone body. west-facing slope.

Climacograptus? sp.

Orthograptus? sp.

Preservation is not at all good. Although both genera range into the Silurian, it is more likely that these are Ordovician.

R. J. Ross, Jr.

December 20, 1972

Field No.	Collection	Location	Quadrangle
---	D2381-CO	(coordinates, Nevada E. zone)	Reed Station
Collector		E. 392,870 ft,	
R. J. Ross, Jr.		N. 2,334,700 ft	

Vinini Formation--from Coats' locality number 2763.

Climacograptus cf. *C. tubuliferus* Lapwork

12th/10 mm, W 2.5 mm

Diplograptus? sp.

Dicranograptus sp.

Graptolites: very fragmentary

Age: Probably zone of *O. quadrimucronatus*. In any case, younger than colln. D2382-CO.

R. J. Ross, Jr.

December 20, 1972

Field No.	Collection	Location	Quadrangle
72RJ17	D2382-CO	(Coordinates, Nevada E. zone)	Reed Station
Collectors		E. 392,200 ft,	
R. R. Coats			
R. J. Ross		N. 2,337,500 ft	

Loc. 2764, on west-facing slope overlooking creek Vinini Formation,

Didymograptus? sp. (fragmentary)

Glossograptus sp. *hincksii* (Hopkinson)

Diplograptus decoratus, two varieties

Cryptograptus sp.

Climacograptus sp.

Amplexograptus sp.

This assemblage is typical of the Vinini in the area of Garden Pass, near the type section. It indicates the zones of *P. etheridgei* to *G. teretiusculus* (late Llanvirnian to Llandeilian).

R. J. Ross, Jr.

December 20, 1972

Limestone in the Western Assemblage

Field No.	Collection ~~No.~~	Location	Quadrangle
62NC100		(Coordinates, Nevada E. zone)	Coal Mine Basin
Collectors		E. 474,500 ft,	
R. R. Coats		N. 2,350,310 ft	
K. A. Howard			

This collection contains what seems to be a previously undescribed Ordovician fauna. It includes an asaphid trilobite with large eyes, a dalmanitid(?) trilobite, and some undetermined calcareous brachiopods. The insoluble residue contained a variety of acrotretids comparable to forms described by G. A. Cooper from the Middle Ordovician, a linguloid of the genus Elliptoglossa, also in G. A. Cooper's Ordovician fauna, and a selection of Ordovician conodonts. This collection is probably Middle Ordovician.

A. R. Palmer

July 8, 1964

Field No.	Collection	Location	Quadrangle
65RJ-26	D1631-CO	(Coordinates Nevada E. zone)	Coal Mine Basin

Collectors

R. R. Coats

R. J. Ross, Jr.

E. 474,420 ft,

N. 2,350,310 ft

SE1/4 sec. 4, T. 38 N., R. 56 E. Limestone "reef," (see also field No.62NC100).

Carolinites sp.

Nileus sp.

Orthidiella sp.

Phragmorthis sp.

Age: Early Middle Ordovician, *Orthidiella* zone. Equivalent to the lower part of the Antelope Valley Limestone of the Pogonip Group. Carbonate buildups of similar composition, similar size, and the same age occur in the Bare Mountain quadrangle and at the Nevada Test Site far to the south; the southern buildups, however, are not in the midst of western assemblages rocks (Ross and others, 1975).

R. J. Ross, Jr.

March 17, 1966

Acontiodus robustus (Hadding)	12
Distacodus sp.	8
Drepanodus subrectus (Branson and Mehl)	
type element	7
homocurvatus element	2
Oistodus venustus Stauffer	7
Periodon aculeatus Hadding falodus element	3
ligonodina element	5
cordylodus element	4
roundya element	5
ozarkodina element	8
Scolopodus varicostatus Sweet and Bergstrom	8

Drepanodus subrectus and *Periodon aculeatus* are probable biologic species, and the others are probably "form species." The fauna is Middle Ordovician, and the presence of *S. varicostatus* suggests that it is early Middle Ordovician.

J. W. Huddle

March 17, 1966

Field No.	Collection	Location	Quadrangle
69NC25A	---	(Coordinates, Nevada E. Zone)	Tuscarora
Collector		E. 322,600 ft,	
R. R. Coats		N. 2,408,000 ft	

Belodella sp.	6
Polygnathus foveolatus Philip and Jackson	4
fragments of bars	

Probably late Early Devonian.

J. W. Huddle

Same locality as above (Field No. 69NC25B):

Belodella sp.	4
Hindeodella sp.	1
Oistodus sp.	2

The age of this sample is questionable; it could be Ordovician to Devonian. The *Belodella* species are like those that occur in the Silurian and Devonian, and are most abundant in the Early Devonian. The *Oistodus* is generally regarded as confined to the Ordovician; its presence here could be an extension of range, or indicate laboratory or field contamination of the sample.

J. W. Huddle

October 15, 1970

Field No.	Collection	Location	Quadrangle
69NC63	---	(Coordinates, Nevada E. zone)	Tuscarora
Collector		E. 325,300 ft	
R. R. Coats		N. 2,404,400 ft	

Belodella sp.	2
Diplododella sp.	2
Hindeodella fragments	60
Nothognathella sp.	1
Ozarkodina sp.	6
Plectospathodus sp.	1
Polygnathus foveolatus Philip and Jackson	150
dehiscens lenzi Klapper	18
Synprioniodina sp.	4

According to Klapper (1969), this fauna occurs in the *Eurekaspirifer pinyonensis* Zone of the Lone Mountain and Nevada Formations and is late Early Devonian, (Emsian).

J. W. Huddle

October 15, 1970

Field No.	Collection	Location	Quadrangle
70NC13	7788-SD	(Coordinates, Nevada E. zone)	Lake Mountain
Collector		E. 320,975 ft	
R. R. Coats		N. 2,323,650 ft	

Palmatolepis glabra leptus Ziegler and Huddle 3

perlobata? Ulrich and Bassler 1

These conodonts are found only in Upper Devonian rocks and indicate a Fammenian age.

J. W. Huddle

October 18, 1971

Field No.	Collection	Location	Quadrangle
70NC21		(Coordinates, Nevada E. zone)	Lake Mountain
Collectors		E. 332,500 ft	
R. R. Coats		N. 2,325,500 ft	
L. D. Cress			

The collection consists of several poorly preserved fragments of a ribbed brachiopod that is possibly Dzieduszyckia, a large rhynchonelloid that has previously been reported in North America only from the Mount Lewis quadrangle, Nev. Gilluly and Gates, 1965). That occurrence, documented recently by Cloud and Boucot (1971), seems to indicate a Late Devonian age.

There are several other brachiopod fragments, including: Orbiculoidea, a spiriferoid that may be Cyrtospirifer, and possibly Tropidoleptus. The entire assemblage is consistent with a Late Devonian age assignment, although the fragmentation of the fossils leaves the generic identifications in some doubt.

It is perhaps more than a coincidence that the Mount Lewis occurrences are also in barite. If more material were available from this locality, we should be able to pin down the fossil identifications and age assignment more precisely. At the least, a suggested correlation with the Mount Lewis localities gives us something to conjure with.

J. T. Dutro, Jr.

March 8, 1971

Field No.	Collection	Location	Quadrangle
71NC160	D2320-CO	(Coordinates, Nevada E. zone)	Reed Station
Collector		E. 390,000 ft	
R. R. Coats		N. 2,333,800 ft	

Brachiopods:

Anomalorthis sp. (primitive sp. with low card. area)

Camerellid? species

Indet. orthid ornamented like *Orthidiella*, but no interiors

Orthidium sp.

Syndielasma sp.

Conodonts:

Acodus sp.

Acontiodus bialatus Mound

Coelocerodontus? (denticulate form)

Falodus prodentatus (Graves and Ellison)

Oistodus longiramis Lindstrom

venustus Stauffer

Periodon aculeatus Hadding

Prioniodina macrodentata (Graves and Ellison)

L. A. Wilson, and R. J. Ross, Jr.

(date)

Antelope Valley(?) Limestone, Nevada.

Brachiopods: 2 genera

Paucicostella? sp.

Trilobites:

Carolinites sp.

Illaenus sp.

Asaphid, not *Isotelus*, like *Presbynileus*

Age: Early Middle Ordovician.

R. J. Ross, Jr.

November 19, 1971

Eoconulus sp.

Ephippelasma sp.

Undiferina sp. 1.

Brachial valves only, not unlike Pratt Ferry material but differing in details of septum.

Schizotreta sp.

Brachial valve only.

Lingulella sp.

(s.l.)

A. J. Rowell and F. F. Krause

February 11, 1972

Field No.	Collection	Location	Quadrangle
	D2379-CO	(Coordinates, Nevada E. zone)	Reed Station
Collectors		E. 390,250 ft	
		N. 2,333,820 ft	

R. R. Coats

L. D. Cress

K. B. Ketner

R. J. Ross, Jr.

Thick-bedded limestone from south end of outcrop.

Camerellid

Paucicostella sp.

This collection provides the first known silicified specimens of shells we have been assigning to Paucicostella(?). We may be able to determine what the generic characteristics are for the first time.

R. J. Ross, Jr.

December 20, 1972

Field No.	Collection	Location	Quadrangle
71NC161	D2321-CO	(Coordinates, Nevada E. zone)	Reed Station
Collector		E. 390,015 ft,	
R. R. Coats		N. 2,333,785 ft	

Acodus sp.

Conodonts:

Falodus prodentatus (Graves and Ellison)

Oistodus sp.

venustus Stauffer

Periodon aculeatus Hadding

Sagittodontus? sp.

Multioistodus compressus Harris and Harris

Phragmodus sp.

L. A. Wilson

January 20, 1972

Brachiopods:

Ephippelasma sp.

Eoconulus sp.

Rhysotreta sp.

(only one brachial valve.)

Lingulella sp.

(s. l.)

All three faunas are consistent with a Middle Ordovician age. We are still accumulating information on the stratigraphic ranges of Ordovician inarticulates and presently cannot be more precise.

A. J. Rowell

F. F. Krause

February 11, 1972

Antelope Valley(?) Limestone.

Brachiopods:

Idiostrophia sp.

Paucicostella? sp.

Rhynchocamara sublaevis Ulrich and Cooper

Age: Early Middle Ordovician.

R. J. Ross, Jr.

November 19, 1971

Field No.	Collection	Location	Quadrangle
71NC162A	D2322-CO	(coordinates, Nevada E. zone)	Reed Station
Collector		E. 389,000 ft,	
R. R. Coats		N. 2,333,800 ft	

Conodonts:

Acontiodus sp.

Drepanodus sp.

Periodon aculeatus Hadding

L. A. Wilson

January 20, 1972

All the above forms indicate a Middle Ordovician age.

R. J. Ross, Jr.

November 19, 1971

Brachiopods:

Undiferina n. sp. 2.

Unusual in having the pedicle valve well represented.

Siphonotretid?

Poorly preserved brachial valve, perhaps a *Multispinula*.

A. J. Rowell and F. F. Krause

February 11, 1972

Paucicostella? sp.

Orthidiella? sp.

Trilobites:

Illaenus sp.

Nileus sp.

Age: Early Middle Ordovician.

R. J. Ross, Jr.

November 19, 1971

Field No.	Collection	Location	Quadrangle
71CS400	---	(coordinates, Nevada E. zone)	California Mountain
Collector		E. 397,350 ft,	
L. D. Cress		N. 2,454,600 ft	

Only one conodont was recovered. This specimen probably represents some species of Gothodus. If so, the age is Ordovician.

J. W. Huddle

June 23, 1972

Field No.	Collection	Location	Quadrangle
72RJ9	D2375-CO to	(coordinates,	Reed Station
72RJ11	D2379-CO	Nevada E. zone)	
Collectors		E. 390,250 ft,	
R. J. Ross, Jr. R. R. Coats		N. 2,333,850 ft	
L. D. Cress, and K. B. Ketner			

Pocket in massive limestone at southeast end of outcrop. (field No. 72RJ11, colln. D2375-CO).

Idiostrophia valdari Ross

lenticularis Ross

Paucicostella sp. (or *Ingria* sp., immature)

Trematorthis? sp.

Trilobite, indet. (too few specimens)

Ostracodes

Lens of coarse fossiliferous calcarenite in thin-bedded dark-gray limestone at southeast end of outcrop. (field No. 72RJ10, colln. D2376 CO).

Idiostrophia valdari Ross (coarse ribbed variety)

Idiostrophia cf. *lentiularis* Ross

Orthid, possibly *Trematorthis* or *Orthidiella*

Paucicostella sp. (or immature *Ingria*)

Possibly *Pleurothis* sp.

Illaenus sp.

Illaenus sp. d of Ross 1972 (pygidium)

Lehua? sp.

Nileus sp.

This assemblage closely approximates several collections from the Middle Ordovician carbonate mudmound at Meiklejohn Peak (Ross, 1972).

R. J. Ross, Jr.

December 20, 1972

Field No. Collection

72RJ11 D2377-CO

Very thin bedded dark-gray limestone interbedded with main core of limestone body.

Paucicostella? sp.

Idiostrophia sp.

Lingulid brachiopods

Nileus sp.

small undet. trilobite

Like the others, this collection is allied to those of other carbonate mudmounds in Elko County and near Beatty.

R. J. Ross, Jr.

December 20, 1972

Field No. Collection

72RJ11 D2378-CO

Limestone from main mass of mound. Same as R. R. Coats' original collection.

Paucicostella sp. (This is the most abundant constituent of this limestone.)

Inarticulate brachiopods.

R. J. Ross, Jr.

December 20, 1972

Field No.	Collection	Location	Quadrangle
78NC56	9998-SD	(Coordinates, Nevada E. zone)	Knoll Mountain
Collector		E. 752,300 ft,	
R. R. Coats		N. 2,485,100 ft	

The slide contains conodonts as follows:

3 p (spathognathodan) elements of Ozarkodina confluens (Branson and Mehl)

2 p (spathognathodan) elements of Ozarkodina excavata excavata (Branson and Mehl)

1 p (spathognathodan) elements of Ozarkodina cf. O. crispa (Branson and Mehl)

3 Panderodus sp.

1 A1 (hindeodellan) element

1 A3 (Trichonodella excavata) element

1 lonchodiniform element

19 indet. bar, blade, and platform fragments

O. confluens ranges from the Upper Silurian (Ludlovian) into the lowermost Devonian, and O. excavata excavata is even longer ranging. True O. crispa (the specimen in your collection is too incomplete to be positive of the specific assignment) is restricted to the upper Ludlovian. AGE: Late Silurian through earliest Devonian (probably Ludlovian).

Color-alteration index = 5, indicating that the host rock reached 250oC.

A. G. Harris

March 23, 1979

Field No.	Collection	Location	Quadrangle
78NC68	9999-SD	(coordinates, Nevada E. zone)	Knoll Mountain
Collector		E. 752,000 ft,	
R. R. Coats		N. 2,485,450 ft	

The slide contains conodonts as follows:

8 indet. bar and blade fragments

1 Ozarkodina excavata excavata (Branson and Mehl), p element fragment

1 Panderodus sp.

AGE: Late Silurian-Early Devonian.

Color-alteration index = 5, indicating that the host rock reached 250oC.

A. G. Harris

March 23, 1979

Field No.	Collection	Location	Quadrangle
78NC71	10000-SD	(coordinates, Nevada E. zone)	Knoll Mountain
Collector		E. 751,500 ft,	
R. R. Coats		N. 2,485,900 ft	

The slide contains conodonts as follows:

1 p (spathognathodan) element fragment of *Ozarkodina confluens* (Branson and Mehl)

1 p (spathognathodan) element fragment of *Ozarkodina excavata excavata* (Branson and Mehl)

20 p (spathognathodan) elements

6 N (neoprioniodinan) elements

6 O (ozarkodinan) elements

7 A1 (hindeodellan) elements

6 A2 (plectospathodan) elements

5 A3 (trichonodellan) elements

4 *Panderodus* sp.

100 indet. bar anlectors

EASTERN ASSEMBLAGE

Cambrian and Ordovician Systems

Field No.	Collection	Location	Quadrangle
62NC40		(Coordinates, Nevada E. zone)	Mountain City
Collector		E. 448,430 ft	
R. R. Coats		N. 2,555,650 ft	

This collection contains a few spicules and acrotretid brachiopods. The age is probably Cambrian or Ordovician.

A. R. Palmer

May 8, 1963

Field No.	Collection	Location	Quadrangle
62NC41	---	(Coordinates, Nevada E. zone)	Mountain City
Collector		E. 449,130 ft	
R. R. Coats		N. 2,556,020 ft	

Spicule and brachiopod fragments, probably Cambrian or Lower Ordovician.

A. R. Palmer

May 8, 1963

Field No.	Collection	Location	Quadrangle
69NC126	---	(Coordinates, Nevada E. zone)	Rowland
Collector		E. 474,600 ft	
R. R. Coats		N. 2,605,600 ft	

Acodus sp.	1
Acontiodus sp.	1
Drepanodus sp.	2
Paltodus sp.	1

This fauna is probably Ordovician.

J. W. Huddle

October 15, 1970

Ordovician System

Pogonip Group

Field No.	Collection	Location	Quadrangle
D19	D2170	(coordinates Nevada E. zone)	Sherman Mountain
Collector R. A. Hope		E. 504,900 ft, N. 1,990,750 ft	

As far as I can tell from the molds and casts of brachiopods in this mudstone and siltstone, two genera are present. One fairly coarse ribbed form is very similar to Orthambonites minusculus (Phleger). There are traces of a finer ribbed form, but none of these show any interior features of either valve.

This unit is probably a little older than the Kanosh shale in its type area to the east.

R. J. Ross, Jr.

December 18, 1969

Field No.	Collection	Location	Quadrangle
D21(see D19) p.A56	D2171-CO	(Coordinates, Nevada E. zone)	Sherman Mountain
Collector		E. 497,650 ft	
R. A. Hope		N. 1,972,600 ft	

Field No.	Collection No	Location	Quadrangle
D22(see D19) p.A56	D2172-CO	(Coordinates, Nevada E. zone)	Sherman Mountain
Collector		E. 497,450 ft,	
R. A. Hope		N. 1,968,700 ft	

Field No.	Collection	Location	Quadrangle
57NC21	---	(coordinates, Nevada E. zone)	Mountain City

Collectors

R. R. Coats

R. H. Cohenour

Eugene Core

E. 434,750 ft,

N. 2,574,150 ft

4,700 ft west of common corner sec. 5, 6, 7, and 8, T. 45 N., R. 55 E. This collection contains an assemblage of phosphatic brachiopods, including a linguloid, an acrotretid, and a species of Schizambon, and orthoid brachiopods probably referable to Nanorthis. Nanorthis is widespread in the Great Basin in beds of earliest Ordovician age. Schizambon is a distinctive form known from earliest Ordovician rocks at many localities in the Cordilleran region from Alaska to Argentina. The specimens on this collection do not seem referable to any of the described species of Schizambon. These beds would correlate with the Goodwin Limestone of the Eureka mining district.

A. R. Palmer

October 15, 1957

Field No.	Collection	Location	Quadrangle
57NC22	---	(coordinates, Nevada E. zone)	Jarbidge
Collector		E. 526,100 ft,	
Ed Lawrence		N. 2,557,400 ft	

This collection contains a single poorly preserved trilobite. Only a part of the thorax and the pygidium remain, and from these it is not possible to give a certain determination more closely than pre-Carboniferous Paleozoic. The pygidium is of a simple ptychoparioid type that is reasonably common in pre-Middle Ordovician rocks, and is most likely that the collection came from rocks of Cambrian or Early Ordovician age. However, trilobites with similar form are known, though less commonly, from younger rocks, and a later Ordovician, Silurian, or Devonian age cannot be definitely excluded.

A. R. Palmer

October 15, 1957

Field No.	Collection	Location	Quadrangle
62NC124	---	(coordinates, Nevada E. zone)	Mountain City
Collector		E. 436,550 ft,	
R. R. Coats		N. 2,572,800 ft	

Six species of conodonts are present. The fauna contains species of Ordovician age but lacks typical Middle and Upper Ordovician genera. The conodonts suggest a Earlier Ordovician age. The phosphatic brachiopods also indicate an Earlier Ordovician age.

J. W. Huddle

A. R. Palmer

May 8, 1963

Field No.	Collection	Location	Quadrangle
65RJ25	D2700-CO	(coordinates, Nevada E. zone)	Mountain City
Collectors		E. 434,750 ft,	
R. R. Coats			
R. J. Ross, Jr.		N. 2,574,150 ft	

This supplements a report on work done in the field in 1965 in the Mountain City quadrangle.

Goodwin(?) Limestone. Alt approx 7,200 ft. On N. boundary of sec. 7, T. 45 N., R. 55 E., on southeast side of 7,250-ft hill.

Abundant inarticulate brachiopods.

Nanorthis

Trilobites:

Apatokephalus(?) sp.

Kainella sp.

Age: Early Ordovician, probably zone D of Ross (1951). Equivalent to the lower part of the Goodwin Limestone of central Nevada and lower part of the Fillmore of western Utah (Hintze, 1951).

R. J. Ross, Jr.

Field No.	Collection	Location	Quadrangle
G1398	---	(coordinates, Nevada E. zone)	Marys River Basin NE.
Collector		E. 573,650 ft,	
R. C. Greene		N. 2,542,450 ft	

This report is based on cross sections of gastropods exposed in two chunks of limestone judged in the field to be from the Pogonip Group. The material is being returned.

A large piece shows cross sections of several moderately large gastropods. At least one of these is Palliseria, and others less well preserved are of the same general size and shape. I would suggest that this fauna is from the lower part of the Antelope Valley Limestone.

E. L. Yochelson

June 11, 1974

Field No.	Collection	Location	Quadrangle
73NC16	8293-CO	(Coordinates, Nevada E. zone)	Wild Horse
Collector		E. 387,700 ft,	
R. R. Coats		N. 2,536,600 ft	

Limestone, intraformational conglomerate, from unknown formation at sta. 2911, sec. 15, T. 44 N., R. 53 E., 700 ft S. of Barn Gulch and approx. 75 ft SE. of a patch of aspen.

2,295 g of rock were processed for conodonts. The following were recovered:

2 *Cordylodus proavus* Miller elements

1 *Cyrtoniodus oklahomensis*? (Mueller) element

1 paltodid element

1 *Proconodontus notchpeakensis* Miller element

3 simple cone fragments

This conodont collection indicates an earliest Ordovician age. The *Cordylodus proavus* zone is the lowest Canadian conodont zone in the zonation scheme of Miller.

The conodonts have a color- alteration index of 5, indicating that the host rock reached 300oC.

A. G. Harris

December 12, 1975

Field No.	Collection	Location	Quadrangle
74NC60	D2610	(coordinates, Nevada E. zone)	Spring Gulch
Collector		E. 889,200 ft,	
R. R. Coats		N. 2,136,000 ft	

Pogonip (?) Group, in a sequence of interbedded shale and limestone, in lower plate of a thrust. Thrust is below thin plate of sheared Eureka Quartzite.

Conodonts:

Fibrous forms of a type common in Middle to Upper Ordovician strata.

Trilobites:

Probable illaenid forms similar to those in carbonate mound at Meiklejohn Peak.

Age: Neither the trilobites nor the conodonts are well preserved. The best estimate is Middle to Late Ordovician but more likely is lower Middle Ordovician.

R. J. Ross, Jr.

L. A. Wilson

A. G. Harris

January 28, 1975

Conodonts

?*Erismodus* sp.	1
Multioistodus subdentatus Cullison,	
cladognathodiform element	2
cordylodiform element	1
Several other broken, abraded fragments	

Age: Middle Ordovician (late Whiterockian or Chazyan).

The hyaline multielement species *Multioistodus subdentatus* Cullison *sensu* Repetski (1973) is a North American Midcontinent Province conodont. It ranges from Midcontinent Province conodont fauna 4 through fauna 5 (Sweet, and others, 1970). Conodonts characteristic of fauna 4 are found in upper Whiterockian strata; fauna 5 conodonts are Chazyan.

The color alteration index of these elements is 4 to 4-1/2, indicating that the host rock has been heated to 180o to 220oC.

John Repetski

December 19, 1977

Ordovician and Silurian Systems

Hanson Creek Formation

Field No.	Collection	Location	Quadrangle
69NC94	---	(coordinates, Nevada E. zone)	Tuscarora
Collector		E. 385,600 ft,	
R. R. Coats		N. 2,408,600 ft	

Sec. 15, T. 40 N., R. 53 E.

Belodina sp.	1
Prepanodus. sp.	1
Oulodus? sp.	1
Panderodus sp.	17

Scolopodus cf. *S. insculptus* (Branson and Mehl)

Bryozoan scraps and ostracodes, not identifiable.

The conodonts are poorly preserved. The age is probably Middle or Late Ordovician.

J. W. Huddle

October 15, 1970

Field No.	Collection	Location	Quadrangle
69NC95		(coordinates, Nevada E. zone)	Mahala Creek West
Collector		E. 385,700 ft,	
R. R. Coats		N. 2,408,500 ft	

Sec. 15, T. 40 N., R. 53 E.

Cordylodus sp.	1
Cyrtoniodus flexuosus (Branson and Mehl)	3
Drepanodus sp.	2
Oistodus sp.	1
Ozarkodina sp.	5
Prioniodina sp.	1
Trichonodella sp.	3

Age: Probably Middle or Late Ordovician.

J. W. Huddle

October 15, 1970

Field No.	Collection	Location	Quadrangle
70CS42	D2249-CO	(Coordinates, Nevada E. zone)	California Mountain

Collectors

R. R. Coats

L. D. Cress

E. 406,375 ft

N. 2,414,025 ft

Hanson Creek Formation(?).

Anataphrus sp.

Cryptolithoides sp.

Orthograptus truncatus var. *intermedium* Elles and Wood

Age: This assemblage indicates correlation with the Caesar Canyon Formation of Kay and Crawford (1964), the top 100 ft of the Copenhagen Formation in its type area, and the lower part of the Hanson Creek Formation in its type section.

R. J. Ross, Jr.

December 3, 1970

Field No.	Collection	Location	Quadrangle
70NC43	D2250-CO	(Coordinates, Nevada E. zone)	California Mountain

Collectors

R. R. Coats

L. D. Cress

E. 405,675 ft

N. 2,413,800 ft

Sec. 6, T. 40 N., R. 54 E. Hanson Creek Formation.

Anataphrus sp.

Conularia? sp.

Cryptolithoides sp.

Age: Same as colln. D2249-CO.

R. J. Ross, Jr.

December 3, 1970

Field No.	Collection	Location	Quadrangle
70CS344	D2251 CO	(Coordinates, Nevada E. zone)	California Mountain
Collector		E. 404,300 ft,	
L. D. Cress		N. 2,413,450 ft	

Hanson Creek Formation.

Cryptolithoides sp. (thorax and pygidium).

Age: Same as 70 NC 42 and 70 NC 43. (D2249 CO) (D2250 CO)

R. J. Ross, Jr.

December 3, 1970

Field No.	Collection	Location	Quadrangle
70NC138	D2252-CO	(Coordinates, Nevada E. zone)	California Mountain

Collectors

R. R. Coats

L. D. Cress

E. 407,600 ft

N. 2,410,150 ft

Sec. 7, T. 40 N., R. 54 E. Hanson Creek Formation.

Cryptolithoides sp.

Age: Same as colln. D2249-CO.

R. J. Ross, Jr.

December 3, 1970

Field No.	Collection	Location	Quadrangle
	D2383-CO	(Coordinates, Nevada E. zone)	California Mountain

Collectors

R. J. Ross, Jr.

R. R. Coats

L. D. Cress K. B. Ketner

E. 406,300 ft

N. 2,414,050 ft

Approx. 100 ft W. of Coats' loc. 2240, alt 6,450 ft. Hanson Creek Formation.

Trilobites:

Anataphrus sp.

Cryptolithoides sp.

This collection suggests correlation with the uppermost part of the Copenhagen Formation in the Antelope Valley area to the south. Same age as colln. D2249-CO.

R. J. Ross, Jr.

December 20, 1972

Field No.	Collection	Location	Quadrangle
	D2384-CO	Coordinates,	California Mountain
		Nevada E. zone	
Collectors		E. 405,850 ft,	
R. J. Ross, Jr.		N. 2,413,950 ft	
R. R. Coats			
L. D. Cress K. B. Ketner			

Halfway between Coats' 10cr 2241 and colln. D2385-CO, Alt approx 6,500 ft, north of valley.

Anataphrus sp.

Cryptolithoides sp.

Age: Same as colln. D2383-CO.

R. J. Ross, Jr.

December 20, 1972

Field No.	Collection	Location	Quadrangle
	D2385-CO	(Coordinates, Nevada E. zone)	California Mountain

Collectors

R. J. Ross, Jr.

R. R. Coats

L. D. Cress K. B. Ketner

E. 405,830 ft

N. 2,414,025 ft

Hanson Creek Formation, above second cherty ledge of thin-bedded limestone.

<u>Cryptolithoides</u> sp.

R. J. Ross, Jr.

December 20, 1972

Field No.	Collection	Location	Quadrangle
	D2386-CO	(Coordinates, Nevada E. zone)	California Mountain

Collectors

R. J. Ross

R. R. Coats

L. D. Cress K. B. Ketner

E. 405,000 ft,

N. 2,413,840 ft

Hanson Creek Formation.

Cryptolithoides sp.

This collection locality is overlain by about 100 ft of cherty thin-bedded limestone, followed by 15 ft of oolitic limestone. Overlying the last units is 50 ft of very cherty thin-bedded limestone that may be the lower Part of the Roberts Mountains Formation. A sample (field No. 77RJ23) taken 30 ft below the top of this higher limestone yielded no conodonts.

R. J. Ross, Jr.

December 20, 1972

Silurian and Devonian Systems

Roberts Mountains Formation

Field No.	Collection	Location	Quadrangle
69NC2	---	(Coordinates, Nevada E. zone)	Santa Renia Field 7-1/2'
Collector		E. 270,500 ft,	
R. R. Coats		N. 2,283,500 ft	

Hindeodella sp.	3
Ligonodina sp.	1
Ozarkodina denckmanni Zeigler	7
Plectospathodus sp.	1
Spathognathodus remscheidensis Zeigler	16
Trichonodella sp.	1

This fauna is probably Early Devonian in age though both *O. denckmanni* and *S. remscheidensis* could occur in Late Silurian rocks. The collection also contained a single specimen of *Oistodus*, but this is probably laboratory contamination since the genus is presumed to be Ordovician only.

J. W. Huddle

October 15, 1970

Simonson, Sevy, and Nevada Formations

Field No.	Collection	Location	Quadrangle
---	---	(Coordinates, Nevada E. zone)	Spruce Mountain
Collector		E. 710,400 ft,	
R. A. Hope		N. 2,106,000 ft	

Spruce Mountain, east slope, 0.5 mi E. of summit 9920. Halysites in dark-gray dolomite.

This Halysite probably represents either the subgenus Catenipora or true Halysite. Smoothed surfaces do not show good internal structure. Catenipora appears in the latest Ordovician, amd persists into the Silurian; true Halysites (Halysites) is only Silurian. I am inclined to think it is the later.

C. W. Merriam

February 4, 1969

Devonian System

Limestone, undifferentiated

Field No.	Collection	Location	Quadrangle
E-4	8876-SD	(Coordinates, Nevada E. zone)	Oxley Peak
Collector		E. 675,900 ft,	
R. A. Hope		N. 2,352,900 ft	

Snake Mountains alt. approx 6,480 ft, near west SE1/4 NW1/4 sec. 2, T. 38 N., R. 62 W.

Icriodus? sp.	1
Neoprioniodus sp.	1
Palmatolepis quadrantinodosalobata Branson and Mehl	3
Synprioniodina sp.	1

The presence of *P. quadrantinodosalobata* indicates a Late Devonian age for this collection.

J. W. Huddle

August 5, 1971

Field No.	Collection	Location	Quadrangle
E-10	8719-SD	(Coordinates, Nevada E. zone)	Summer Camp
Collector		E. 671,800 ft,	
R. A. Hope		N. 2,376, 320 ft	

Sec. 10, T. 39 N., R. 62 E.

Philipsastraea sp.

This taxon is limited to the early Late Devonian (Frasnian) in North America.

W. A. Oliver, Jr.

September 13, 1971

Field No.	Collection	Location	Quadrangle
---	8721-SD	(Coordinates, Nevada E. zone)	Summer Camp
Collector		E. 676,600 ft,	
John Riva		N. 2,400,000 ft	

Sec. 23, T. 40 N., R. 62 E.

Favosites sp.

This taxon could be Late Ordovician but is more likely Silurian or Devonian.

W. A. Oliver, Jr.

September 13, 1971

Sec. 23, T. 40 N., R. 62 E.

Icriodus rectangularis Carls and Gandl	20
cone conodonts	6
Panderodus sp.	3

This species of *Icriodus* is known only from Lower Devonian rocks and this collection is thought to be Early Devonian.

J. W. Huddle

December 8, 1971

Field No.	Collection	Location	Quadrangle
E5	8875-SD	(Coordinates, Nevada E. zone)	Oxley Peak
Collector		E. 676,100 ft,	
R. A. Hope		N. 2,351,300 ft	

Alt above 6,720 ft, near W. line of NW1/4SW1/4 sec. 2, T. 38 N., R. 62 E., Snake Mountains.

Hindeodella sp.	3
Palmatolepis sp.	1
Polygnathus asymmetricus Bischoff and Ziegler	2
dubius Hinde	2
Synprioniodina sp.	1

P.. asymmetricus associated with *Palmetolepis* indicates an early Late Devonian age for this collection.

J. W. Huddle

August 5, 1971

Field No.	Collection	Location	Quadrangle
69NC43	---	(coordinates, Nevada E. zone)	Mahala Creek W.
Collector		E. 388,925 ft,	
R. R. Coats		N. 2,377,600 ft	

Sec. 10, T. 39 N., R. 53 E.

Hindeodella sp.	1
Panderodus sp.	1
Polygnathus kockeliana? Bischoff and Ziegler	1 juv.
linguiformis s.l. Hinde	1

This sample is probably Middle Devonian, but it could be slightly younger or older. If the identification of the juvenile *p. kockeliana* is correct, the age is probably Eifelian because this species has been reported from the *Leptathyris circula* Zone of Johnson in the Nevada Formation of former usage.

J. W. Huddle

October 15, 1970

Field No.	Collection	Location	Quadrangle
69NC78	---	(Coordinates, Nevada E. zone)	Mahala Creek W.
Collector		E. 388,200 ft,	
R. R. Coats		N. 2,377,650 ft	

Sec. 10, T. 39 N., R. 53 E.

Bar fragments

Polygnathus linguiformis s.l. Hinde 1

P. linguiformis s.l. ranges from late Early Devonian to Early Devonian.

J. W. Huddle

October 15, 1970

Field No.	Collection	Location	Quadrangle
69NC79	---	(Coordinates, Nevada E. zone)	Mahala Creek W.
Collector		E. 388,400 ft,	
R. R. Coats		N. 2,237,400 ft	

Sec. 10, T. 39 N., R. 53 E.

Polygnathus linguiformis s.l.

This species ranges from late Early Devonian to early Late Devonian.

J. W. Huddle

October 15, 1970

Field No.	Collection	Location	Quadrangle
69NC183		(Coordinates, Nevada E. zone)	Mahala Creek W.
Collector		E. 390,700 ft,	
R. R. Coats		N. 2,384,150 ft	

Sec. 3, T. 39 N., R. 53 E.

Brytantodus sp.	1
Ligonodina? sp.	1
Polygnathus sp.	1

The presence of *Polygnathus* sp. suggests that the age is Devonian or Early Mississippian.

J. W. Huddle

October 15, 1970

Guilmette and Devils Gate Formations

Field No.	Collection	Location	Quadrangle
---	---	(Coordinates, Nevada E. zone)	Spruce Mountain
Collector		E. 711,900 ft,	
R. A. Hope		N. 2,113,500 ft	

Near top of Spruce Mountain. "Spaghetti rock."

Smoothed surfaces of this limestone revealed no internal structure of the spaghetti branches. On a weathered surface it appears to consist of a combination of a Cladopora-like tabulate corals and the branching stromatoporoid Amphipora. Better preserved material is needed to confirm.

Spaghetti rock of this kind is especially common in the lower part of the Devils Gate Limestone, where Amphipor first appears in the Great Basin. Such beds are late Middle Devonian or Late Devonian. The upper part of the Devils Gate is Late Devonian and commonly includes a large brachiopod fauna.

C. W. Merriam

February 4, 1969

Field No.	Collection	Location	Quadrangle
D6	---	(Coordinates, Nevada E. zone)	Jackson Springs
Collector		E. 914,900 ft,	
R. A. Hope		N. 2,440,750 ft	

0.25 mi NE. of Jackson Mines. Guilmette Formation, about 200 ft stratigraphically below the contact with conglomerate of Diamond Peak Formation.

Amphipora cf. A. ramosa (Phillips)

This spaghetti-limestone-building digitate stromatoporoid is quite similar to A. ramosa, the type species, from Devonshire, England, and the Rhine Valley, Germany, where it is abundant in Middle Devonian strata. Little is known of the stratigraphic range of Amphipora, but it almost certainly appears in the Upper Silurian. In the Great Basin of Nevada and Utah I have recognized it only in the Devonian, where it is most abundant in the uppermost Middle Devonian and in the lower Upper Devonian. For example, it is an important limestone builder at the base of the Devils Gate Limestone in the Eureka mining district, Nev., together with massive stromatoporoids, where the beds yield few other fossils. Your sample looks lithologically like this lower Devils Gate rock, which is either upper Middle Devonian or Upper Devonian. The Devils Gate faunas of definite Frasnian (Late Devonian) age are higher up. I don't know the range of Amphipora in the Guilmette of Utah, but the specimens collected by Dick Hose in the Confusion Range have much the same appearance as yours.

C. W. Merriam

December 5, 1969

Devonian and Mississippian Systems

Pilot Shale and Joana Limestone

Field No.	Collection	Location	Quadrangle
B85	24689-PC	(Coordinates, Nevada E. zone)	Elko 2°
Collector		E. 801,900 ft,	
R. A. Hope		N. 2,071,000 ft	

This report concerns a collection of corals from an aberrant block of limestone in the NW1/4 sec. 35, T. 30 N., R. 66 E. The sample contains the following taxa: *Homalophyllites* sp.

Lithostrotionella cf. *L. Microstylum* (White)

Syringopora surcularia Girty *Vesiculophyllum* sp.

This assemblage is representative of zone C_1 of Sando and others (1969) which is of late Kinderhookian and early Osagean age. Zone C_1 coincides with the Woodhurst Member of the Lodgepole Limestone of the Madison Group in the northern Rocky Mountains region; it is also compatible with a stratigraphic level in the Joana Limestone of Utah and Nevada.

W. J. Sando

October 6, 1972

Field No.	Collection	Location	Quadrangle
E13	24405-PC	(coordinates, Nevada E. zone)	Spruce Mountain
Collector		E. 697,000 ft,	
R. A. Hope		N. 2,207,100 ft	

NW1/4 T. 31 N., R. 63 E., on east slope of saddle just east of closed 7,000-ft contour, 1 mi NNW. of site of Sprucemont.

Hindeodella sp.	1
H. sp. A.	4
Ligonodina sp.	2
Neoprioniodus sp.	1
Polygnathus sp.	5
Polygnathus communis Branson and Mehl	16
Siphonodella obsoleta Hass	42
Spathognathodus sp.	5

The *Siphonodella* indicates that collection this is Kinderhookian and that the fauna is that of the Joana Limestone, probably the lower part.

J. W. Huddle

February 8, 1971

OVERLAP ASSEMBLAGE

Mississippian System

Tripon Pass Limestone of Oversby (1973)

Field No.	Collection No.	Location	Quadrangle
E2	24521-PC	(Coordinates, Nevada E. zone)	Oxley Peak
Collector		E. 683,150 ft,	
R. A. Hope		N. 2,358,900 ft	

Detrital limestone beds below the Diamond Peak Formation east of jeep trail on Cedar Peak above 8,000-ft contour NE1/4NW1/4 sec. 36, T. 39 N., R. 62 E.

Gnathodus punctatus (Cooper)	3
Hibbardella sp.	2
Hindeodella sp.	4
Polygnathus communis Branson and Mehl	6
Siphonodella obsoleta Hass	16
Spathognathodus sp.	1
Synprionodina sp.	1

This collection is Kinderhookian in age as is indicated by the presence of *S. obsoleta* and *G. punctatus*.

J. W. Huddle

August 5, 1971

Field No.	Collection	Location	Quadrangle
E8	24522-PC	(coordinates, Nevada E. zone)	Oxley Peak
Collector		E. 678,150 ft,	
R. A. Hope		N. 2,364,900 ft	

Snake Mountains, alt approx 6,720 ft, east of Twelve Mile Spring, NE1/4 NW1/4 sec. 26, T. 39 N., R. 62 E. Detrital limestone below the Diamond Peak Formation.

Gnathodus sp.		3
Polygnathus communis Branson and Mehl	3	
inornatus Branson		1
Siphonodella cooperi Hass	2	
obsoleta Hass	18	

The species of *Siphonodella* and *Gnathodus* indicate a Kinderhookian age for this collection. This is the same fauna that occurs in the Joana Limestone in central Nevada.

J. W. Huddle

August 5, 1971

Banner and Nelson Formations

Field No.	Collection	Location	Quadrangle
57NC88	17662-PC	(Coordinates, Nevada E. zone)	Mountain City
Collector		E. 395,900 ft,	
R. R. Coats		N. 2,577,750 ft	

Banner Limestone of, Granger and others (1957).

Loc. 63, in vicinity of 1/4 cor. secs. 2 and 11, T. 45 N., R. 53 E.

The prepared material of this collection contains two specimens of Cavusgnathus. This genus has a recorded range of Upper Mississippian (Meramecian) to Lower Permian.

W. H. Hass

Adetognathus gigantus Gunnell	5
Gnathodus cf. G. commutatus (Branson and Mehl)	1

A. gigantus is known to range from Morrowan to Missourian but G. commutatus is reported only from the Chester. I guess that this collection is probably Early Pennsylvanian but it might be somewhat older or younger.

J. W. Huddle

December 6, 1971

Field No.	Collection	Location	Quadrangle
58NC56		(Coordinates, Nevada E. zone	Mount Velma
Collector		E. 520,500 ft,	
R. R. Coats		N. 2,540,700 ft	

Recognizable conodonts in this collection are like those present in the upper faunal zone of the Barnett Formation of Texas, the lower part of the Caney Shale of Oklahoma, and the lower part of the Stanley Shale of Arkansas and Oklahoma. These formations are presently considered to be of Late Mississippian (Meramecian). I have seen similar conodonts in the core of a Mississippian black shale (Floyd) from Mississippi. The rocks from which this collection came may be early Chesterian rather than Meramecian but the rocks definitely are not as young as Pennsylvanian, as suggested by the field man.

I recognized the following conodont species in the collection; all the specimens are small fragments, very dark gray--a color characteristic of conodont specimens from the West.

Geniculatus claviger (Roundy)	2
Gnathodus bilineatus (Roundy)	1
girtyi Hass	12
inornata Hass (*G. commutatus* of later authors)	1
Gnathodus texanus Roundy	1
Hindeodella ensis Hass	1
Ligonodina sp.	1

Neoprioniodus ligo Hass

Fairly large number of indeterminable conodont fragments.

W. H. Hass

November 6, 1958

This report covers those fossils not discussed in earlier reports by W. H. Hass (conodonts, dated Nov. 6, 1958) and W. J. Sando (corals, dated Nov. 14, (1958). These additional fossils suggest a Late Mississippian age, and no refinement of Hass's assignment can be made. The collection (field No. 58NC56, from loc. 103), from limestone that appears to overlie, unconformably, Vinini-type rocks, contains:

echinoderm debris, indet.

Cystodictya sp.

Archimedes?

ramose bryozoan, indet.

strophomenoid brachiopod fragments, indet.

productoid brachiopod fragment, indet.

Punctospirifer? sp.

Composita sp.

pelecypod fragments, indet.

J. T. Dutro, Jr.

November 17, 1958

Field No. 58NC56--Continued

This report concerns five fragmentary coral specimens in Coats' field No. 58NC56 from loc. 103, from limestone that appears to overlie unconformably, Vinini-type rocks, in the Mount Velma quadrangle, Nev. The corals are silicified and were recovered during etching of the material for conodonts.

The following forms are present:

Michelinia sp.	1
Zaphrentites? sp.	1
Permia? sp.	3

The genera represented here are common in rocks of Mississippian age. The material is inadequate for more precise age determination.

W. J. Sando

November 14, 1958

Field No.	Collection	Location	Quadrangle
59NC5	19526-PC	(coordinates, Nevada E. zone)	Owyhee 15' - minute
Collector		E. 383,300 ft,	
R. R. Coats		N. 2,573,700 ft	

This small sample contained two fragmentary specimens of small horn corals. The material is in adequate for identification of the genera represented. The larger fragment, however, seems to be a zaphrentoid of a type that occurs in the Ferdelford beds of the Carlin area. On the basis of this very inadequate evidence, the locality might tentatively be considered to be in the Banner Formation.

Helen Duncan

August 1, 1960

Field No.	Collection	Location	Quadrangle
59NC47	19528-PC	(Coordinates Nevada E. zone)	Owyhee 15' -minutes
Collector		E. 383,800 ft,	
T. R. Coats		N. 2,573,600 ft	

This collection consists of a large slab from a lithostrotionid colony. The corallites are somewhat distorted as a result of squeezing, but preservation of internal structures is better than in most of the corals so far collected from the Banner Formation. Thin sections indicate that the genus represented is Siphonodendron. I have not tried to compare the species with forms so far described but am certain it is not the same as the one we have from the Ferdelford beds of the Carlin area.

Helen Duncan

August 1, 1960

Field No.	Collection	Location	Quadrangle
59NC46	19527-PC	(coordinates, Nevada E. zone)	Owyhee 15' - minutes
Collector		E. 383,800 ft,	
R. R. Coats		N. 2,573,800 ft	

This is a large collection, containing several specimens of colonial corals and a number several small horn corals. Some of the rock is highly crinoidal. The corals, however, are extensively altered, and features necessary for identification of the genera represented are mostly destroyed. The colonial corals are phaceloid forms, presumably lithostrotionoids. I was able to find only two or three corallites in which skeletal deposits were well enough preserved to suggest that Siphonodendron is probably present. I also found a transverse section that suggests a small Caninia, but this section might be a corallite of the compound genus Diphyphyllum. Most of the colonial material is essentially in the state of pseudomorphs preserving only the growth form.

We dissolved some of the blocks in acid and obtained small horn corals suggestive of the zaphrentoids that occur in coll. 17662-PC (field No. 57NC88) from the Banner Formation.

According to comments accompanying the shipment, this collection came from rocks that can be traced into the type Banner. Even though preservation of the fossils is poor, this material extends our information on the types of colonial corals to be expected in the Banner. The presence of Siphonodendron-like lithostrotionoids helps confirm the Mississippian age of the Banner Formation.

Helen Duncan

August 1, 1960

Field No.	Collection	Location	Quadrangle
60NC34		(coordinates, Nevada E. zone)	Owyhee 15' -minute
Collectors		E. 383,800 ft,	
R. R. Coats		N. 2,573,800 ft	
B. S. Karkare			
R. J. Roberts			

Possibly Menophyllum? or Canadiphyllum.

W. J. Sando

August 6, 1971

Field No.	Collection	Location	Quadrangle
62NC345	21588-PC	(Coordinates, Nevada E. zone)	Mountain City
Collector		E. 442,300 ft,	
K. H.		N. 2,597,600 ft	

Canadiphyllum? sp.

Lithostrotion (*Siphonodendron*) sp. (small)

(*Siphonodendron*)? sp. (large)

Lithostrotionella? sp.

Multithecopora sp.

W. J. Sando

April 2, 1971

Field No.	Collection	Location	Quadrangle
64NC52		(Coordinates, Nevada E. zone)	Mountain City
Collector		E. 437,450 ft,	
R. R. Coats		N. 2,604,050 ft	

Limestone containing corals. from massive dark bed near base of cliffs on south side of knob, near end of ridge north of Trail Gulch, E1/2SW1/4 sec. 6, T. 46 N., R. 55 E.

Multithecopora? sp.

Horn corals, indet.

The Multithecopora? in this collection suggests a possible age range of Mississippian to Permian, with which the indeterminate horn corals are compatible.

W. J. Sando

April 2, 1971

Field No.	Collection	Location	Quadrangle
64G25	22813-PC	(Coordinates, Nevada E. zone)	Owyhee 15'
Collectors		E. 380,900 ft, N. 2,570,950 ft	
R. R. Coats, Don Dean Mackenzie Gordon, Jr.			

North slope of Mill Creek opposite and northwest of Idaho-Nevada shaft, 100 to 150 ft above valley floor.

Dorlodotia?, probably 2 spp.

"*Menophyllum*" sp.

Siphonodendron sp.

This coral assemblage is certainly Mississippian and very likely Meramecian. The horn corals resemble those previously collected from the Banner Formation. The colonial forms I have identified as *Dorlodotia*? are very poorly preserved, but they seem to have the dendroid growth habit characteristic of Dorlodotia, as well as indications of lonsdaleoid dissepimentaria. *Dorlodotia* is widely distributed in rocks of early Meramecian age in the West, and the presence in your area of corals that probably belong to this genus helps substantiate the Meramecian age of at least part of the Banner Formation.

Helen Duncan

August 30, 1967

Field No.	Collection	Location	Quadrangle
66NC67	22499-PC	(Coordinates, Nevada E. zone)	California Mountain
Collector		E. 400,500 ft	
R. R. Coats		N. 2,444,750 ft	

Rhomboporoid bryozoan

Cystodictya sp. indet.

Crinoid columnals

Rhipidomella sp.

Semicostella sp.

Tomiproductus? sp.

Flexaria? sp.

Anthracospirifer sp.

A separate report on this collection by Helen Duncan, dated February 9, 1967 (see below), added Fenestella, Penniretepora, Polypora, and possibly Dichotrypa to the two bryozoans noted above. There is not much to go on, but I believe that the identification of Semicostella is firm enough (although other avoniids resemble it) to suggest a Late Mississippian age. Tomiproductus is doubtfully identified, but this sort of productoid is more typically Early Mississippian. However, the two forms might conceivably be found together in rocks of early Meramecian age. This assemblage indicates to me that the containing rock is pre-Chesterian (Mississippian), and as an educated guess, I feel that a possible Meramecian (Late Mississippian) age is reasonable.

Mackenzie Gordon, Jr.

March 6, 1967

Bryozoan material is abundant in some of the slabs submitted to me, but the fossils occur as sand-size debris. Cystodictya, Fenestella, Penniretepora, and Polypora are present. Fenestella is by far the most abundant identifiable genus. The debris derived from rhomboporoids and trepostomes is not generically determinable. A scrap of a bilamellar fistuliporoid suggests Dichotrypa. The genera identified are known to be common in the Western Mississippian; the absence of anything particularly diagnostic of Pennsylvanian and Permian bryozoan faunules supports a Mississippian age assignment, but the evidence is not good enough to indicate just what part of the System is represented. The brachiopods in the rock should prove more useful for dating than the bryozoan debris. The part of the collection submitted to me has been discarded.

Helen Duncan

February 9, 1967

Field No.	Collection	Location	Quadrangle
70CS337	24780-PC	(coordinates, Nevada E. zone)	California Mountain
Collector		E. 401,160 ft,	
L. D. Cress		N. 2,444,600 ft	

East side of Independence Mountains, approx 2 mi NW of Evans Ranch.

Michelinia? sp.

Fenestella sp.

Fenestrate bryozoan indet.

Cystodictya sp. A

sp. B

Cleiothyridina sp. (fragment)

Crinoid columnal?

Crurithyris sp.

Cystodictya sp. A

sp. B

Fenestella sp.

Fenestrate bryozoan, indet.

Heterolosia sp.

Limipecten? sp. indet.

Michelina ? sp.

Neilsonia sp. (identified by Ellis Yochelson)

Orthotetoid, gen. and sp. indet. (2 fragments)

Productoid, gen. and sp. indet.

Reticulariina? sp. indet.

Rugosochonetes sp.

Semicostella sp.

This collection is Late Mississippian. The material is silicified, and the collection was obtained by etching the containing rock. The two species of Cystodictya (bryozoans) are abundant and look like the same species that are abundant in the Green Ravine Formation of the northern Oquirrh Mountains, Utah (Tooker and Roberts, 1970, p. A40, table 1). The Green Ravine is early Chesterian, but the Elko County collection also contains Semicostella sp., a productoid brachiopod that resembles an undescribed species that is fairly widespread in rocks of late Meramecian age in Nevada. Because Cystodictya is a rather long-ranging genus, my inclination at present is to suggest a late Meramecian age for the Elko County collection; it certainly is Late Mississippian.

Mackenzie Gordon, Jr.

April 24, 1972

Field No.	Collection	Location	Quadrangle
70CS339		(Coordinates, Nevada E. zone)	California Mountain
Collector		E. 401,000 ft,	
L. D. Cress		N. 2,445,100 ft	

This very small sample etched well in acid. I recovered several isolated crinoid-stem segments, one Composita brachiopod (juvenile), and half a dozen partially silicified pleurotomariacean gastropods. My inclination is to suggest that this gastropod is most characteristic of the Late Mississippian, although I may be misled by the features imposed by silicification. More material is needed.

E. L. Yochelson

June 23, 1971

Schoonover Formation

Field No.	Collection	Location	Quadrangle
66NC5	22756-PC	(Coordinates, Nevada E. zone)	Wild Horse
Collector		E. 377,700 ft	
R. R. Coats		N. 2,532,300 ft	

Near the top of the Schoonover Formation; sample weight, 1,041 g, insoluble residue, 400 g.

Bar fragments, probably *Hindeodella* sp.	5
Spathognathodus sp.	4
Gnathodus girtyi Hass	2
Neoprioniodus sp.	1
Cavusgnathus sp.	2
fragments	4

Cavusgnathus is of a type that is not known in rocks older than the shale of Church Grove (above the limestone of Kirkland) in the uppermost Chesterian of the type region. *G. girtyi* occurs in the Bird Spring Formation, which was correlated by Dunn (1965, p. 1145) with the Church Grove, and also occurs in the Barnett Shale of Texas (Hass, 1953), but the age of these two formations is questionable. *G. girtyi* ranges from Middle to Late Mississippian in Germany. A Late Mississippian age is indicated, and a latest Mississippian age is suggested.

J. W. Huddle

January 24, 1967

Bryozoan debris is scarce in the slabs submitted to me. All particles are too small for the certain identification of genera. Trepostome and rhomboporoid forms are more common than other types. Fenestellids are virtually absent. One fragment suggestive of Cystodictya was seen. The bryozoan material provides no good evidence for precise dating of the unit collected, but nothing I saw would be out of place in the Mississippian. Fortunately, J. W. Huddle found Late Mississippian conodonts in the part of the sample he examined. I have discarded the material I studied.

Helen Duncan

February 9, 1967

Field No.	Collection	Location	Quadrangle
66NC68	22498-PC	(Coordinates, Nevada E. zone)	Bull Run
Collectors		E. 368,700 ft,	
R. R. Coats		N. 2,462,250 ft	
K. B. Ketner			

North side of Schoonover Creek, 0.3 mi above crossing of Jack Creek Road.

Auloporoid coral

Michelinia sp.

Penniretepora sp.

bifoliate ramose bryozoan

Cystodictya sp.

Neochonetes sp.

Inflatia cf. *I. bilobata* Sadlick

Anthracospirifer aff. *A. leidyi* (Norwood and Pratten)

Punctospirifer? sp.

Hustedia sp. indet.

Cleiothyridina sp.

Neilsonia? sp.

Glyptotomaria (*Dictyotomaria*)? sp.

Meekospira sp.

Aclisina sp.

Anomphalus sp.

Pronoritid? sp. indet.

Rocks of two different types were included in this collection. Three pieces were of indurated siltstone showing some siliceous and ferruginous lined cavities and indeterminate blobs resembling fossils but not demonstrably organic. The other two pieces were of dark-gray partly crinoidal limestone containing small silicified fossils; these two pieces were etched and provided the fossils listed above.

The age of the collection, based largely on the productoid Inflatia, is believed to be Late Mississippian (Chesterian). This productoid is closest to a species considered to be typical of the lower and middle Chesterian in the Great Basin. Most of the other forms listed are rather long ranging.

Mackenzie Gordon, Jr.

March 6, 1967

Supplement

Conodont fragments and fish tooth	
Gnathodus bilineatus (Roundy)	5
girtyi Hass	2
inornatus Hass	1
Spathognathodus sp.	1

This fauna is probably Late Mississippian Chesterian, as suggested by the other fossils reported by Mackenzie Gordon, Jr. It could be as old as the St. Genevieve Limestone, but it is probably younger.

J. W. Huddle

March 27, 1967

Mississippian and Pennsylvanian Systems

Chainman and Diamond Peak Formations, undivided

Field No.	Collection	Location	Quadrangle
62NC306		(Coordinates, Nevada E. zone)	Rowland
Collector		E. 454,650 ft	
K. A. Howard		N. 2,549,700 ft	

Spines, perhaps of brachiopods

Torynifer sp.

The only recognizable fossil in this collection is an external mold in fine sandy siltstone of a rather shallow pedicle valve of a brachiopod, 38 mm wide and 30 mm high, with a narrow shallow sulcus and bearing concentric spine fringes. It is too large and gently convex to represent the Pennsylvanian and Permian forms of this group of *Squamularia*-like spiriferoids and belongs, I think, to *Torynifer*, a genus restricted to rocks of Mississippian age. As an educated guess, I would say that this collection belongs in the Diamond Peak Formation, or whatever you call its equivalent in that area.

Mackenzie Gordon, Jr.

June 19, 1964

Field No.	Collection	Location	Quadrangle
62NC348	21589-PC	(Coordinates, Nevada E. zone)	Mountain City
Collector		E. 441,900 ft,	
K. A. Howard		N. 2,598,600 ft	

stenoporoid bryozoan

Cystodictya sp. indet.

bryozoan indet.

Chonetes sp. indet.

Inflatia aff. *I. bilobata* Sadlick

Echinoconchus? cf. *E.*? *biseriatus* (Hall)

Ovatia? sp. indet.

Spirifer cf. *S. brazerianus* Girty

Reticulariina sp.

Torynifer aff. *T. pseudolineatus* (Hall)

Composita? sp. indet.

Phestia? sp. indet.

Sphenotus? sp. indet.

goniatite imprints cf. *Goniatites granosus* Portlock

This collection is Late Mississippian (Chesterian). The presence of *Inflatia*, *Spirifer*, and *Torynifer* indicates a Mississippian rather than Pennsylvanian age. The *Reticulariina* indicates a Chesterian, rather than Meramecian age, although the genus ranges higher than the Mississippian. The imprints of a moderate-size lirate goniatite and the spacing of the lirae suggests the species *Goniatites granosus* Portlock. For the purposes of the Mississippian paleotectonic map, we are taking the base of the *G. granosus*

zone as the base of the Chesterian Series in sections where the goniatites are present. Similar mold assemblages containing fragments of goniatites of the G. granosus zone occur in the Diamond Peak Formation at its type locality. Although these assemblages have not been found in measured sections, they were provisionally assigned by Brew (1961) to unit D of his section of the Diamond Peak Formation at Diamond Peak. This collection is in a lithology very reminiscent of the Diamond Peak Formation, though a little more altered than in the type section.

Mackenzie Gordon, Jr.

June 8, 1964

Field No.	Collection	Location	Quadrangle
62NC360	21590-PC	(coordinates, Nevada E. zone)	Mountain City
Collector		E. 434,700 ft,	
K. A. Howard		N. 2,596,000 ft	

Chonetes? sp. indet.

Cystodictya sp. indet.

horn coral

Neoglyphioceras? sp. indet.

pectenoid pelecypod, indet.

This collection contains fewer species, most of them more fragmental than in colln. 21589-PC. Nevertheless, the squeezed fragment of what appears to be a rather widely umbilicate coarsely lirate goniatite suggests the genus *Neoglyphioceras*, which is restricted to the *Goniatites granosus* zone. I would tentatively refer this collection to that zone and consider it roughly equivalent in stratigraphic position to colln. 21589-PC.

Mackenzie Gordon, Jr.

June 8, 1964

Field No.	Collection	Location	Quadrangle
62NC361	21591-PC	(Coordinates, Nevada E. zone)	Mountain City
Collector		E. 434,800 ft	
K. A. Howard		N. 2,597,000 ft	

Crinoid columnals

Inflatia aff. *I. bilobata* Sadlick

Reticulariina sp. (fragment)

Spiriferoid, indet. (fragment)

The two brachiopods that are identifiable as to genus in this collection appear to be species that occur also in colln. 21589-PC. Although the collection is skimpy and poorly preserved, it seems reasonable that it represents about the same stratigraphic zone as collns. 21589-PC and 21590-PC.

Mackenzie Gordon, Jr.

June 8, 1964

Field No.	Collection	Location	Quadrangle
69NC19	---	(Coordinates, Nevada E. zone)	Tuscarora
Collector		E. 384,400 feet	
R. R. Coats		N. 2,383,000 ft	

Ozarkodina sp.

This tuxon could be Ordovician since the genus ranges from Ordovician to Triassic.

J. W. Huddle

October 15, 1970

Pennsylvanian System

Ely Limestone

Field No.	Collection	Location	Quadrangle
D30	24720-PC	(Coordinates, Nevada E. zone)	Elko 2°
Collector		E. 821,000 ft;	
R. A. Hope		N. 1,961,500 ft	

This report refers to a specimen of a hydrozoan from the Ely Limestone at a locality on the west slope of a ridge in the W 1/3 T. 26 N., R. 67 E. (northwest corner of last "0" in "7000", Elko AMS Sheet NK-11-12).

Chaetetes sp.

The specimen consists of a partly silicified fragment of a colony of a species of Chaetetes, which has been placed in various biologic groups, the latest of which is the class Hydrozoa of the phylum Coelenterata. Chaetetes is particularly common in rocks of Pennsylvanian age, although its known geologic range is Devonian to Permian. The absence of any comprehensive study of the genus in North America makes it difficult to assign a specimen of unknown age to some species that has unique stratigraphic significance. Your specimen does not appear to belong to C. milleporaceus M-E and H, the common Desmoinesian species.

In summary, your Chaetetes suggests, but does not require, a Pennsylvanian age. It does not permit me to determine whether the containing beds are Middle or Upper Pennsylvanian.

W. J. Sando

January 13, 1972

Van Duzer Limestone

Field No.	Collection	Location	Quadrangle
71NC194	24864-PC	(Coordinates, Nevada E. zone)	Wild Horse
Collector		E. 386,700 ft,	
R. R. Coats		N. 2,535,400 ft	

Grayish-black partially silicified limestone. Etched residue.

Horn coral indet.

Fenestella sp.

Polypora sp.

Rhomboporoid bryozoans

Bryozoan, gen. and sp. indet.

Cancrinella? sp.

Terebratuloid, gen. and sp. indet.

This faunule is rather unusual. The small linoproductoid indicates a post-Devonian age. It might be a Cancrinella but could be a small Ovatia. It looks somewhat like the Cancrinella? in your field No. 71NC76, reported to have come from the Sunflower. The terebratuloid is difficult to place in any genus. It has a fairly long loop but aside from that is somewhat like Beecheria. I can't date it any closer than Carboniferous or Permian at present.

Mackenzie Gordon, Jr.

July 18, 1972

This is a restudy of the collection reported on by Mackenzie Gordon, Jr., dated July 18, 1972.

The fauna consists of:

Several bryozoa

A horn coral

Cryptacanthia sp.

Cancrinella?

Petasmetherus?

Cryptacanthia, a terebratuloid, is well preserved, and the visibility of several of its internal features makes this identification accurate. *Cryptacanthia* ranges from Middle Pennsylvanian to Lower Permian. *Cancrinella*? belongs to a group of brachiopods nearly identical to *Cancrinella*; it is impossible to differentiate it with one specimen. All members of the *Cancrinella* group range from Pennsylvanian through Permian. *Petasmetherus*?, a rhynchonellid, is poorly preserved. The fauna is silicified and our collection is small. I think this locality should be recollected in bulk. The age could be better pinpointed in the Middle Pennsylvanian-to-Early Permian timespan.

B. R. Wardlaw

December 17, 1975

Field No.	Collection	Location	Quadrangle
74NC78	2647-P	(Coordinates, Nevada E. zone)	Wild Horse

Collectors

Elizabeth Coats

R. R. Coats

E. 386,700 ft,

N. 2,535,400 ft

Re-collection of limestone included in the Van Duzer Limestone. 1635 g of limestone were processed for conodonts and yielded:

4 blade and bar fragments

2 p elements of Neognathodus sp.

Neognathodus ranges from the base of the Morrowan through the Desmoinesian. Brachiopods previously identified by Mackenzie Gordon Jr., and B. R. Wardlaw (field No. 71NC194) indicate an age range of Desmoinesian to Early Permian. The ranges of the two faunal components overlap in the Desmoinesian. The age of the collection is probably Desmoinesian.

The color-alteration index of 5 indicates that the host rock reached 300oC.

A. G. Epstein

February 2, 1976

Mitchell Creek Formation

Field No.	Collection	Location	Quadrangle
61NC78	24603-PC	(Coordinates, Nevada E. zone)	Owyhee 15 -minute
Collector		E. 352,300 ft,	
R. R. Coats		N. 2,567,000 ft	

bar fragments

Cavusgnathus convexus? Rexroad	2
Gnathodus texanus? Roundy	2

This collection is not well enough preserved, nor abundant enough, to be certain of the identifications. The age is probably Late Mississippian. Conodonts are scarce, only four in 6.5 kg of limestone.

J. W. Huddle

October 29, 1971

Field No.	Collection	Location	Quadrangle
62NC63	21592-PC	(Coordinates, Nevada E. zone)	Owyhee 15'
Collector		E. 342,700 ft,	
R. R. Coats		N. 2,563,500 ft	

Same locality and horizon as field No. 61NC94.

bryozoan fragments

crinoid columnals

brachiopod fragments

lirate goniatite, gen. and sp. indet.

The first three items, very poorly preserved, are in a very finely micaceous sediment that originally appears to have been a calcareous shale. The fragment with the goniatite differs slightly: it is medium gray, fine grained, and less micaceous than the other fragments. The goniatite is subspherical, moderately involute, and bears approximately 50 longitudinal lirae on the flanks and venter between the umbilical shoulders. Grinding and application of acid has failed to develop a suture. It is not Goniatites granosus Portlock nor any of the species of that zone known to me, although this determination does not preclude its belonging there. In the absence of sutures, I cannot say whether a Mississippian or Pennsylvanian species is represented. I know of no pre-Chesterian goniatites of this type.

Mackenzie Gordon, Jr.

June 8, 1964

Field No.	Collection	Location	Quadrangle
64G24	22812-PC	(Coordinates, Nevada E. zone)	Owyhee 15' -minute
Collectors		E. 342,700 ft, N. 2,563,500 ft	
R. R. Coats, Don Dean, Mackenzie Gordon, Jr.,			

North slope of Mitchell Creek, approx 100 ft above valley floor at a point 1.25 mi up Mitchell Creek from Winters Creek Road fork (which is 0.5 mi up Winters Creek from White Rock Road), approx 0.75 mi. W. of Humboldt National Forest boundary.

Adetognathodus sp.	3
Bars and blades	
Gnathodus cf. *G. pawhuskaensis* (Harris and Hollingsworth)	1
Idiognathodus sp.	1

This collection is Pennsylvanian, probably Early Pennsylvanian.

J. W. Huddle

April 19, 1968

Field No.	Collection No.	Location	Quadrangle
64G22		(Coordinates, Nevada E. zone)	Owyhee 15'
Collectors		E. 366,200 ft N. 2,576,000 ft	

R. R. Coats,

Don Dean

Mackenzie Gordon, Jr.

Jeep road on west side of Fawn Creek, approx 100 yd below fork and 25 to 30 ft above creek at large ponded area behind ancient beaver dam, near ctr. NE1/4 sec. 1 (unsurveyed), T. 45 N., R. 52 E.

Gondolella sp.	1
Streptognathodus? sp.	1

This sample is thought to be the same as field No. 62NC200, which I reported on in 1963 (loc. SW-63-26) as "probably Middle Silurian to Upper Devonian." This guess was made on the basis of a species of Polygnathus and some of the bar conodonts present. Gnathodus is also present, and so the age must be Mississippian or younger. Gondolella ranges from Early Pennsylvanian through Triassic. The sample is probably Pennsylvanian.

J. W. Huddle

April 19, 1968

Pennsylvanian and Permian Systems

Strathearn Formation

(includes the Sunflower Formation of Coash, 1967)

Field No.	Collection	Location	Quadrangle
	17660-PC		
57NC45	(f21735)	(Coordinates, Nevada E. zone)	Owyhee 15'
Collector		E. 362,600 ft,	
R. R. Coats		N. 2,570,000 ft	

?*Fusulinella* sp.

All fusulinids in this sample are fragmentary and show abrasion and probable reworking. They are not too different from the forms in colln. f21733 and may have been deposited originally at about the same time.

R. C. Douglass

The prepared material of this collection contains one specimen of *Idiognathodus*. Many collections from the upper Middle Pennsylvanian (Desmoinesian) commonly contain numerous specimens of *Idiognathodus*; specimens of this genus are also common in the lower Upper Pennsylvanian. In the upper Upper Pennsylvanian, *Idiognathodus* is rarely found and presumably does not range into the Permian. However, at the present time, little is known concerning Permian conodonts and in the case of colln. 57NC45, on the basis of one conodont, I should hesitate to state positively that this collection is from Pennsylvanian rocks.

W. H. Hass

July 2, 1958

Field No.	Collection	Location	Quadrangle
60NC14	f24360	(Coordinates, Nevada E. zone)	Marys River Basin NW
Collector		E. 524,150 ft	
R. R. Coats		N. 2,543,900 ft	

Brachiopods

Coral *Caninia* sp.

Large crinoid columnals

Large *Triticites*

Textularid

Early Permian (?).

R. C. Douglass

W. J. Sando

August 6, 1971

Field No.	Collection	Location	Quadrangle
60NC19	f24361	(Coordinates, Nevada E. zone)	Marys River Basin NW.
Collector		E. 523,200 ft,	
R. R. Coats		N. 2,545,100 ft	

bryozoan

brachiopod

rare fusulinids

Late Pennsylvanian.

R. C. Douglass

August 6, 1971

Field No.	Collection	Location	Quadrangle
62NC5	24600-PC	(Coordinates, Nevada E. zone)	Rowland
Collector		E. 458,600 ft	
R. R. Coats		N. 2,549,300 ft	

Adetognathus? sp.	1
Gondolella bella? Stauffer and Plummer	1
Streptognathodus elegantulus Stauffer and Plummer	1

This collection is unquestionably Pennsylvanian and, I think, Missourian. More material is necessary to confirm the identifications.

J. W. Huddle

October 29, 1971

Field No.	Collection	Location	Quadrangle
62NC6		(coordinates, Nevada E. zone)	Wild Horse
Collector		E. 451,750 ft,	
R. R. Coats		N. 2,545,900 ft	

Loc. 362, collected from a boulder in conglomerate.

The sample contains small poorly preserved fusulinids of Middle Pennsylvanian age, most likely assignable to the genus Fusulinella.

R. C. Douglass

December 2, 1964

Field No.	Collection	Location	Quadrangle
62NC8	24601-PC	(Coordinates, Nevada E. zone)	Mountain City
Collector		E. 447,300 ft	
R. R. Coats		N. 2,549,300 ft	

Prominent outcrop at top of steep slope facing Chicken Creek.

Gondolella denuda Ellison	1
Hindeodella sp.	1
Prioniodina sp.	1
Synprioniodina sp.	1
Fragments	6

This collection is Pennsylvanian, as indicated by *G. denuda*, which ranges from lower Missourian to middle Virgilian. A larger collection would make this age determination more certain.

J. W. Huddle

October 29, 1971

Field No.	Collection	Location	Quadrangle
62NC308	21596-PC	(Coordinates, Nevada E. zone)	Mountain City
Collector		E. 446,800 ft,	
K. A. Howard		N. 2,551,700 ft	

Crurithyris sp.

Cypricardella? sp.

Schizodus? sp.

This fauna is too meager and too poorly preserved to identify. Moderately large crurithyrids of this type are fairly common in the Great Basin in rocks of Late Pennsylvanian to middle Permian age. The *Cypricardella*?, represented by two internal molds with some adhering shell, is a rather distinctive species that might be useful in assigning this collection stratigraphically, once we know where it belongs in the section.

Mackenzie Gordon, Jr.

June 19, 1964

Field No.	Collection	Location	Quadrangle
62NC309	21597-PC	(Coordinates, Nevada E. zone)	Mountain City
Collector		E. 454,000 ft	
K. A. Howard		N. 2,550,800 ft	

Sunflower Formation of Coash (1967).

Choristites? sp.

Reticulatia? sp. indet.

This collection is small and poorly preserved but contains large spiriferoid and productoid brachiopods in a limestone matrix. The spiriferoid appears to be the same as the one we have collected from the Antler Peak Limestone at its type locality, and the presence of large semireticulate productoids is also typical of beds of Late Pennsylvanian (Virgilian) to Early Permian (Wolfcampian) age throughout the Great Basin. If this is Coash's (1967) Sunflower Formation, it is a local name for the Antler Peak Limestone, and should be underlain by a thick conglomerate of Pennsylvanian age, the Battle Conglomerate, and overlain by the Edna Mountain Formation, the typical fossils and lithology of which have been sent in several of your collections.

Mackenzie Gordon, Jr.

June 19, 1964

Field No.	Collection	Location	Quadrangle
62NC310	21598-PC	(Coordinates, Nevada E. zone)	Mountain City
Collector		E. 450,300 ft,	
K. A. Howard		N. 2,550,400 ft	

Sunflower Formation of Coach (1967).

Kochiproductus? sp. indet. (fragment)

Orthotoechia sp. indet.

Spiriferella? sp. (fragment)

This collection is in the same rock type as field No. 62NC309. The large fragment of a productoid with crude buxtoniid sculpture, which suggests the genus *Kochiproductus*, is much too meager and poorly preserved to give an age assignment that would stand alone. I merely state that its composition and lithology are compatible with an Antler Peak assignment.

Mackenzie Gordon, Jr.

June 19, 1964

Field No.	Collection	Location	Quadrangle
79NC56	2742-PC	(Coordinates,	Osino
	f-14198	Nevada E. zone)	
Collector		E. 485,940 ft	
R. R. Coats		N. 2,246,550 ft	

Medium gray laminated limestone, blocky jointing.

Byrozoans are diversified and abundantly present in this collection, but relatively poorly preserved. The bryozoan colonies are comminuted, and their skeletal material is commonly replaced. The following bryozoans are identified from 22 thin sections, most of which contain several fragments of these taxa.

Fenestelloids. These zooarial fragments appear to be from acanthocladid and polyporid specimens.

Fistuliporoids. Possible new genus; These specimens resemble an undescribed Cyclotrypa? sp. that apparently occurs in the "Coal Measures" of Kansas, as reported in the older literature.

Rhabdomeson? sp.

Rhombopora sp. These specimens resemble R. lepidodendroides Meek a typical taxon of Pennsylvanian age, but could belong to another species.

Rhombotrypella sp. Possible new species; this genus is known only from strata of Pennsylvanian and Permian age. It has been described as Rhomboporella by some paleontologists. Rhomboporella is considered now to be a junior synonym of Rhombotrypella.

On the basis of the presence of Rhombotrypella and the morphologic appearances of specimens referred to Rhombopora sp. and fistuliporoids, these strata may be Pennsylvanian. Confirmation of this age assignment by other invertebrates is desirable because of the incompleteness of the bryozoan colonies.

Several thin sections contained fusulinids; the remainder of the collection is being forwarded for further determination.

O. L. Karklins

December 3, 1979

This sample is dominantly composed of bryozoan fragments but includes rare crushed fusulinids. Triticites sp. is represented and suggests a Late Pennsylvanian (Virgilian) age.

R. C. Douglass

April 29, 1980

Field No.	Collection	Location	Quadrangle
64G23	22811-PC	(Coordinates, Nevada E. zone)	Owyhee 15'
Collectors		E. 360,650 ft, N. 2,570,150 ft	

R. R. Coats, and

Don Dean

Mackenzie Gordon, Jr.

On knoll (not shown on topo graphic map sheet) with approx 6,800 ft summit, on south slope of west branch of Fawn Creek, NE1/4SW1/4 sec. 1 (unsurveyed), T. 45 N., R. 52 E. Fossils collected throughout about 20 to 25 ft of somewhat altered crinoidal limestone containing chert and other pebbles. Field assignment: Sunflower(?) Formation of Coash (1967)

Ascopora? sp.

Caninia? sp.

Fistuliporoid bryozoans with bilamellar fronds, some fragments show evidence of multifoliate zoaria

Leioclemoid bryozoan

Rhombotrypella sp.

Rhombotrypella is abundant and indicates a Pennsylvanian or Permian age. All the fossils occur as clastic particles in a conglomeratic rock,and so none are particularly well preserved. This assemblage is certainly one that could occur in the Sunflower Formation, but at this point the material I studied cannot be used to differentiate Pennsylvanian from Permian beds.

Helen Duncan

August 30, 1967

Field No.	Collection	Location	Quadrangle
64G28	22817-PC	(Coordinates,	Mountain City
	(f23845)	Nevada E. zone)	
Collectors		E. 447,200 ft	
		N. 2,554,100 ft	

R. R. Coats,

Don Dean

Mackenzie Gordon, Jr.

Formation of Coash (1967) on slope at east edge of hayfield and Sunflower Flat, 400 ft E. of Chicken Creek, 950 ft N., 2, 150 ft E. of SW. cor. SE1/4 SW1/4 sec. 28, T. 45 N., R. 55 E. Zone of gray limestone, approx 50 ft thick, north of sandstone; Sunflower collected September 1, 1964.

This sample contains:

Pseudofusulinella sp.

Triticites sp.

This fauna represents a Late Pennsylvanian age and resembles that in field No. 59NC56 (colln. f21734) reported on July 14, 1960.

R. C. Douglass

August 3, 1967

Fistuliporoid bryozoan, bilamellar fronds

Rhombotrypella sp.

The fusulines date this collection as Late Pennsylvanian, and the bryozoans are forms that are likely to occur in rocks of this age.

Helen Duncan

August 30, 1967

Slope at east edge of hayfield and Sunflower Flat, 400 ft E. of Chicken Creek, SW1/4SW1/4 sec. 28, T. 45 N., R. 55 E., gray limestone north of sandstone, Sunflower Formation of Coash (1967).

bar conodonts, some well preserved

Bryantodina sp. 1

Gnathodus pawhuskaensis (Harris and Hollingsworth) 2

This collection is probably Early Pennsylvanian but may be Middle Pennsylvanian.

J. W. Huddle

April 19, 1968

Field No.	Collection	Location	Quadrangle
64G28A	22818-PC	(Coordinates, Nevada E. zone)	Mountain City
Collectors		E. 447,200 ft, N. 2,553,900 ft	

R. R. Coats,

Don Dean

Mackenzie Gordon, Jr.

Same locality as colln. 22817-PC but 150 to 200 ft S., on other side of sandstone-crinoidal rock from base of slope. Colonial corals approx 100 ft upslope. Field assignment: Sunflower Formation of Coash (1967).

Bayhaium vallum? Hoare

Fistuliporoid bryozoans, bilamellar fronds

Rhombotrypella sp.

Hoare (1966) has described a species of *Bayhaium* from the Sunflower Formation. The specimens in this collection probably belong to *B. vallum*, although the growth habit of the coralla seems to differ somewhat. The bryozoans are the same kinds that occur in other collections from the Sunflower and probable Sunflower.

Helen Duncan

August 30, 1967

Field No.	Collection	Location	Quadrangle
64G29	22819-PC	(Coordinates, Nevada E. zone)	Mountain City
Collectors		E. 447,100 ft N. 2,552,500 ft	

R. R. Coats, ~~and~~

Don Dean

Mackenzie Gordon, Jr.

Outcrop of blue-gray limestone on north-south-trending nose nearly 1,500 ft S. of loc 22818, NE1/4 NW1/4 sec. 33, T. 45 N., R. 55 E. Collection from 1-ft -thick Acaciapora-like coral bed and 3 ft above containing some silicified brachiopods. Field assignment; Sunflower Formation of Coarsh (1967).

Acaciapora cf. A. duncanae Hoare

Bryozoan debris, indet.

Cladochonus? sp.

Fistuliporoid bryozoan, bilamellar fronds

Rhombotrypella sp.

Hoare (1966) has described Acaciapora duncanae and a species of Cladochonus from the Sunflower Formation. The bryozoans resemble those that occur in other lots from the Sunflower.

Helen Duncan

August 30, 1967

Field No.	Collection	Location	Quadrangle
64NC165	23781-PC	(Coordinates, Nevada E. zone)	Mountain City
Collector		E. 446,820 ft	
R. R. Coats		N. 2,551,700 ft	

Sta. 977. Float nearly in place, 50 ft E. of fence corner and on top of low ridge. Sunflower(?) Formation.

Astartella sp.

Cleiothyridina? sp. indet. (fragment)

Crurithyris n. sp.

Edmondia sp.

Gastropod, indet.

Nuculopsis sp.

Paleoniscid fish scale, gen. and sp. indet.

Pleurotomariacean gastropod, gen. and sp. indet.

Rhynchonelloid, gen. and sp. indet.

Sponge spicules

The preponderance of the brachiopod identified as *Crurithyris* n. sp. is highly reminiscent of beds in the upper part of the Antler Peak Limestone at Antler Peak, and, therefore, this sample probably belongs with the Sunflower Formation of Coash (1967).

Mackenzie Gordon, Jr.

April 25, 1969

Field No.	Collection	Location	Quadrangle
70NC12	24512-PC	(coordinates,	Santa Renia Fields
	(f24346)	Nevada E. zone)	
Collectors		E. 304,950 ft,	
R. R. Coats		N. 2,308,750 ft	
L. D. Cress			

This sample consisted of two bags of material. The first bag was nearly barren, but I recognized the smaller foram Tetrataxis sp. The second bag contained an abundant fauna of fusulinids and other foraminifers, including:

Bradyina? sp.

Pseudofusulinella?

Textularids

Triticites sp.

This fauna is Late Pennsylvanian, age equivalent to the Strathearn Formation of the Carlin area.

R. C. Douglass

June 23, 1971

This collection also contained fusulinids that gave a Late Pennsylvanian age, equivalent to the Strathearn Formation of the Carlin area. The present fossils are included for completeness but by themselves are in sufficient to date the collections.

Composita sp.

Foraminifera (reported on by Douglass as colln. f24346)

Pelecypod gen. and sp. indet.

Stenoporoid bryozoan, massive to ramose

Mackenzie Gordon, Jr.

April 26, 1972

Field No.	Collection No.	Location	Quadrangle
71NC76	---	(Coordinates, Nevada E. zone)	Mount Velma
Collector		E. 491,700 ft,	
R. R. Coats		N. 2,495,900 ft	

This was a small sample; about 400 g.

Bar fragment	1
Spathognathodus minutus (Ellison)	1

S. minutus ranges through the Pennsylvanian and Permian.

J. W. Huddle

October 27, 1971

Field No.	Collection	Location	Quadrangle
71NC78	24867-PC	(Coordinates, Nevada E. zone)	Mount Velma
Collector		E. 489,200 ft	
R. R. Coats		N. 2,502,500 ft	

This report concerns two bryozoan collections from the upper Paleozoic strata in Nevada. Most bryozoan species in this faunule are undescribed and appear to be new; one genus may also be new. The presence of new taxa makes an age determination somewhat tentative for lack of a reliable reference material. The general morphologic appearance of these species seems to suggest a Pennsylvanian (probably Late Pennsylvanian) and Permian age for these strata. It is of interest to note the presence of several genera (Ascopora, Nikiforopora?, Rhombotrypella and Streblascopora) that are commonly associated with the Carboniferous and Permian of the U.S.S.R. or the countries of the Far East. The species content differs somewhat in the two collections. Colln. 24868-PC contains Rhombotrypella sp. and Streblascopora sp., which may or may not be present in colln. 24867-PC. Colln. 24867 appears to contain Rhombotrypella sp., which seems to be absent in colln. 24868. Both collections appear to be lithologically similar.

SW1/4NE1/4NW1/4 sec. 14, T. 43 N., R. 56 E.

Ascopora? sp.

McKinney (1972, p. 9, 11) discussed briefly the distribution of this genus. The stratigraphic range appears to be Mississippian to Permian.

Fenestellids, a few indeterminate fragments.

Meekopora sp.

Probable new species. This is a common but poorly described genus from Upper Paleozoic strata.

Nikiforopora? sp. 1

This fragment resemble a stenoporoid genus that Dunaeva (1964) reported from Lower Carboniferous strata in the Donets basin, U.S.S.R. McKinney (1972, p. 37) reported a somewhat similar form from the Bangor Limestone and questionably assigned it to Nikiforopora. The identification of the single fragment in this collection is also questionable until additional material becomes available for further study.

Rhombotrypella? sp.

See colln. 24868-PC for remarks. (Listed under Carlin sequence)

Rhombotrypella sp. 9

The stratigraphic range of this genus appears to be Pennsylvanian to Permian (Boardman, and McKinney 1976, 37).

Stenoporid genus

Fritz (1942) described a somewhat similar form from the Mississippian of British Columbia, and an undescribed species occurs in the Earp Formation of Arizona. The latter seem to be more like the specimens in this collection than the one described by Fritz. These forms appear to belong to a new genus. The presence of a similar species in the Earp Formation may suggest a Late Pennsylvanian or Early Permian age for these strata.

Streblascopora? sp. 1

Indeterminate; see colln. 24868-PC for further comments.

Tabuliporid fragments, indet.

O. L. Karklins

October 3, 1972

A 164

A24

Field No.	Collection	Location	Quadrangle
72CR49	25001-PC	(Coordinates, Nevada E. zone)	Mount Velma
Collector		E. 465,400 ft,	
L. D. Cress		N. 2,531,700 ft	

Sunflower Formation. o Coash (1967)

Adetognathus sp.	1
Streptognathodus sp.	1
bar fragments	4

These genera range through the Pennsylvanian and into the Permian.

J. W. Huddle

January 16, 1973

Carlin sequence of Roberts and Thomasson (1964) (amended)

Field No.	Collection	Location	Quadrangle
D-15	f24172	(coordinates, Nevada E. zone)	Wine Cup Ranch
Collector		E. 746,550 ft,	
R. A. Hope		N. 2,457,500 ft	

The following is a report on a collection from the Knoll Mountains in the SW1/4 sec. 25, T. 42 N., R. 64 E.

You may be interested in a report on several collections from the same area that were submitted by R. J. Roberts. My report, dated June 7, 1966, shows that rocks of Missourian (Late Pennsylvanian) through Wolfcampian (Early Permian) age were found in that area.

About 1.3 mi northeast of hill 6957, in strata just a few feet above the contact with the Chainman Shale. Coarse crinoidal limestone with scattered fusulinids, bryozoans, corals, etc.

Schwagerina sp. Late Wolfcampian to possible early Leonardian age.

This sample is similar to but not the same as, colln. f23423 or 64F20 of R. J. Roberts.

R. C. Douglass

March 19, 1970

Field No.	Collection	Location	Quadrangle
E-1	---	(Coordinates, Nevada E. zone)	Wells Peak
Collector		E. 696,150 ft,	
R. A. Hope		N. 2,360,500 ft	

This sample contains about eight fragments of a punctate brachiopod that resembles Rhynchopora, as well as numerous unidentifiable (by me, John Pojeta, Jr., or R. W. Imlay) fragments of pectinoid clams. On the basis of the brachiopods, I think a Permian age is likely, but Pennsylvanian is not ruled out by Rhynchopora.

The clams are silicified, but the rock is too siliceous to etch in HCl.

R. E. Grant

November 10, 1971

Field No.	Collection	Location	Quadrangle
E-6	---	(Coordinates, Nevada E. zone)	Oxley Peak
Collector		E. 679,000 ft,	
R. A. Hope		N. 2,348,000 ft	

This sample contains two species of palaeotaxodont pelecypods that are characteristic of upper Paleozoic, particularly Pennsylvanian and Permian rocks--Nuculopsis sp. and Phestia sp. Both species were shallow-burrowing infaunal deposit feeders.

John Pojeta, Jr.

November 10, 1971

Field No.	Collection	Location	Quadrangle
E-7	---	(Coordinates, Nevada E. zone)	Oxley Peak
Collector		E. 678,300 ft,	
R. A. Hope		N. 2,350,400 ft	

This sample contains one aviculopectinid pelecypod, genus and species indeterminate. Pectinoid pelecypods are not known from rocks older than Late Silurian, and the specimens in this sample most nearly resemble late Paleozoic forms. Aviculopectinids were byssally attached epifaunal suspension feeders.

John Pojeta, Jr.

November 10, 1971

Field No.	Collection	Location	Quadrangle
E-12	f24344	(Coordinates, Nevada E. zone)	Melandco
Collector		E. 716,920 ft,	
R. A. Hope		N. 2,410,650 ft	

NE1/4 sec. 12, T. 40 N., R. 63 E. From rocks tentatively assigned to the Strathearn Formation as mapped by Oversby (1972).

I would agree with the identification as Early Permian. Whether it is called Strathearn or Ferguson Mountain, I guess, depends on the facies development rather than the age assignment. The fusulinid present is one of those late forms intermediate between Triticites and Pseudofusulina but more easily assignable to Triticites sp.

R. C. Douglass

May 25, 1971

Field No.	Collection	Location	Quadrangle
71F3	f24420	(coordinates, Nevada E. zone)	Hot Creek
Collector		E. 611,000 ft,	
R. A. Hope		N. 2,491,120 ft	

Upper Pennsylvanian

SE1/4NW1/4 sec. 27, T. 43 N., R. 60 E., from Pennsylvanian beds unconformably overlying western assemblage allochthonous lower Paleozoic rocks, approx 25 ft above base of silty limestone above the basal conglomerate.

This sample consists of two rock types, each of which contains Triticites sp. of Late Pennsylvanian age. One of these strongly suggests Virgilian equivalence.

R. C. Douglass

December 13, 1971

Field No.	Collection	Location	Quadrangle
71F4	f24421	(Coordinates, Nevada E. zone)	Pequop Summit SW.
Collector		E. 738,800 ft,	
R. A. Hope		N. 2,320,550 ft	

Ctr. E. line of sec. 3, T. 37 N., R. 64 E. Sandy limestone.

This sample contains small fusulinids probably assignable to Schwagerina sp. and Pseudofusulina sp., these suggest an Early Permian age.

R. C. Douglass

December 13, 1971

Field No.	Collection	Location	Quadrangle
71F8	f24425	(Coordinates, Nevada E. zone)	Wells Peak
Collector		E. 708,850 ft	
R. A. Hope		N. 2,343,600 ft	

NW1/4 sec. 14, T. 38 N., R. 14 E.

This sample contains Schwagerina sp. of probable late Wolfcampian age and an abundant fauna of Schubertella sp. Although the forms contained are not the same as those in field No. F4 or F10, the sample could be of approximately the same (Late Permian) age.

R. C. Douglass

December 13, 1971

Field No.	Collection	Location	Quadrangle
71F10	f24426	(Coordinates, Nevada E. zone)	Wells Peak
Collector		E. 719,000 ft,	
R. A. Hope		N. 2,325,300 ft	

SW1/4 sec. 31, T. 38 N., R. 15 E.

This sample has been badly compressed but contains Schwagerina sp. and possibly Monodiexodina sp., suggesting a late Wolfcampian age.

R. C. Douglass

December 13, 1971

Field No.	Collection	Location	Quadrangle
60NC9	f24358	(Coordinates, Nevada E. zone)	Wild Horse
Collector		E. 449,100 ft,	
R. R. Coats		N. 2,529,600 ft	

Calcirudite.

algae

Brachiopods

Bryozoa

crinoidal debris

Fusulinella

High energy environment--many rock fragments.

Age: Middle Pennsylvanian (Late Atokan) to early Desmoinesian favor Desmoinesian.

R. C. Douglass

W. J. Sando

August 6, 1971

Field No.	Collection	Location	Quadrangle
71CS402	f24529	(Coordinates, Nevada E. zone)	Beaver Peak
Collector		E. 314,450 ft,	
L. D. Cress		N. 2,307,175 ft	

Large Triticites sp.

Upper Pennsylvanian to Lower Permian.

R. C. Douglass

September 26, 1972

A17~~5~~7

Field No.	Collection	Location	Quadrangle
71CS403	24868-PC	(Coordinates, Nevada E. zone)	Beaver Peak
Collector		E. 314,850 ft,	
L. D. Cress		N. 2,308,000 ft	

Rhombotrypella sp.

Probable new species, different from that in colln. 24867-PC.

Streblascopora sp.

This genus has not been reported previously from the United States. Recent reports indicate that Streblascopora is common in the Carboniferous and Permian strata of Japan, Thailand, Malaysia, Australia, and the U.S.S.R. Sakagami (1970) described briefly the distribution of Streblascopora. According to Sakagami, Streblascopora ranges from approximately the Middle Carboniferous through the Permian. Specimens in this collection belong to a new species.

Acanthocladids, several indeterminate fragments.

O. L. Karklins

October 3, 1972

Field No.	Collection	Location	Quadrangle
71CS404	f24530	(Coordinates, Nevada E. zone)	Beaver Creek
Collector		E. 318,450 ft,	
L. D. Cress		N. 2,300,430 ft	

Bradyina sp.

Large *Triticites* sp.

Textularids

Upper Pennsylvanian to Lower Permian.

R. C. Douglass

Sept. 26, 1972

Field No.	Collection	Location	Quadrangle
75NC10	26124-PC	(Coordinates, Nevada E. zone)	Beaver Peak
Collector		E. 315,350 ft,	
R. R. Coats		N. 2,304,850 ft	

Limestone from apparently the highest beds apparently unconformably overlying beds that have been correlated with the Strathearn Formation.

1,614 g of limestone was processed for conodonts (155 g of rock of +20-mesh size remained undissolved). The following conodont faunule was recovered:

131 fragments and 11 complete to nearly complete elements of *Neogondolella bisselli* (Clark and Behnken)--known range: late Wolfcampian to early Leonardian

25 elements of *Neostreptognathodus elongatus* (Gunnell)--known range: Lower Permian

2 elements of *Neostreptognathodus pequopensis* Behnken--known range: late Wolfcampian to middle Leonardian

11 juvenile and adult elements of *Sweetognathus whitei* (Rhodes)--known range: late Wolfcampian

20 bar and blade fragments

The presence of *S. whitei* (Rhodes) restricts the age of this collection to late Wolfcampian.

The color alteration index of the conodonts is 1-1/2 to 2, indicating that the host rock never reached a temperature above 60°C (assuming an average geothermal gradient).

A. G. Epstein, 1976

Limestone and Dolomite

Field No.	Collection	Location	Quadrangle
B-39	f23848	(Coordinates, Nevada E. zone)	Elko 2°
Collector		E. 821,200 ft,	
R. A. Hope		N. 1,960,000 ft	

T. 26 N., R. 67 E., on 6-mi-long ridge 2 mi E. of Boone Spring Hills. about 1.5 mi N. of county line along the ridge.

Fine calcareous sandstone containing abundant fusulinids showing some abrasion and crushing.

Pseudofusulina sp. is the common form.

This sample is similar in age to colln. f23418, which was submitted by Dick Hose, from loc. H64-119 from the south end of the Kingsley Mountains. From what I have seen, I would say the Arcturus and Pequop Formations overlap in age.

R. C. Douglass

March 5, 1968

Field No.	Collection	Location	Quadrangle
D-29	f24162	(Coordinates, Nevada E. zone)	Elko 2°
Collector		E. 820,500 ft,	
R. A. Hope		N. 1,972,500 ft	

Elko AMS sheet NK 11-12. Approximately on line between T. 26 N. and T. 27 N., R. 67 E. Boone Spring Hills area, near top of low north-south-trending ridge just west of graded road that heads south from the ruins of Boone Spring Station on U.S. Highway 50 (alternate) (0.025 in. SE. of last "E" in "Antelope" on the map).

Lime mudstone containing scattered fusulinids.

Triticites sp.

This represents a Late Pennsylvanian age, older than the Riepe Spring Limestone but younger than the Ely Limestone in the Ely area.

R. C. Douglass

March 19, 1970

Field No.	Collection No.	Location	Quadrangle
D31	f24163	(Coordinates, Nevada E. zone)	Utah Peak
Collector		E. 924,650 ft,	
R. A. Hope		N. 2,016,600 ft	

Fine silty sandstone containing scattered fusulinids.

Triticites sp. or *Kansanella* sp.

?*Wedekindellina* sp. aff. *W. ultimata*

This fauna suggests a Missourian (Late Pennsylvanian) age and would be younger than the Ely Limestone in the Ely area. Steele (1960) would place this fauna in the Ferguson Springs Formation.

R. C. Douglass

March 19, 1970

Field No.	Collection	Location	Quadrangle
D32	f24164	(Coordinates, Nevada E. zone)	Utah Peak
Collector		E. 924,440 ft,	
R. A. Hope		N. 2,016,600 ft	

Fine-grained gray limestone containing scattered fusulinids.

Triticites sp. of Late Pennsylvanian age

This taxon appears to be younger than D31.

R. C. Douglass

March 19, 1970

Field No.	Collection	Location	Quadrangle
D33	f24165	(Coordinates, Nevada E. zone)	Utah Peak
Collector		E. 924,270 ft	
R. A. Hope		N. 2,016,650 ft	

Calcareous siltstone containing fusulinids.

Triticites sp., advanced form

This sample appears to be still younger than field No. D32 but of Late Pennsylvanian age, probably Virgilian equivalent.

R. C. Douglass

March 19, 1970

Field No.	Collection	Location	Quadrangle
D34	f24166	(Coordinates, Nevada E. zone)	White Horse Pass
Collector		E. 905,000 ft	
R. A. Hope		N. 2,022,850 ft	

Fine silty sandstone containing scattered fusulinids.

Kansanella sp.

Pseudofusulinella sp.

This sample is of approximately the same age as your field No. D31.

R. C. Douglass

March 19, 1970

Field No.	Collection	Location	Quadrangle
D35	f24167	(coordinates, Nevada E. zone)	White Horse Pass
Collector		E. 903,850 ft,	
R. A. Hope		N. 2,021,750 ft	

Kansanella sp.

Pseudofusulinella sp.

Approximately the same as field No. D34 but slightly better preserved.

Upper Pennsylvanian (Missourian).

R. C. Douglass

March 19, 1970

Field No.	Collection	Location	Quadrangle
D36	f24168	(Coordinates, Nevada E. zone)	White Horse Pass
Collector		E. 901,650 ft	
R. A. Hope		N. 2,019,220 ft	

Calcareous siltstone containing abundant fusulinids.

Triticites sp. of a fairly advanced form, of approximately the same age as field No. D33.

R. C. Douglass

March 19, 1970

Field No.	Collection	Location	Quadrangle
D39	f24169	(Coordinates, Nevada E. zone)	Elko 2°
Collector		E. 899,100 ft,	
R. A. Hope		N. 2,004,500 ft	

Silty limestone containing abundant fusulinids.

Triticites sp. of an advanced form, approximately equivalent to that in field No's. D33 and D36.

R. C. Douglass

March 19, 1970

Field No.	Collection	Location	Quadrangle
D40	f24170	(Coordinates, Nevada E. zone)	Elko 2°
Collector		E. 898,500 ft,	
R. A. Hope		N. 2,004,000 ft	

Calcareous siltstone containing common fusulinids.

Kansanella sp. rare

Pseudofusulinella sp. common

This fauna is approximately equivalent to that in field No's D34 and D35.

R. C. Douglass

March 19, 1970

Field No.	Collection	Location	Quadrangle
D42	f24171	(Coordinates, Nevada E. zone)	Elko 2°
Collector		E. 876,000 ft,	
R. A. Hope		N. 1,981,000 ft	

SE1/4 T. 27 N., R. 68 E., on line to R. 69 E. just south of the graded road. Calcareous siltstone containing fusulinids.

Triticites, of an advanced form of the kind found in the Riepe Spring Limestone Early Permian

R. C. Douglass

March 19, 1970

Field No.	Collection	Location	Quadrangle
F5	f24422	(Coordinates, Nevada E. zone)	Secret Valley
Collector		E. 599,500 ft,	
R. A. Hope		N. 2,207,900 ft	

SE1/4 sec. 20, T. 34 N., R. 60 E., along ridge of 7,400-ft summit ESE. of Secret Peak, northern Ruby Mountians.

This sample contains a large and very elongate Monodiexodina sp. The age suggested is late Wolfcampian (Early Permian) equivalent.

R. C. Douglass

December 13, 1971

Field No.	Collection	Location	Quadrangle
71F6	f24423	(Coordinates, Nevada E. zone)	Secret Valley
Collector		E. 599,370 ft,	
R. A. Hope		N. 2,205,600 ft	

Essentially the same area as colln. f24422, but just to the south.

Thepresence of an advanced form of Schwagerina sp. in this sample suggests a late Wolfcampian (Early Permian) age.

R. C. Douglass

December 13, 1971

Havallah and Reservation Hill Formations

Field No.	Collection	Location	Quadrangle
72NC172	---	(Coordinates, Nevada E. zone)	Burner Hills 7-1/2-min.
Collector		E. 206,000 ft,	
R. R. Coats		N. 2,446,050 ft,	

Gondollella sp., 2 fragments

These fragments look like *G. clarki* of the Early Pennsylvanian, which is probable age. The genus has a longer range, Pennsylvanian to Triassic.

J. W. Huddle

Mississippian, Pennsylvanian, and Permian Systems

Limestone, shale, chert, orthoquartzite, and quartz siltite

Field No.	Collection	Location	Quadrangle
E32	---	(coordinates Nevada E. zone)	Delaplain
Collector		E. 730,700 ft,	
R. A. Hope		N. 2,613,500 ft	

This collection E-32 contains fragments of crushed brachiopods in a black limestone matrix. These appear to be leorhynchiods of some sort, and perhaps a stenoscismatacean, although this identification could not be confirmed by serial sections. Leiorhynchus and its allies are common in dark rocks from the Devonian to the top of the Paleozoic. If the rock type resembles that of the Permian elsewhere in the study area, the brachiopods are not incompatible with such a determination, but neither do they confirm it. The sample has been turned over to J. W. Huddle to examine for conodonts, although there is no assurance now that any are present.

R. E. Grant

November 10, 1971

Field No.	Collection	Location	Quadrangle
59NC55	f21733	(coordinates, Nevada E. zone)	Marys River Basin NE.

Collectors

R. R. Coats

Amar Mukherjee

E. 569,200 ft,

N. 2,523,120 ft

?*Fusulinella* sp.

?*Wedekindellina* sp.

Neither of these forms is identified with certainty, although these taxa represent the most likely assignments. The age suggested is Middle Pennsylvanian.

R. C. Douglass

July 14, 1960

Field No.	Collection	Location	Quadrangle
59NC56	19529-PC	(Coordinates	Marys River Basin NE.
	f21734	Nevada E. zone)	
Collectors		E. 569,200 ft,	
R. R. Coats		N. 2,519,100 ft	
Amar Mukherjee			

This collection contains both fusulinids and bryozoans. R. C. Douglass reported on the fusulinids on July 14, 1960. I have identified the meager bryozoan material as:

Fistuliporoid bryozoan, gen. indet.

Polypora? sp.

Rhombotrypella sp.

The genus *Rhombotrypella* is confined to Middle and Upper Pennsylvanian and Permian rocks. The bryozoan assemblage would not be out of place in the lower Upper Pennsylvanian, an age assignment suggested by Douglass. This locality is fairly certainly not in the Banner Formation.

Helen Duncan

August 1, 1960

?*Fusulinella* sp.

Triticites sp.

The form identified with question as *Fusulinella* (?) might be assignable to *Pseudofusulinella* sp. Thompson. *Triticites* is more definitely recognized in this material, and the particular kind represented suggests the lower Upper Pennsylvanian.

R. C. Douglass

July 14, 1960

Field No.	Collection No.	Location	Quadrangle
60NC7	---	(Coordinates, Nevada E. zone)	Mount Velma
Collector		E. 526,100 ft	
R. R. Coats		N. 2,546,100 ft	

The collection contains six specimens of Taphrognathus cf. T. varians Branson and Mehl and a few unidentifiable conodont fragments. It is probably Early Mississippian because T. varians has been reported only in the Keokuk Limestone of the Mississippi Valley.

J. W. Huddle

March 14, 1963

Field No.	Collection	Location	Quadrangle
60NC13	f24359	(coordinates, Nevada E. zone)	Marys River Basin NW.
Collector		E. 526,300 ft,	
R. R. Coats		N. 2,542,500 ft	

Micrite.

Beedeina

Bryozoans

Fusulinella

Gastropods

Textularid

Age: Desmoines (Middle Pennsylvanian).

R. C. Douglass

August 6, 1971

Field No.	Collection	Location	Quadrangle
62NC301	24602-PC	(Coordinates, Nevada E. zone)	Wild Horse
Collector		E. 450,800 ft,	
K. A. Howard		N. 2,546,000 ft	

Gnathodus girtyi Hass	9
texanus Roundy	6
Hindeodella sp.	2
Spathognathodus sp.	3

The two species of *Gnathodus* listed above occur together in the middle Chesterian (Late Mississippian) in the Mississippi Valley, and that is the presumed age of this collection.

J. W. Huddle

October 29, 1971

Field No.	Collection No.	Location	Quadrangle
69NC113	---	(coordinates, Nevada E. zone)	Marys River Basin NW.
Collector		E. 527,140 ft	
R. R. Coats		N. 2,535,000 ft	

NW1/4 sec. 13, T. 44 N., R. 57 E.

Gnathodus bassleri (Harris and Hollingsworth	6
opimus Igo and Koike	20
Gondolella sp.	1
Idiognathodus delicatus Gunnell	125
Neoprioniodus sp.	1

This fauna is Early Pennsylvanian and was reported by Webster (1969) in the Bird Spring Formation of southern Nevada.

J. W. Huddle

October 15, 1970

Field No.	Collection	Location	Quadrangle
69NC114	---	(Coordinates, Nevada E. zone)	Marys River Basin NW.
Collector		E. 526,950 ft	
R. R. Coats		N. 2,535,650 ft	

NE1/4 sec. 13, T. 44 N., R. 57 E.

Cavusgnathus lautus Gunnell	2
Gnathodus girtyi? Hass	4
aff. *G. muricatus* (Dunn)	2
Idiognathodus delicatus Gunnell	15
Idiognathoides noduliferus (Ellison and Graves)	2
sinuatus Harris and Hollingworth	9
Ozarkodina sp.	2

This fauna seems to be Early Pennsylvanian, but the presence of *G. girtyi* Hass is anomalous because it is supposed to be confined to the Mississippian. Its presence here may be an extension of range or indicate contamination of the sample.

J. W. Huddle

October 15, 1970

Field No.	Collection	Location	Quadrangle
69NC117	---	(Coordinates, Nevada E. zone)	Marys River Basin NW.
Collector		E. 526,600 ft	
R. R. Coats		N. 2,536,150 ft	

SE1/4 sec. 12, T. 44 N., R. 57 E.

Gnathodus girtyi Hass	13
Neoprioniodus sp.	1

This sample is probably Late Mississippian, but note above the presence of *G. girtyi* with Early Pennsylvanian conodonts.

J. W. Huddle

October 15, 1970

Field No.	Collection No.	Location	Quadrangle
69NC118	---	(coordinates, Nevada E. zone)	Mary River Basin NW.
Collector		E. 526,300 ft,	
R. R. Coats		N. 2,536,900 ft	

SE1/4 sec. 12, T. 44 N., R. 57 E.

Cavusgnathus sp.	1
Gnathodus bilineatus (Roundy)	2
girtyi Hass	14
inornatus? Hass	2
texanus Roundy	9
Hindeodella sp.	15
Spathognathodus sp.	3

This fauna is probably Chesterian. It occurs in the Barnett Shale of Texas and in the Caney Shale of Oklahoma.

J. W. Huddle

October 15, 1970

Field No.	Collection	Location	Quadrangle
69NC119	---	(coordinates, Nevada E. zone)	Marys River Basin NW.
Collector		E. 526,380 ft	
R. R. Coats		N. 2,537,650 ft	

SE1/4 sec. 12, T. 44 N., R. 57 E.

Cavusgnathus sp.	4
Gnathodus girtyi Hass	15
texanus Roundy	6
Hindeodella sp.	14
Neoprioniodus sp.	2
Ozarkodina cf. *O. roundyi* (Hass)	2
Spathognathodus sp.	5

This fauna is probably Chesterian, like field No. 67NC118.

J. W. Huddle

October 15, 1970

Field No.	Collection No.	Location	Quadrangle
70NC41	24779-PC	(Coordinates, Nevada E. zone)	Wild Horse

Collectors

R. R. Coats

L. D. Cress

E. 404,450 ft,

N. 2,487,150 ft

Lower east slope of Independence Mountains, roughly 1 mi of Doheny Ranch headquarters, cut bank on, north side of, North Fork of Humboldt River.

Strophalosiid, gen. and sp. indet. (part of brachial valve)

Linoproductus sp. (small form)

Crurithyris sp. A

Pelecypod, gen. and sp. indet.

Mackenzie Gordon, Jr.

April 24, 1972

Crurithyris sp. A, a rather distinctive species, fairly large for the genus, occurs in Lower Permian rocks in a considerable part of central and eastern Nevada. The range of this species is not fully known but it is common in the Rib Hill Sandstone of the Ely mining district, where it is bracketed by fusulinids of Early Permian (Wolfcampian) age. For this reason, I have been considering that rocks in which this species is predominant and in which relatively few other species are present are Early Permian.

Field No.	Collection	Location	Quadrangle
71NC4	24810-PC	(Coordinates, Nevada E. zone)	Wild Horse
Collector		E. 451,500 ft	
R. R. Coats		N. 2,537,000 ft	

NW1/4 NW1/4 NE1/4 sec. 15, T. 44 N., R. 55 E., on road in gully bottom, on west side.

Gnathodus roundyi Gunnell	8	
aff. *G. roundyi* Gunnell	6	
sp.		1
Gondolella clarki? Koike	70	
Idiognathoides sinuatus Harris and Hollingsworth	40	
Corrugatiform element		14
Streptognathodus delicatus Gunnell	80	
Unidentified bars and fish teeth		

This fauna is probably early Pennsylvanian and is the same, as that reported in your colln. 22815-PC (loc. SW-67-2) and field Nos. 60NC10 and 60NC11 (loc. SW-60-3). These collections are unusual in that both *Gondolella* and *Streptognathodus* are abundant; these two faunas are thought to be characteristic of different facies. *Gondolella clarki* is identified from a drawing and a description, and so the identification is questioned. Your collections are the only ones to contain *G. clarki* outside of Japan, so far as I know. These specimens are nearly identical with mature specimens of *G. idahoensis* and *G. rosenkrantzi*. The specimens of *G. clarki*? in this

collection have the broad, flat attachment area on the underside without a keel in all stages of growth, not just in the mature specimens. The age determination is based largely on the other species present.

J. W. Huddle

June 23, 1972

Field No.	Collection	Location	Quadrangle
71NC9	---	(Coordinates, Nevada E. zone)	Mount Velma
Collector		E. 456, 000 ft,	
R. R. Coats		N. 2,547,600 ft	

NW1/4 NE1/4 sec. 2, T. 44 N., R. 55 E.

The small foraminifers on the surface of the rock chips are a uniserial form similar to those described by Plummer (1950) from the Pennsylvanian of Texas. The genus Nodosinella is known to range at least from Upper Devonian to Permian; these specimens could come from anywhere within that range.

R. C. Douglass

September 26, 1972

Field No.	Collection	Location	Quadrangle
71NC11	24862-PC	(coordinates, Nevada E. zone)	Wild Horse
Collector		E. 451,900 ft,	
R. R. Coats		N. 2,532,300 ft	

SW1/4 SE1/4 sec. 15, T. 44 N., R. 55 E., 300 ft N. of township-line fence. Gray detrital limestone.

Compositoid?, gen. and sp. indet.

Cystodictya sp.

Orthotetoid, gen. and sp. indet.

Rhipidomella? sp. indet.

Stenoporoid, tiny bulbous form

Trepostomatous bryozoan, tiny ramose form

This material resembles that of field No. 71NC13 and presumably is from the same formation. The fossils are discussed under field No. 71NC13.

Mackenzie Gordon, Jr.

July 18, 1972

Field No.	Collection	Location	Quadrangle
71NC12	24811-PC	(Coordinates, Nevada E. zone)	Wild Horse
Collector		E. 453,400 ft	
R. R. Coats		N. 2,534,500 ft	

NE1/4 NE1/4 SE1/4 sec. 15, T. 44 N., R. 55 E. Limestone ledge on west side of ridge.

Gnathodus bilineatus Roundy	9
commutatus (Branson and Mehl)	2
cf. *defectus* Dunn	8
girtyi Hass	30
Spathognathodus muricatus? (Dunn)	3

This collection is probably Late Mississippian. *Gnathodus girtyi*, *G. commutatus*, and *G. bilineatus* are thought to be confined to the Mississippian, but some nearly identical species occur in the Pennsylvanian. The certainty of the age determination depends on the specific identification.

J. W. Huddle

June 23, 1972

Field No.	Collection	Location	Quadrangle
71NC13	24863-PC	(Coordinates, Nevada E. zone)	Wild Horse
Collector		E. 453,400 ft,	
R. R. Coats		N. 2,534,850 ft	

NE1/4NE1/4SE1/4 sec. 15, T. 44 N., R. 55 E. Same ledges as USGS colln. 24811-PC field No. 71NC12. Etched poorly silicified material from gray detrital limestone.

Horn corals, gen. and sp. indet.

Auloporoid, gen. and sp. indet.

Cystodictya sp. indet.

Rhipidomella? sp. indet.

Pulsia? sp. indet.

Orthotetoid, gen. and sp. indet. (perhaps same as last)

Productoid, gen. and sp. indet.

Composita? sp. indet.

Spiriferoid, gen. and sp. indet.

Spiriferoid? gen. and sp. indet.

Pelecypods, gen. and sp. indet.

Worn shell fragments and pebbles

These silicified fragments of fossils are very poorly preserved, and the uncertain identifications listed above are perhaps too certain! Because of the presence of the bryozoan Cystodictya, I prefer a Mississippian age for this collection. J. W. Huddle suggested a Late Mississippian age for the conodonts in field No. 71NC12, reported to have come from the same ledges, and this collection of larger invertebrates does not contradict that

determination. W. J. Sando stated that the corals are Carboniferous or younger, considered alone, but with the other evidence agree with a Late Mississippian age.

Mackenzie Gordon, Jr.

July 18, 1972

Field No.	Collection	Location	Quadrangle
71NC15	24818-PC	(Coordinates, Nevada E. zone)	Mount Velma
Collector		E. 459,650 ft,	
R. R. Coats		N. 2,537,400 ft	

SE1/4 SW1/4 SW1/4 sec. 11. T. 44 N., R. 55 E.

Streptognathodus sp.

This genus ranges from Pennsylvanian to Permian.

J. W. Huddle

June 23, 1972

Field No.	Collection No.	Location	Quadrangle
71NC21	24812-PC	(Coordinates, Nevada E. zone)	Mount Velma
Collector		E. 454,900 ft	
R. R. Coats		N. 2,517,900 ft	

NE1/4 SW1/4 sec. 35, T. 44 N., R. 55 E.

Gnathodus girtyi? Hass	1
Hindeodella sp.	8
Ozarkodina sp.	1

If the specimen truly belongs in *G. girtyi*, the age of the sample is Late Mississippian, but there are two Early Pennsylvanian species that are quite similar, and so the age is still questionable.

J. W. Huddle

June 23, 1972

Field No.	Collection No.	Location	Quadrangle
71NC22	24813-PC	(Coordinates, Nevada E. zone)	Mount Velma
Collector		E. 455,000 ft,	
R. R. Coats		N. 2,517,700 ft	

NE1/4SW1/4 sec. 35, T. 44 N., R. 55 E.

Gnathodus girtyi simplex Dunn	4
bilineatus Roundy	1
Hindeodella sp.	20
Neoprioniodus singularis Hass	2

This collection is probably Late Mississippian.

J. W. Huddle

June 23, 1972

Field No.	Collection	Location	Quadrangle
71NC24	24814-PC	(Coordinates, Nevada E. zone)	Mount Velma
Collector		E. 459,300 ft	
R. R. Coats		N. 2,517,500 ft	

NW1/4SW1/4SW1/4 sec. 36, T. 44 N., R. 55 E., on brow of hill 50 ft E. of gully bottom.

Cavusgnathus? sp.	2
Gnathodus bilineatus? Roundy	1
Gnathodus girtyi Hass	3
Bar fragments, mainly *Hindeodella*	60

This collection is probably Late Mississippian, but the specimens are broken, and so the identifications are uncertain.

J. W. Huddle

June 23, 1972

Field No.	Collection	Location	Quadrangle
71NC27	24815-PC	(Coordinates, Nevada E. zone)	Mount Velma
Collector		E. 458,300 ft	
R. R. Coats		N. 2,523,200 ft	

NE1/4 SE1/4 sec. 36, T. 44 N., R. 55 E.

This collection contains 15 specimens of broken, waterworn(?) conodonts that represent one or two species of Streptognathodus. This genus ranges from Pennsylvanian to Permian.

J. W. Huddle

June 23, 1972

Field No.	Collection	Location	Quadrangle
71NC52	24816-PC	(Coordinates, Nevada E. zone)	Mount Velma
Collector		E. 478,650 ft,	
R. R. Coats		N. 2,548,400 ft	

SE1/4 sec. 33, T. 45 N., R. 56 E.

Gondolella? sp.	1
Streptognathodus elegantulus? Stauffer and Plummer	14

All the specimens in this collection are corroded and broken. *Streptognathodus* ranges from Pennsylvanian to Permian, and *S. elegantulus* has a similar range.

J. W. Huddle

June 23, 1972

One specimen of the coral *Caninia* was identified by W. J. Sando. This genus ranges from Mississippian to Permian.

W. J. Sando

June 23, 1972

Field No.	Collection	Location	Quadrangle
71NC70	24819-PC	(Coordinates, Nevada E. zone)	Mount Velma
Collector		E. 482,750 ft,	
R. R. Coats		N. 2,539,150 ft	

NW1/4 sec. 10, T. 44 N., R. 56 E., Permian.

Adetognathus? sp.	1
Bar fragments	
Gnathodus cf. *roundyi* Gunnell	15
Gondolella clarki? Koike	28
Hindeodella sp.	10
Idiognathodus cf. I. *delicatus* Gunnell	30
Idiognathoides opimus (Igo and Koike)	6
sinuatus Harris and Hollingsworth	25
corrugatiform element	26
Neoprioniodus sp.	1

This collection is probably Early Pennsylvanian and represents the same zone as field No. 71NC4.

J. W. Huddle

June 23, 1972

Field No.	Collection No.	Location	Quadrangle
71NC71	24820-PC	(Coordinates, Nevada E. zone)	Mount Velma
Collector		E. 483,600 ft	
R. R. Coats		N. 2,540,100 ft	

Sec. 10, T. 44 N., R. 56 E.

Cavusgnathus? sp.	2
Gnathodus sp.	3
Hindeodella sp.	3
Ozarkodina sp.	1

All the specimens are broken and the fragments are not identifiable. The light residues contain silicified bryozoans, tubes, and some pelmatozoan stems, also not identifiable.

J. W. Huddle

June 23, 1972

Field No.	Collection No.	Location	Quadrangle
71NC97	24821-PC	(Coordinates, Nevada E. zone)	Mountain City
Collector		E. 445,000 ft,	
R. R. Coats		N. 2,553,700 ft	

Bar fragments

Gnathodus girtyi Hass 4

Gnathodus girtyi is thought to be confined to the Chesterian, and this collection is presumed to be Late Mississippian.

J. W. Huddle

June 23, 1972

Field No.	Collection No.	Location	Quadrangle
71NC140	24822-PC	(Coordinates, Nevada E. zone)	Wild Horse
Collector		E. 410,500 ft	
R. R. Coats		N. 2,485,300 ft	

SE1/4SE1/4 sec. 32, T. 43 N., R. 54 E.

Adetognathus sp.

Anchignathodus sp.

Idiognathodus ellisoni Clark and Behnken

Neostreptognathodus pequopensis Behnken

Streptognathodus sp.

This fauna is Early Permian, (late Wolfcampian).

B. R. Wardlaw

November 3, 1977

Field No.	Collection No.	Location	Quadrangle
71NC141	D143-PC	(Coordinates, Nevada, E. zone)	Wild Horse
Collector		E. 409,600 ft	
R. R. Coats		N. 2,492,000 ft	

Conodonts:

Ellisonia sp.	several
Neogondolella idahoensis (Youngquist, Hawley, and Miller)	many
Xaniognathus abstractus (Clark and Ethington) (o elements)	3

This fauna indicates a Leonardian (Early Permian) age. The conodont color-alteration index is 4, indicating host-rock temperatures of 190 to 300°C.

B. R. Wardlaw

May 11, 1978

A 225

Field No.	Collection No.	Location	Quadrangle
71NC142	D144-PC	(Coordinates, Nevada E. zone)	Wild Horse
Collector		E. 410,700 ft	
R. R. Coats		N. 2,493,450 ft	

NE1/4 NE1/4 sec. 29, T. 43 N., R. 54 E.

This collection consists of bioclastic limestone, almost entirely composed of echinoderm debris, with indeterminate bivalve and bryozoan fragments. A large pelecypod fragment is of a type considered possibly Silurian to Devonian by John Pojeta. Clams of this general kind occur only in post-Cambrian rocks; this collection is definitely not Cambrian.

John Pojeta, Jr.

February 28, 1972

Conodonts:

Ellisonia sp.	several
Neogondolella idahoensis (Youngquist, Hawley, and Miller)	many
Xaniognathus sp. (o elements)	2

This fauna indicates a Leonardian (Early Permian) age. The color-alteration index CAI is 4, indicating host-rock temperatures of 190° to 300°C. This sample seems to be closely related to field No. 71NC141.

B. R. Wardlaw

May 11, 1978

A226

Field No.	Collection	Location	Quadrangle
71NC143	D145-PC	(Coordinates, Nevada E. zone)	Wild Horse
Collector		E. 408,000 ft,	
R. R. Coats		N. 2,489,000 ft	

NE1/4NW1/4 sec. 32, T. 43 N., R. 54 E.

Essentially a coquina of crurithyrid and rhynchonelloid brachiopods. Definitely not Cambrian, probably Devonian or younger.

J. T. Dutro, Jr.

February 28, 1972

Conodonts:

Bar fragments	several
Idiognathodus sp.	1
Neogondolella idahoensis (Youngquist, Hawley, and Miller)	several
Neostreptognathodus sulcoplicatus (Youngquist, Hawley, and Miller)	1
n. sp. D of Wardlaw and Collinson	1
Polygnathus cf. *P. pennatus* Hinde	3

A2279

This is a mixed fauna. Polygnathus pennatus commonly occurs in lower Upper Devonian rocks, Idiognathodus in Pennsylvanian and Lower Permian (Wolfcampian) rocks. The youngest fauna (probably indigenous) is that of Neogondolella and Neostreptognathodus, which indicate a Roadian (late Leonardian, Early Permian) age; they commonly occur in the Meade Peak Phosphatic Shale Member of the Phosphoria Formation. The undetermined brachiopods also match the fauna typical of the Meade Peak. Because this collection contains reworked material, it may be older than field Nos. 71NC141 and 71NC142 and stratigraphically lower. This age also would make both these samples uppermost Leonardian (Roadian) and equivalent to the Meade Peak. The color-alteration index for both the reworked faunas and the indigenous fauna is 4, indicating host-rock temperatures of 190° to 300°C.

B. R. Wardlaw

May 11, 1978

Field No.	Collection No.	Location	Quadrangle
71NC144	---	(Coordinates, Nevada E. zone)	Wild Horse
Collector		E. 409,600 ft	
R. R. Coats		N. 2,488,450 ft	

SW1/4SE1/4 sec. 32, T. 43 N., R. 54 E.

Contains probable Leiorhynchoidea and Quadratia; age is most likely Late Mississippian.

J. T. Dutro, Jr.

February 28, 1972

A229

Field No.	Collection	Location	Quadrangle
71NC146	24741-PC	(coordinates, Nevada E. zone)	Wild Horse
Collector		E. 410,800 ft,	
R. R. Coats		N. 2,489,350 ft	

NE1/4 NE1/4 sec. 32 T. 43 N., R. 54 E.

Only fragments of conodonts were recovered. One specimen is probably a species of Cavusgnathus; two specimens seem to be fragments of hindeodellids. The presence of Cavusgnathus? suggests a Carboniferous age for the rock containing these conodonts and tends to confirm the Carboniferous age suggested by the bryozoan Rhomboporella? sp., as reported by O. L. Karklins.

J. W. Huddle

July 25, 1972

The bryozoans generally are poorly preserved; they seem to be partialy silicified or are affected by recrystallization of the skeletal material. The bryozoans are identified tentatively as follows:

Fistuliporids?

Peculiar colonial structure suggests vague similarities to fistuliporids. Probably a new genus; stratigraphically not significant at this time.

3C
A 230

Rhabdomesids

Rhombotrypella?

No stratigraphic significace can be attached to these forms, except to note that vaguely similar forms do not seem to occur in strata older than Devonian.

To summarize, Rhombotrypella?, if my identification is reasonably correct, appears to indicate an Early Pennsylvanian or younger age for the strata from which this collection was obtained.

O. L. Karklins

February 28, 1972

A231

Field No.	Collection	Location	Quadrangle
71NC256	24865-PC	(Coordinates, Nevada E. zone)	Marys River Basin NE.
Collector		E. 562,800 ft	
R. R. Coats		N. 2,506,370 ft	

Gray fine- to medium-grained limestone.

Rhomboporoid, gen. and sp. indet.

Crinoid columnals

Brachiopod, gen. and sp. indet.

Crimites? sp.

Crimites is an ammonoid. I was able to develop the suture, but not clearly; this failure accounts for the questioned identification. The presence of Crimites indicates an Early Permian age for the rock. The superficially similar form Agathiceras indicates a Des Moinesian to Wolfcampian age. That's about the range of possibility. Obviously, more specimens would probably tie it down to one or the other. Crimites elkoensis Miller, Furnish, and Clark was described from a single fragment from light-brown dense limestone of middle Wolfcampian age in North Carlin Canyon (sec. 10, T. 33 N., R. 53 E.). Your specimen, however, seems to differ somewhat in its suture, and the ventral lobe has wider prongs than the Carlin Canyon specimen. Judging from the lithology, your material might be from the Sunflower Formation of Coash (1967).

Mackenzie Gordon, Jr.

July 18, 1972

Field No.	Collection No.	Location	Quadrangle
71NC259	f24524	(Coordinates, Nevada E. zone)	Marys River Basin NE.
Collector		E. 566,500 ft	
R. R. Coats		N. 2,506,750 ft	

Bradyina sp.

Textularid

Triticites sp.

Upper Pennsylvanian.

R. C. Douglass

September 26, 1972

A233

Field No.	Collection	Location	Quadrangle
71NC260	24823-PC	(Coordinates, Nevada E. zone)	Marys River Basin NE.
Collector		E. 562,250 ft	
R. R. Coats		N. 2,506,900 ft	

Adetognathus sp.

Idiognathodus sp.

Neostreptognathodus?

Streptognathodus sp.

This fauna is probably Lower Permian.

B. R. Wardlaw

November 3, 1977

A-234

Field No.	Collection	Location	Quadrangle
71NC262	24866-PC	(Coordinates, Nevada E. zone)	Marys River Basin NE.
Collector		E. 566,500 ft	
R. R. Coats		N. 2,507,850 ft	

Dark-brownish-gray impure limestone weathering grayish brown.

Horn coral, gen. and sp. indet.

Crinoid ossicles

Sulcataria sp.

Buxtoniid, gen. and sp. indet.

Composita sp.

Crurithyris sp.

Nuculopsis sp.

Gastropod, gen. and sp. indet. (tiny turbinate form)

The *Sulcataria* and the shape and size of the *Crurithyris* indicate an Early Permian age.

Mackenzie Gordon, Jr.

July 18, 1972

37

A235

Field No.	Collection	Location	Quadrangle
71NC262A	f24525	(coordinates, Nevada E. zone) E. 565,730 ft, N. 2,505,560 ft	Marys River Basin NE.

Collector

R. R. Coats

Pseudofusulinella sp.

Triticites sp.

Upper Pennsylvanian

R. C. Douglass

September 26, 1972

Field No.	Collection No.	Location	Quadrangle
71NC263	f24526	(Coordinates, Nevada E. zone)	Marys River Basin NE.
Collector		E. 564,650 ft	
R. R. Coats		N. 2,504,700 ft	

Triticites sp.

Upper Pennsylvanian.

R. C. Douglass

September 26, 1972

Field No.	Collection	Location	Quadrangle
71NC264	f24527	(Coordinates, Nevada E. zone)	Marys River Basin NE.
Collector		E. 564,450 ft	
R. R. Coats		N. 2,504,700 ft	

<u>Fusulinella</u>?

Middle Pennsylvanian(?).

R. C. Douglass

September 26, 1972

40

A238

Field No.	Collection No.	Location	Quadrangle
71NC266	24945-PC	(Coordinates, Nevada E. zone)	Marys River Basin NE.
Collector		E. 563,700 ft	
R. R. Coats		N. 2,504,500 ft	

Gondolella denuda Ellison	1
Streptognathodus elegantulus Stauffer and Plummer	1
fragments of other species	

These two conodont species range from Missourian to Virgilian in the midcontinent.

J. W. Huddle

July 18, 1972

Field No.	Collection No.	Location	Quadrangle
71NC268	f24528	(Coordinates,	Marys River
Basin		Nevada E. zone)	
Collector		E. 566,600 ft,	
R. R. Coats		N. 2,525,650 ft	

Schubertella sp.

Triticites sp.

Upper Pennsylvanian and Lower Permian.

R. C. Douglass

September 26, 1972

Field No.	Collection	Location	Quadrangle
71CS373	24824-PC	(Coordinates, Nevada E. zone)	Mount Velma
Collector		E. 463,475 ft	
L. D. Cress		N. 2,525,850 ft	

Neogondolella sp.

Streptognathodus gracilis Stauffer and Plummer

This fauna indicates an age range Des Moinesian (Middle Pennyslvania to Wolfcampian (Early Permian).

B. R. Wardlaw

November 3, 1977

Field No.	Collection	Location	Quadrangle
71CS423	24825-PC	(Coordinates, Nevada E. zone)	Marys River Basin NE.
Collector		E. 563,320 ft	
L. D. Cress		N. 2,504,000 ft	

Adetognathus sp.

Gondolella sp.

Neostreptognathodus pequopensis Behnken

Streptognathodus elegantulus Stauffer and Plummer

Xaniognathus sp.

This fauna indicates an Early Permian, (late Wolfcampian) age.

Bruce R. Wardlaw

November 3, 1977

Field No.	Collection	Location	Quadrangle
72CR26	24953-PC	(Coordinates, Nevada E. zone)	Marys River Basin NE.
Collector		E. 571,740 ft	
L. D. Cress		N. 2,534,120 ft	

Idiognathodus sp.	3
Streptognathodus sp.	2

silicified bryozoa in the coarse residue.

The range of these genera is Pennsylvanian to Permian.

J. W. Huddle

October 27, 1972

Field No.	Collection	Location	Quadrangle
72CR35	24996-PC	(coordinates, Nevada E. zone)	Mount Velma
Collector		E. 484,350 ft	
L. D. Cress		N. 2,513,700 ft	

Gondolella cf. *clarki* Koike	1
Hindeodella sp.	13
Idiognathoides sinuatus Harris and Hollingsworth	
right element	5
left element	6
Bar fragments	

Idiognathoides sinuatus indicates an Early Pennsylvanian age for the rocks containing them. *Gondolella* also occurs in rocks of that age but ranges into the Triassic.

J. W. Huddle

January 16, 1973

46

244

A ~~230~~

Field No.	Collection	Location	Quadrangle
72CR37	24997-PC	(Coordinates, Nevada E. zone)	Mount Velma
Collector		E. 485,870 ft	
L. D. Cress		N. 2,519,710 ft	

Hindeodella sp.	4
Neognathodus bassleri symmetricus (Lane)	2
sp.	1
Rachistognathus muricatus (Dunn)	1

These forms indicate an Early Pennsylvanian age.

J. W. Huddle

January 16, 1973

Field No.	Collection	Location	Quadrangle
72CR38	24998-PC	(Coordinates, Nevada E. zone)	Mount Velma
Collector		E. 486,920 ft	
L. D. Cress		N. 2,579,680 ft	

Gnathodus or *Neognathodus* sp. 2

Bar fragments

A Pennsylvanian age is probable for this bioclastic limestone.

J. W. Huddle

January 16, 1973

48

246

A ~~232~~

Field No.	Collection	Location	Quadrangle
72CR39	---	(Coordinates, Nevada E. zone)	Mount Velma
Collector		E. 484,110 ft	
L. D. Cress		N. 2,520,700 ft	

This collection consists of a brachiopod from which Mackenzie Gordon, Jr., sawed off most of the matrix, which was all etched. The residue yielded five fragments and valves, including one broken valve that is definitely Graphiadactyllis, a genus common in rocks of Mississippian age but not as yet recorded in rocks of Pennsylvanian age. The following taxa are represented:

Microcheilinella? sp. 1 valve

Graphiadactyllis sp.

Gen. indet. fragment with ribbed surface

Gen. indet., large smooth, fragment of ventral part.

Fragment indet.

Based on the presence of Graphiadactyllis, I would, pending evidence to the contrary, judge this part of the formation to be Mississippian.

I. G. Sohn

February 2, 1973

The specimen, an incomplete pedicle valve, mostly an external mold, is a spiriferid, genus and species indeterminate. Spiriferids occur only in the upper Paleozoic. A Mississippian age for ostracodes from this collection was suggested by I. G. Sohn in a report dated February 2, 1973.

Mackenzie Gordon, Jr.

B. R. Wardlaw

December 9, 1975

50
A 245
~~234~~

Field No.	Collection	Location	Quadrangle
72CR40	24999-PC	(Coordinates, Nevada E. zone)	Mount Velma
Collector		E. 485,400 ft	
L. D. Cress		N. 2,526,550 ft	

Diplodolella sp.	1
Gnathodus cf. *G. commutatus* (Branson and Mehl)	1
Hindeodella sp., broken	100
Idiognathoides sinuatus Harris and Hollingsworth	
left elements	31
right elements	25
Neognathodus bassleri symmetricus (Lane)	12
Ozarkodina sp.	10
Synprioniodina sp.	2

This collection is Early Pennsylvanian, as indicated by the presence of *Idiognathoides* and *Neognathodus bassleri*.

J. W. Huddle

January 10, 1973

Field No.	Collection No.	Location	Quadrangle
72CR43	25000-PC	(Coordinates, Nevada E. zone)	Mount Velma
Collector		E. 477,800 ft	
L. D. Cress		N. 2,522,000 ft	

Hindeodella sp.	21
Ideognathoides sinuatus Harris and Hollingsworth	
left element	62
right element	34
sulcatus Higgins and Bouckaert	3
Ozarkodina sp.	3
Rhaschistognathus primus Dunn	6
Synprioniodina sp.	3

This collection is Early Pennsylvanian. The ostracodes were given to I. G. Sohn for identification.

J. W. Huddle

January 16, 1973

52

A250

~~236~~

The unetched portion of this sample was crushed, but no ostracodes were recovered; the etched material yielded abundant very poorly silicified specimens, with quartz grains and silicified fragments adhering and masking the surfaces. The following taxa are present:

Monoceratina spp.

Amphissites spp.

Kirkbya sp.

Bairdia sp.

Healdia spp.

Pseudoparaparchites? sp.

genera indet.

This assemblage does not contradict the Early Pennsylvanian age determined by J. W. Huddle.

I. G. Sohn

A 2 ~~57~~
~~237~~

Field No.	Collection	Location	Quadrangle
72CR66	25002-PC	(Coordinates, Nevada E. zone)	Marys River Basin NE.
Collector		N. 566,090 ft	
L. D. Cress		N. 2,520,810 ft	

Adetognathus sp.	7
Idiognathoides sp.	1
Streptognathodus sp.	3

The conodonts in this collection are broken and worn, and may have been reworked. The genera range from the Pennsylvanian into the Permian.

J. W. Huddle

January 16, 1973

54

A 252

~~238~~

Field No.	Collection	Location	Quadrangle
72D26	24952-PC	(Coordinates,	Marys River Basin NE.
	f24535	Nevada E. zone)	
Collector		E. 573,270 ft	
D. B. Crocker		N. 2,539,440 ft	

Streptognathodus elegantulus Stauffer and Plummer 1

This form ranges from the Pennsylvanian into the Permian. The residue also contained silicified fusulinids, spines, ostracodes, and bryozoans.

J. W. Huddle

January, 16, 1972

This sample contains *Triticites* sp. and *Pseudofusulinella* sp.

Late Pennsylvanian.

R. C. Douglass

October 30, 1972

55

A 2~~53~~

~~239~~

Field No.	Collection No.	Location	Quadrangle
72D63	f24536	(Coordinates, Nevada E. zone)	Marys River Basin NW.
Collector		E. 524,300 ft	
D. B. Crocker		N. 2,539,000 ft	

Bryozoans, Pseudofusulinella?

Upper Pennsylvanian.

R. C. Douglass

October 30, 1972

56

A2 F4

~~2 70~~

Field No.	Collection No.	Location	Quadrangle
72D64	25003-PC	(Coordinates, Nevada E. zone)	Marys River Basin NW.
Collector		E. 523,680 ft	
D. B. Crocker		N. 2,537,800 ft	

Idiognathodus cf. *I. humerus* Dunn

Idiognathoides convexus (Ellison and Graves)

This fauna indicates a Morrowan, (Early Pennsylvanian). The conodont color-alteration index (CAI) is 5, indicating maximum host-rock temperatures of 350° to 400°C.

B. R. Wardlaw

November 4, 1977

51
A255
~~241~~

Field No.	Collection	Location	Quadrangle
72D66	25004-PC	(Coordinates,	Marys River Basin NE.
	f24537	Nevada E. zone)	
Collector		E. 572,450 ft	
D. B. Crocker		N. 2,541,160 ft	

Streptognathodus sp. 1

Pennsylvanian to Permian.

J. W. Huddle

January 16, 1973

Triticites sp.

Late Pennsylvanian.

R. C. Douglass

October 30, 1972

58

A256

~~242~~

Field No.	Collection	Location	Quadrangle
72NC34	---	(Coordinates, Nevada E. zone)	Marys River Basin SE.
Collector		E. 561,900 ft	
R. R. Coats		N. 2,487,300 ft	

Straparollus (Straparollus) sp. indet. The upper whorl face, although it preserves growth lines, shows no angulation of its outer edge, so presumably these shells do not belong in S. (Euomphalus). One mold of the lower side shows what looks like a short longitudinal keel, but this resemblance may be due only to distortion during diagenesis. S. (Straparollus) ranges through Mississippian and Pennsylvanian rocks.

Mackenzie Gordon, Jr.

B. R. Wardlaw

December 9, 1975

59
A257
~~245~~

Field No.	Collection	Location	Quadrangle
72NC36	---	(Coordinates, Nevada E. zone)	Marys River Basin NE.
Collector		E. 563,200 ft	
R. R. Coats		N. 2,489,620 ft	

<u>Composita</u>? sp. indet.

Probably middle or late Paleozoic on the basis of available material.

B. R. Wardlaw

Mackenzie Gordon, Jr.

December 23, 1975

60
A258
~~244~~

Field No.	Collection	Location	Quadrangle
72NC74	f24531	(Coordinates, Nevada E. zone)	Marys River Basin NE.
Collector		E. 577,000 ft	
R. R. Coats		N. 2,531,400 ft	

Triticites sp.

Upper Pennsylvanian.

R. C. Douglass

September 27, 1972

61

A 259

~~258~~

~~245~~

Field No.	Collection No.	Location	Quadrangle
72NC116	25005-PC	(Coordinates, Nevada E. zone)	Marys River Basin NW.
Collector		E. 524,250 ft	
R. R. Coats		N. 2,525,850 ft	

Gnathodus girtyi? Hass

bar fragments

This questionable identification suggests a Late Mississippian age, (Chesterian) age.

J. W. Huddle

January 16, 1973

62
60
A2 ~~65~~
~~246~~

Field No.	Collection No.	Location	Quadrangle
72NC117	25006-PC	(Coordinates, Nevada E. zone)	Marys River Basin NW.
Collector		E. 524,200 ft	
R. R. Coats		N. 2,524,380 ft	

Gnathodus commutatus? (Branson and Mehl)	1
girtyi Hass	6
cf. *G. texanus* Roundy	2
Synprioniodina sp.	1
bar fragments, including hindeodellids	

This fauna suggests a Late Mississippian, (Chesterian) age.

J. W. Huddle

January 16, 1973

Ammonoid, gen. and sp. indet.

Orthoconic nautiloid, gen. and sp. indet.

This specimen was marked in the field as a fusulinid, and so it went to the fusulinid lab and was cut on the rock saw. The section revealed that it was an ammonoid. By the time Mackenzie, Gordon Jr., received it, not much was left to work on, but he managed to flake out one side, reveal the sutures, which were of a type common to the families Homoceratidae, Gastrioceratidae, and Paragastrioceratidae. Because the specimen does not seem to have umbilical nodes, the first listed family is the most likely, but this ranges from Late Mississippian to Early Permian, and so it is of limited help in

C3
A26P
241

dating the rock. The second fossil is an orthoconic nautiloid containing septal deposits. It was cut in three pieces but none exhibits the characters of the siphuncle, which are necessary to identify genera in this group. Obviously, we need a new start with more material. The locality is worth re-collecting.

Mackenzie Gordon, Jr.

B. R. Wardlaw

December 9, 1975

64
AZ 62
24

Field No.	Collection No.	Location	Quadrangle
72NC137	f24538	(Coordinates, Nevada E. zone)	Marys River Basin NE.
Collector		E. 572,850 ft	
R. R. Coats		N. 2,532,050 ft	

Pseudoschwagerina sp.

Schwagerina? sp.

Lower Permian.

R. C. Douglass

October 30, 1972

65

A 263

~~249~~

Field No.	Collection No.	Location	Quadrangle
72NC138	f24539	(Coordinates, Nevada E. zone)	Marys River Basin NE.
Collector		E. 573,450 ft	
R. R. Coats		N. 2,531,100 ft	

Schwagerinid

Upper Pennsylvanian to Lower Permian.

R. C. Douglass

October 30, 1972

66

AZ 64

~~240~~

Field No.	Collection No.	Location	Quadrangle
72NC141	f24561	(Coordinates, Nevada E. zone)	Marys River Basin NE.
Collector		E. 565,560 ft,	
R. R. Coats		N. 2,518,800 ft	

Triticites sp.

Pseudofusulinella sp.

Upper Pennsylvanian.

R. C. Douglass

October 30, 1978

67

A 265

~~251~~

Field No.	Collection No.	Location	Quadrangle
72NC143	25080-PC	(Coordinates, Nevada E. zone)	Marys River Basin NE.
Collector		E. 565700 ft	
R. R. Coats		N. 2,517,300 ft	

Massive medium-gray slightly fetid limestone.

Anchignathodus minutus (Ellison)

Anchignathodus minutus ranges from Early Pennsylvanian to Early Permian (late Wolfcampian). This sample falls within that range and is probably Pennsylvanian. The conodont color-alteration index (CAI) is 4-1/2, indicating maximum host-rock temperatures of 300° to 400°C.

B. R. Wardlaw

November 3, 1977

68
A266
252

Field No.	Collection No.	Location	Quadrangle
72NC145	f24562	(Coordinates, Nevada E. zone)	Marys River Basin NE.
Collector		E. 567,000 ft	
R. R. Coats		N. 2,524,620 ft	

This sample contains ramose bryozoans and Triticites sp.

Upper Pennsylvanian.

R. C. Douglass

March 21, 1973

69

A2 ~~69~~

~~257~~

Field No.	Collection No.	Location	Quadrangle
72NC146	f24563	(Coordinates, Nevada E. zone)	Marys River Basin NE.
Collector		E. 567,250 ft	
R. R. Coats		N. 2,524,100 ft	

This sample contains rare specimens of Triticites sp.

Upper Pennsylvanian.

R. C. Douglass

March 21, 1973

Dark-gray slightly fetid calcarenite.

Adetognathus sp.	1
Gnathodus roundyi? Gunnell	1
bar fragments	

Gnathodus roundyi occurs in the Late Pennsylvanian and Early Permian.

J. W. Huddle

June 8, 1973

70

A2~~68~~ ~~254~~

Field No.	Collection	Location	Quadrangle
72NC147A	25081-PC	(Coordinates, Nevada E. zone)	Marys River Basin NE.
Collector		E. 567,200 ft	
R. R. Coats		N. 2,523, 250 ft	

Adetognathus sp.	1
Spathognathodus sp.	1

J. W. Huddle

June 8, 1973

71

A269

~~255~~

Field No.	Collection	Location	Quadrangle
72NC147B	25082-PC	(Coordinates, Nevada E. zone)	Marys River Basin NE.
Collector		E. 567,200 ft	
R. R. Coats		N. 2,523,250 ft	

Adetognathus sp.	3
Hindeodella sp.	1
Idiognathodus sp.	2

Field Nos. 72NC147A and 72NC147B are both probably Pennsylvanian.

J. W. Huddle

June 8, 1973

72

A270

~~256~~

Field No.	Collection	Location	Quadrangle
72NC148	25054-PC	(Coordinates, Nevada E. zone)	Marys River Basin NE.
Collector		E. 566,700 ft	
R. R. Coats		N. 2,522,950 ft	

The material is silicified but poorly preserved, and it is difficult to see any costation on the brachiopod shells, although some weak ribs are visible locally. Beekite rings in the silicified areas nearly obliterate the spine bases. The main species is a marginiferid of a shape that is fairly common in Late Mississippian (Chesterian) through Middle Permian rocks. On one specimen, however, can be seen six holes in the silicified matrix made by forward protruding spines on the interior of the brachial valve. On another, spine bases of two balancing spines that once protruded from the pedicle valve at either side of the sulcus are visible. It almost certainly belongs in the genus Kozlowskia, Which ranges from Late Mississippian (Late Chesterian) through Early Permian. The early species however, through lower Des Moinesian, are small and round. Forms like this begin in the upper Des Moinesian and continue through much of the Missourian (Marmaton and Kansas City Groups). A somewhat similar species occurs in the Lower Permian of the Ely district implies a late Des Moinesian to Early Permian age for this material.

A 2~~7~~ (p. A 2~~7~~3 follows)
~~2~~ to correspond to orig written instructions) see orig

Massive fine-grained medium-gray-weathering limestone containing silicified fossils.

Horn coral, gen. and sp. indet.

Kozlowskia sp.

Pelmatozoan debris

Mackenzie Gordon, Jr.

December 16, 1975

A22 4 3

Field No.	Collection No.	Location	Quadrangle
72NC150	25083-PC	(Coordinates, Nevada E. zone)	Marys River Basin NW.
Collector		N. 523,850 ft	
R. R. Coats		N. 2,527,660 ft	

Coarse- calcarenite containing granules of the Valmy.

Hindeodella sp.	1
Idiognathodus sp.	1

Idiognathodus ranges from Lower Pennsylvanian to Permian.

J. W. Huddle

June 8, 1973

5

274

A 2D 74

~~259~~

Field No.	Collection	Location	Quadrangle
72NC151	25084-PC	(Coordinates, Nevada E. zone)	Wild Horse
Collector		E. 452,450 ft	
R. R. Coats		N. 2,528,750 ft	

Two or three beds, each approx 6 in. thick, of dark-gray calcarenite.

Cavusgnathus cf. *C. unicornis* Youngquist and Miller	1
Gnathodus cf. *G. girtyi* Hass	1
cf. *G. texanus* Roundy	1
Hindeodella sp.	2

The conodonts I have identified in this collection suggest a middle Mississippian age, equivalent to part of the interval St. Louis Limestone to early Chesterian in the Mississippi Valley. I know of nothing in the Phosphoria Formation that looks like *Gnathodus texanus*, although the other forms are similar to Permian species.

J. W. Huddle

June 8, 1973

6

A2 ~~74~~ 78

~~2~~ 60

Field No.	Collection No.	Location	Quadrangle
NG1267-1	f24532	(Coordinates, Nevada E. zone)	Marys River Basin NE.
Collector		E. 574,050 ft	
R. C. Greene		N. 2,539,500 ft	

Pseudofusulinella sp.

Triticites sp.

Upper Pennsylvanian to Lower Permian.

R. C. Douglass

September 27, 1972

77

A276

~~261~~

Field No.	Collection	Location	Quadrangle
NG1274		(Coordinates, Nevada E. zone)	Marys River Basin NE.
Collector		E. 573,620 ft	
R. C. Greene		N. 2,544,300 ft	

Straparollus? sp. indet.

This large gastropod was seen only in cross section. E. L. Yochelson suggested that it is a straparollid rather than a bellerophontacean. Straparollids of this size generally do not occur in Pennsylvanian rocks.

Mackenzie Gordon, Jr.

December 23, 1975

78

A2 2 ~~2~~

~~262~~

Field No.	Collection No.	Location	Quadrangle
NG1276	26152-PC	(Coordinates, Nevada E. zone)	Marys River Basin NE.
Collector		E. 577,200 ft	
R. C. Greene		N. 2,544,050 ft	

Proetid trilobite, possibly Ameura

This form has a tapering pygidium bordered by a wide flange. It is of a size and shape more common in Middle Pennsylvanian to Permian rocks, but the Mississippian cannot be positively ruled out.

Mackenzie Gordon, Jr.

December 23, 1975

Trilobite, genus and species indeterminate

MacKenzie Gordon, Jr., asked me to examine this fossil, which he and B. R. Wardlaw reported on previously. The specimen consists of a partial thorax and pygidium, and a partial right librigena in ventral aspect. The tergites are flat with wirelike borders and lack facets on the tips. These are features not commonly seen in phillipsiid and other upper Paleozoic trilobites. The tergites are similar to those commonly developed in olenids and papyriaspidids, but those trilobites all have small tails. Both asaphids and asaphiscids have pygidia similar to this, but I do not know of any genus among them that has the peculiar development of the tergites. In short, I do not know the identity of the trilobite. In terms of age, all that can be said is that the specimen is post-Lower Cambrian Paleozoic.

M. E. Taylor

1976

Permian System

Sandstone of Horse Mountain

80
AZ 88
264

Field No.	Collection No.	Location	Quadrangle
69NC58	---	(Coordinates, Nevada E. zone)	Mount Blitzen
Collector		E. 248,859 ft	
R. R. Coats		N. 2,403,800 ft	

Collection 69NC58 contains a single brachial mold of a spiriferoid brachiopod that might be a Lower Devonian delthyrid. The age is almost certainly Silurian or Devonian.

J. T. Dutro, Jr.

January 21, 1970

51

A 280 ~~279~~

~~265~~

Field No.	Collection	Location	Quadrangle
70NC91	---	(Coordinates, Nevada E. zone)	Mount Blitzen
Collector		E. 248,600 ft,	
R. R. Coats		N. 2,404,000 ft	

West slope of Tuscarora Mountains, near east base of hill with quicksilver prospect, on north side of Rock Creek.

Crinoid columnals

Orbiculoidea? sp. indet.

Crurithyris sp. A

Gastropods, gen. and sp. indet.

Mackenzie Gordon, Jr.

April 24, 1972

82

A28~~4~~

~~266~~

Field No.	Collection	Location	Quadrangle
70NC92	---	(Coordinates, Nevada E. zone)	Mount Blitzen
Collector		E. 248,850 ft	
R. R. Coats		N. 2,403,800 ft	

South side of Rock Creek.

Crurithyris sp. A

Field Nos. 70NC41, 70NC91, and 70NC92 all contain *Crurithyris* sp. A, a rather distinctive species, fairly large for the genus, that is found in Lower Permian rocks in a considerable area of central and eastern Nevada. The range of this species is not fully known but it is common in the Rib Hill Sandstone of the Ely mining district, where it is bracketed by fusulinids of Early Permian (Wolfcampian) age. For this reason I have been considering that the rocks in which this species is predominant and in which relatively few other species are present are Early Permian.

Mackenzie Gordon, Jr.

April 24, 1972

83
A 282
~~267~~

Field No.	Collection No.	Location	Quadrangle
70NC98	---	(Coordinates, Nevada E. zone)	Mount Blitzen
Collector		E. 251,950 ft	
R. R. Coats		N. 2,410,600 ft	

Sta. 2297, west slope of Tuscarora Mountains, drainage of Rock Creek, in cut bank on west side of creek.

Trepostomatous bryozoans, ramose forms

Fenestella sp. indet.

Rhomboporoid bryozoans

Cystodictya? sp. indet.

Crinoid columnals

Brachiopod fragments, including some of productoids

This moderately coarse detrital limestone contains bryozoan and crinoidal debris and a few brachiopod fragments, none of which is complete enough to yield a recognizable fauna capable of providing an age for the enclosing rocks. All that can be said is that the rock is late Paleozoic (Carboniferous or Permian).

Mackenzie Gordon, Jr.

April 24, 1972

84

A2 ~~83~~ ~~268~~

Field No.	Collection	Location	Quadrangle
74G4	25305-PC	(Coordinates, Nevada E. zone)	Elk Mountain

Collectors

Mackenzie Gordon, Jr.

R. R. Coats

William McCaslin

E. 604,800 ft

N. 2,566,700 ft

NE1/4 NW1/4 sec. 16, T. 45 N., R. 60 E., in southeast-trending tributary drainage of North Fork of Cottonwood Creek, 80 to 100 ft above bottom of drainage and just below clump of mountain mahogany trees.

Brachiopod, gen. and sp. indet.

Crurithyris sp.

Only the one recognizable genus is present. Although Crurithyris is a relatively long ranging form, the presence of fairly large specimens (10 mm long) in abundance to the exclusion of nearly all other genera is taken in this area to indicate an Early Permian age. What seems to be the same species is abundant in the Riepetown (Rib Hill) Sandstone, of Wolfcampian age, in the Ely mining district. Crurithyris is also abundant in beds of Leonardian age, where it commonly is accompanied by several other species of brachiopods.

B. R. Wardlaw,

Mackenzie Gordon, Jr.

November 28, 1975

85

A2 84

269

Field No.	Collection	Location	Quadrangle
74G5	25306-PC	(coordinates, Nevada E. zone)	Elk Mountain

Collectors

Mackenzie Gordon, Jr.

William McCaslin

E. 606,500 ft,

N. 2,567, 700 ft

SW1/4 SE1/4 sec. 9, T. 45 N., R. 60 E., on top of north-south-trending flat rocky nose, approx 2,000 ft N. 60° E. from field No. 74G4, alt approx 7,250 ft.

Crurithyris sp.

Same assemblage as in field No. 74G4 but in slightly fresher rock.

B. R. Wardlaw

Mackenzie Gordon, Jr.

November 28, 1975

8

A 285

~~A 290~~

Field No.	Collection No.	Location	Quadrangle
75G6	25307-PC	(Coordinates, Nevada E. zone)	Elk Mountain
Collector		E. 605,600 ft	
R. R. Coats		N. 2,567,800 ft	

SE1/4SW1/4 sec. 9, T. 45 N., R. 60 E., on northeast-trending nose, alt 7,440 ft, about 200 ft east from old claim monument on top of ridge.

Aviculopecten? sp. indet.

Crurithyris sp.

Small productoid, gen. and sp. indet.

Spiriferellina? sp. indet.

An Early Permian age is indicated.

B. R. Wardlaw

Mackenzie Gordon, Jr.

November 28, 1975

87

286

A ~~285~~

~~A 287~~

Pequop Formation

A288
~~A287~~

Field No.	Collection	Location	Quadrangle
B40	24447-PC	(coordinates, Nevada E. zone)	Elko 2°
Collector		E. 820,500 ft	
R. A. Hope		N. 1,961,500 ft	

West slope of ridge, approx 0.34 mi NW of sta. 49 and 250 ft down section, T. 26 N., R. 67 E., along ridge 2 mi E. of Boone Spring Hills. Pequop Formation.

Caninia sp.

Cladochonus sp.

Fenestrate bryozoan

Ramose bryozoans

This report concerns a small collection of corals and bryozoans from beds thought to belong to the Pequop Formation in Elko County, Nev. These fossils are compatible with a Permian age assignment for the beds in question.

W. J. Sando

March 22, 1971

A2 ~~88~~ 89

Field No.	Collection No.	Location	Quadrangle
B141	f23852	(Coordinates, Nevada E. zone)	Elko 2°
Collector		E. 642,300 ft	
R. A. Hope		N. 2,089,000 ft	

Two rock types were included in this sample. One is a coarse light-colored calcareous sandstone containing fragments of, and eroded, fusulinids. The other is a dark coarse-grained calcareous sandstone containing abundant fusulinids, many of which seem to be stained with a bright-red material resembling cinnabar.

The presence of Schwagerina sp. which can be recognized in this sample, suggests correlation with the Ferguson Springs Formation or the lower part the Pequop Formation. The Ely Limestone can be ruled out.

R. C. Douglass

March 5, 1968

90

A 289

Field No.	Collection No.	Location	Quadrangle
B143	f23849	(Coordinates, Nevada E. zone)	Elko 2°
Collector		E. 646,500 ft	
R. A. Hope		N. 2,082,000 ft	

Sta. 120, NE1/4 T. 30 N., R. 61 E., in low hills at south end of Valley Mountain, Fine sandy to silty limestone containing abundant fusulinids.

Parafusulina sp.

There is no conflict with your field determination of the Pequop Formation.

R. C. Douglass

March 5, 1968

A2 9/6

Field No.	Collection	Location	Quadrangle
B144	f23850	(Coordinates, Nevada E. zone)	Elko 2°
Collector		E. 650,200 ft,	
R. A. Hope		N. 2,084,000 ft	

Same general location as field No. B143 but across dirt road to the east. Dark silty limestone containing abundant fusulinids.

Schwagerina sp.

This sample fits well with the field assignment to the Pequop Formation.

R. C. Douglass

March 5, 1968

A 291

Field No.	Collection No.	Location	Quadrangle
B146	f23853	(Coordinates, Nevada E. zone)	Elko 2°
Collector		E. 662,200 ft	
R. A. Hope		N. 2,101,000 ft	

Lower Permian

SW cor. T. 31 N., R. 62 E., at south edge of Valley Mountain.

Limestone composed principally of fusulinids.

Parafusulina sp. comparable to that in field No. collection f23849 This sample represents Pequop Formation.

R. C. Douglass

March 5, 1968

A 292 3

Field No.	Collection No.	Location	Quadrangle
B153	f23851	(Coordinates, Nevada E. zone)	Elko 2°
Collector		E. 642,900 ft	
R. A. Hope		N. 2,089,000 ft	

NE1/4 T. 30 N., R. 61 E., on hill approx 2 mi NW of field No. B143, f23849.

This sample contains abundant specimens of fusulinids. The calcite filling of the shells is coarsely recrystallized, which has destroyed many details on the specimens.

Pseudoschwagerina sp. can be recognized.

The Ferguson Springs Formation or the lower part of the Pequop Formation is suggested. This sample is younger than any rock of the Ely Limestone I know.

R. C. Douglass

March 5, 1968

A 29~~3~~4

Field No.	Collection	Location	Quadrangle
B163	f23854	(Coordinates, Nevada E. zone)	Elko 2°
Collector		E. 629,000 ft,	
R. A. Hope		N. 2,179,000 ft	

SW1/4 T. 33 N., R. 61 E., near south end of East Humboldt Range. foothills on west side of range, approx 3.5 mi N. of south end of range. Just south of closed 7,000-ft contour west of crest.

Dark limestone with common fusulinids.

Parafusulina sp.

Your field determination of Pequop Formation instead of Ely Limestone is correct.

Lower Permian.

R. C. Douglass

March 5, 1968

A294 5

Field No.	Collection No.	Location	Quadrangle
B164	f23855	(Coordinates, Nevada E. zone)	Elko 2°
Collector		E. 640,600 ft	
R. A. Hope		N. 2,172,500 ft	

Near crt. 5 1/2 T. 33 N., R. 61 E., near south end of East Humboldt Range along southeast-trending ridge 1.9 mi SE. of peak 8,054-ft on hilltop (closed 6,800-ft contour). Dark limestone containing common fusulinids.

Parafusulina sp.

The Pequop Formation is indicated.

R. C. Douglass

March 5, 1968

A 295

Field No.	Collection	Location	Quadrangle
B165	f23856	(Coordinates, Nevada E. zone)	Elko 2°
Collector		E. 640,600 ft,	
R. A. Hope		N. 2,172,500 ft	

Same locality as field No. B164. Silty to sandy limestone containing scattered fusulinids.

Schwagerina sp.

The upper part of the Ferguson Springs Formation to the lower part of the Pequop Formation seems reasonable for this sample.

R. C. Douglass

March 5, 1968

A 296 ? (p. 298 follows as orig.)

THIS PAGE SHOULD BE CHECKED! NOT FOLLOWING SEQUENCE. C48 (N EXP 9. f23971 duplicated.

Field No.	Collection	Location	Quadrangle
C48	f23971	(Coordinates, Nevada E. zone)	Montello
Collector		E. 889,650 ft	
R. A. Hope		N. 2,411,200 ft	

SE1/4 sec. 9, T. 40 N., R. 69 E., bluff just east of Gamble Ranch with road running along base; Collection from cliffs near top of bluff, southeast of Gamble Ranch.

The fusulinids are not well preserved but represent either Schwagerina. sp. or a primitive Parafusulina sp.

R. C. Douglass May 19, 1969

Lower Permian

Collector	E. 640,600 ft
R. A. Hope	N. 2,172,500 ft

Same locality as f23855 (above).

Silty to sandy limestone with scattered fusulinids.

Schwagerina sp.

Late Ferguson Springs to early Pequop seems reasonable for this sample.

R. C. Douglass

March 5, 1968

A 298

Or is it this pg. that is [illegible]

Field No.	Collection	Location	Quadrangle
C48	f23971	(Coordinates, Nevada E. zone)	Montello
Collector		E. 889,650 ft	
R. A. Hope		N. 2,411,200 ft	

SE1/4 sec. 9, T. 40 N., R. 69 E., bluff just east of Gamble Ranch with road running along base; collection from cliffs near top of bluff, southeast of Gamble Ranch.

The fusulinids are not well preserved but represent either Schwagerina sp. or a primitive Parafusulina sp.

Lower Permian.

R. C. Douglass

May 19, 1969

SEE previous page 1st entry

(298 ? 98)

Field No.	Collection No.	Location	Quadrangle
C49	f23972	(Coordinates, Nevada E. zone)	Twelve Mile Ranch
Collector		E. 891,500 ft	
R. A. Hope		N. 2,419,950 ft	

SW. cor. sec. 33, T. 41 N., R. 69 E., on ridge just below the volcanic rocks.

Slightly different lithology, but a comparable fauna to that of field No. C-48, f23971.

Lower Permian.

R. C. Douglass

May 19, 1969

A 299

Field No.	Collection No.	Location	Quadrangle
D-2	f24157	(Coordinates, Nevada E. zone)	Nine Mile Mountain NE.
Collector		E. 863,600 ft	
R. A. Hope		N. 2,418,250 ft	

Siltstone containing scattered fossil debris including brachiopods, bryozoans, gastropods, crinoid columnals, and fusulinids. The fusulinids, at least, are partialy silicified.

The fusulinid is a small slender Schwagerina sp. with advanced septal fluting--close to Parafusulina sp. and compatible with the assignment to the Pequop Formation.

R. C. Douglass

March 19, 1970

A 300

Field No.	Collection	Location	Quadrangle
D-3	f24158	(Coordinates, Nevada E. zone)	Nine Mile Mountain NE.
Collector		E. 864,900 ft	
R. A. Hope		N. 2,420,950 ft	

Fine grained sandstone containing scattered fusulinids, mostly fragmental. They represent a Schwagerina sp. similar to that in field No. D2.

R. C. Douglass

March 19, 1970

A301

Field No.	Collection	Location	Quadrangle
D-4	f24159	(Coordinates, Nevada E. zone)	Nine Mile Mountain NE.
Collector		E. 865,600 ft	
R. A. Hope		N. 2,420,750 ft	

Siltstone containing scattered fragments of brachiopods, bryozoans, crinoidal debris, and fusulinids.

Schwagerina sp., a thin-walled form with advanced fluting.

R. C. Douglass

March 19, 1970

A 302

Field No.	Collection No.	Location	Quadrangle
D-5	f24160	(Coordinates, Nevada E. zone)	Twelve Mile Ranch
Collector		E. 866,900 ft	
R. A. Hope		N. 2,424,600 ft	

Silty sandstone containing abundant fossil fragments, including:

Parafusulina sp. primitive form

Schwagerina sp.

All of this suite falls within the range of the Pequop Formation as you have determined in the field. The lowest sample is still Permian and of approximately the same age as the Arcturus Limestone in the Ely area.

R. C. Douglass

March 19, 1970

A 303

Field No.	Collection	Location	Quadrangle
D28	f24161	(Coordinates, Nevada E. zone)	Elko 2°
Collector		E. 635,100 ft,	
R. A. Hope		N. 2,183,400 ft	

SW1/4 T. 33 N., R. 61 E., east Humboldt Range, southeast spur, top of ridge on closed 8,000-ft contour (0.25 in. due north of "8" in "8054."). Purple siltstone containing scattered fusulinids.

Pseudofusulina sp.

This form is expectable in the Pequop Formation but would be found more commonly in the Riepe Spring Limestone or Ferguson Mountain Formation.

R. C. Douglass

March 19, 1970

A 304

Field No.	Collection	Location	Quadrangle
71F7	f24424	(coordinates, Nevada E. zone)	Elko 2o-degree
Collector		E. 627,500 ft,	
R. A. Hope		N. 2,183,500 ft	

NE1/4 sec. 18, T. 33 N., R. 61 E., on west side of southern East Humboldt Range.

The presence of a large early Parafusulina sp. in this sample suggests a Leonardian age. Your assignment to the Pequop Formation is reasonable.

R. C. Douglass

December 13, 1971

A 305

Field No.	Collection	Location	Quadrangle
L51	26891-PC	(Coordinates, Nevada E. zone)	Montello Canyon

Collectors

N. R. D. Albert

Ron LeCompte

E. 860,950 ft

N. 2,406,100 ft

Bryozoa

Rhabdomesid, indet. 1

Streblotrypa sp. 1

Probable new species; similar specimens occur in collns. 26893-PC, 26894-PC, and 26896-PC of this report. This Streblotrypa sp. appears to be widespread in the Western United States and probably ranges from the Pennsylvanian into the Permian. Similar specimens occur in the probable Oquirrh Limestone of the Matlin Mountains, Utah (WMR-73-9, bryozoans reported Nov 9, 1973; WMR-73-12, bryozoans, reported June 22, 1976) in upper Paleozoic strata, Strevell quadrangle, Cassia County, Idaho (CMR-74-10, Bryozoans, reported Dec 2, 1974), and in the Arco 4 NE. quadrangle, Butte County, Idaho (CEG-76-1, bryozoans, reported Oct. 8, 1976).

Tabulipora sp. 1

Probable new species similar to T. carbonaria (Worthen). The known range of T. carbonaria is Middle Pennsylvanian to Early Permian (Cuffey, 1967).

<u>Timanodictya</u>(?) sp. 1

Probable new species; similar specimens occur in collns. 26893-PC and 26894-PC of this report. Timanodictyids are typically of Permian age; they are not known to occur in strata older than Permian.

O. L. Karklins

June 6, 1977

Brachiopoda

<u>Peniculauris</u> sp.

B. R. Wardlaw

September 30, 1977

A 307

Unnamed Bioclastic Limestone

A 308

Field No.	Collection	Location	Quadrangle
76	26892-PC	(Coordinates, Nevada E. zone)	Montello Canyon
Collectors		E. 859,900 ft	
N. R. D. Albert		N. 2,406,700 ft	
Ron LeCompte			

Timanodictya sp. 3

Probable new species; similar specimens occur in collns. 26893-PC and 26894-PC of this report. This species appears to resemble *T. dichotoma* (Stuckenberg) of the Early Permian in the U.S.S.R.

O. L. Karklins

June 6, 1977

Aviculopecten sp.

B. R. Wardlaw

September 30, 1977

A 309

Field No.	Collection No.	Location	Quadrangle
187	26893-PC	(Coordinates, Nevada E. zone)	Montello Canyon

Collectors

N. R. D. Albert

Ron LeCompte

E. 858,875 ft

N. 2,408,900 ft

Bryozoa

Streblotrypa sp. 6

As in collns. 26891-PC, 26894-PC, and 26896-PC of this report.

Timanodictya sp. 6

As in collns. 26892-PC and 26894-PC of this report.

Timanodictya(?) sp. 5

As in collns. 26891-PC and 26894-PC of this report.

O. L. Karklins

June 6, 1977

Brachiopoda

Peniculauris sp.

Quadrichonetes?

B. R. Wardlaw

September 30, 1977

A310

Field No.	Collection	Location	Quadrangle
P14	26894-PC	(Coordinates, Nevada E. zone)	Montello Canyon

Collectors

N. R. D. Albert

Ron LeCompte

E. 859,500 ft

N. 2,406,000 ft

Fenestelloids, indet.	3
Stenoporids(?), indet.	2
Streblotrypa sp.	4

As in collns. 26891-PC, 26893-PC and 26896-PC of this report.

Timanodictya sp.	2

As in collns. 26892-PC and 26893-PC of this report.

Timanodictya(?) sp.	3

As in collns. 26891-PC and 26893-PC of this report.

O. L. Karklins

June 6, 1977

A 311

Field No.	Collection	Location	Quadrangle
73A29	26895-PC	(Coordinates, Nevada E. zone)	Montello Canyon

Collectors

N. R. D. Albert

Ron LeCompte

E. 859,400 ft

N. 2,409,600 ft

Tabulipora(?) sp. 1

Probable new species and different from the one in colln. 26891-PC of this report.

O. L. Karklins

June 6, 1977

A 312

Field No.	Collection	Location	Quadrangle
347	26896-PC	(Coordinates,	Nine Mile Mountain
NE.			
		Nevada E. zone)	
Collectors		E. 859,550 ft	
N. R. D. Albert		N. 2,418,150 ft	
Ron LeCompte			

Rhombotrypella sp. 4

Probable new species. Rhombotrypella is known to range from the Pennsylvanian into the Permian. Similar species occur commonly in strata of late Paleozoic age in the Western United States.

Streblotrypa sp. 5

As in collns. 26891-PC, 26893-PC, and 26894-PC of this report.

O. L. Karklins

June 6, 1977

The bryozoans in these samples are of some stratigraphic interest. Timanodictya is known to occur only in strata of Permian age; it is widespread in the U.S.S.R. and in some regions of the Far East, and is common in the Western United States. Timanodictya sp. in samples of this report, however, appear to be slightly different from those occurring in other areas of the Western United States or in the U.S.S.R. Rhombotrypella, Streblotrypa, and Tabulipora are typical upper Paleozoic genera. Specimens of these genera of this report appear to belong to new species; they also seem to be widespread in the Western United States but have so far remained undescribed.

Samples containing Timanodictya indicate a Permian age for the strata.

Species of other genera do not contradict a Permian age but can also be older.

O. L. Karklins

June 6, 1977

A-316

Field No.	Collection No.	Location	Quadrangle
78	23-D	(Coordinates, Nevada E. zone)	Montello Canyon

Collectors

N. R. D. Albert

Ron LeCompte

E. 860,475 ft

N. 2,408,180 ft

Brachiopoda

Leiorhynchoidea?

Lingula sp.

Aulostegid brachiopod

Spiriferoid brachiopod

B. R. Wardlaw

September 30, 1977

A 315

Field No.	Collection	Location	Quadrangle
L98	22-D	(Coordinates, Nevada E. zone)	Montello Canyon

Collectors

N. R. D. Albert

Ron LeCompte

E. 852,400 ft

N. 2,406,025 ft

Brachiopoda

Composita sp.

Meekella sp.

Peniculauris?

B. R. Wardlaw

September 30, 1977

A 316

Field No.	Collection	Location	Quadrangle
73A28	26-D	(Coordinates, Nevada E. zone)	Montello Canyon

Collectors

N. R. D. Albert

Ron LeCompte

E. 853,100 ft

N. 2,404,675 ft

Brachiopoda

Aviculopecten sp.

Meekella sp.

Aulostegid? brachiopod

B. R. Wardlaw

September 30, 1977

A 317

Field No.	Collection	Location	Quadrangle
P-10	25-D	(Coordinates, Nevada E. zone)	Montello Canyon

Collectors

N. R. D. Albert

Ron LeCompte

E. 860,450 ft

N. 2,408,025 ft

Brachiopoda

Peniculauris sp.

B. R. Wardlaw

September 30, 1977

A318

Field No.	Collection No.	Location	Quadrangle
P-8	24D	(Coordinates, Nevada E. zone)	Montello Canyon
Collector		E. 860,450 ft	
N. R. D. Albert		N. 2,408,900 ft	

Brachiopoda

Leiorhynchoidea sp.

B. R. Wardlaw

September 30, 1977

A 319

Field No.	Collection	Location	Quadrangle
344	---	(Coordinates,	Nine Mile Mountain
NE.			
		Nevada E. zone)	
Collectors		E. 859,750 ft	
N. R. D. Albert		N. 2,419,225 ft	
Ron LeCompte			

Brachiopoda:

Peniculauris sp.

All these collections appear to be from the same unit. *Meekella* does not occur above the Lower Permian in the Great Basin, its highest occurrence is in the Kaibab Limestone and in the Grandeur Member of the Park City Formation. It also is common in the Pequop Formation. *Peniculauris* is common to the upper part of the Pequop Formation, the Kaibab Formation, and the Grandeur Member of the Park City Formation. I know of no aulostegids from the Kaibab or the Grandeur; they occur, however, below in the Pequop (Arcturus) Formation and above in the uppermost part of the Plympton and Gerster Formations and in their equivalents. This occurrence suggests a correlation with the Pequop Formation. The abundant bryozoans found in these rocks, I have seen locally only in the Pequop Formation in the Leach Mountains.

A320

Meekella and Peniculauris are strictly Lower Permian. The lowest occurrence of Peniculauris is in the basal Leonardian (of fusulinid workers) which is equivalent the upper Wolfcampian of brachiopod workers. It is not abundant or common until definite Leonardian (the Cathedral Mountain Formation of western Texas) and carries over into the Roadian (uppermost Leonardian of same). I think a fairly reliable Leonardian age can be assigned to these rocks, as well as a fairly firm correlation with the Pequop Formation. A few of the larger collections are being etched for conodonts, and these will be reported on upon recovery.

B. R. Wardlaw

September 30, 1977

Park City Group

A322

Field No.	Collection	Location	Quadrangle
61NC107	21583-PC	(coordinates, Nevada E. zone)	Double Mountain
Collector		E. 460,100 ft,	
R. R. Coats		N. 2,447,600 ft	

Sta. 346, SE1/4 sec. 2, T. 41 N., R. 55 E. Pale buff siltstone.

Bryozoan

Crinoid columnals

productoid cf. Canerinella phosphatica (Girty)

Pugnoides sp.

Pugnoides? sp.

Leiorhynchus sp. indet.

"*Spirifer*" aff. "*S.*" *texanus* Meek

Hustedia cf. *H.* *phosphoriensis* Branson

Streblochondria? cf. *S.*? *montpelierensis* (Girty)

Cyrtorostra *varicostata* Branson

pelecypod, indet.

pleurotomariaceann gastropod, indet.

This collection resembles collns. 21584-PC and 21585-PC reported on in shipment SW-62-23 and the enclosing beds are equivalent to the Park City Formation to the east and the Edna Mountain Formation to the southwest.

Mackenzie Gordon, Jr.

E. L. Yochelson

June 18, 1964

A323

Field No.	Collection No.	Location	Quadrangle
62NC37	21593-PC	(Coordinates, Nevada E. zone)	Double Mountain
Collector		E. 460,550 ft	
R. R. Coats		N. 2,447,750 ft	

bryozoan

spinose productoid cf. Echinauris sp. indet.

costellate productoid cf. Cancrinella phosphatica (Girty)

Pugnoides sp.

Pugnoides? sp.

Leiorhynchus? sp. indet.

Rhynchopora cf. R. taylori Girty

"Spirifer" aff. "S." texanus Meek

spiriferoid, indet.

Hustedia cf. H. phosphoriensis Branson

Cleiothyridina? sp. indet.

Composita? sp.

Beecheria sp.

Girtyella sp.

Streblochondria? cf. S.? montpelierensis (Girty)

Cyrtorostra varicostata Branson

pelecypod, indet.

pleurotomariacean gastropod, gen. and sp. indet.

ostracodes

A324

This is the same fauna as that reported from collns. 21583-PC, 21584-PC, and 21585-PC, which is equivalent to that of the Park City Formation to the east and the Edna Mountain Formation to the southwest.

With regard to the unknown pleurotomariacean gastropod, E. L. Yochelson commented, in part, as follows:

> "I am unable to assign a generic name to the material from 21593-PC (62NC37). With the possible exception of two lower spired specimens, which might be the result of crushing, all material seems to be conspecific. This pleurotomariacean has fine spiral lirae on the base, a moderately high spire and a selenizone on the side of the whorl. It is not Glyptotomaria, nor Rhineoderma. It may be a Neilsonia, but if it is, the species is most atypical. If younger faunas are considered, then one can draw comparisons with the Permian "Worthenia" arizonensis Winters. This bears much coarser ornament on the base, but has a shape and position of selenizone which are similar. Beyond saying that I think this is probably upper Paleozoic, I cannot assign an age to this gastropod."

Mackenzie Gordon, Jr.

June 19, 1964

Field No.	Collection	Location	Quadrangle
62NC38	21584-PC	(Coordinates, Nevada E. zone)	Double Mountain
Collectors		E. 460,580 ft	
R. R. Coats		N. 2,446,700 ft	
K. A. Howard			

Bryozoan mold

crinoid columnals

Echinauris sp.

Pugnoides sp.

Leiorhynchus sp.

Rhynchopora cf. *R. taylori* Girty

"Spirifer" aff. S. texanus Meek

Hustedia cf. *H. phosphoriensis* Branson

Composita sp. indet.

Streblochondria? sp. indet.

Crytorostra varicostata Branson

pleurotomariacean gastropod, indet.

This collection is Permian and appears to be equivalent to part of the middle or upper part of the Park City Formation. The spiny productoid brachiopod *Echinauris* sp. is closely related to *E. subhorrida* (Meek) and may be a variant of it. *E. subhorrida* occurs in the Franson and Ervay Members of the Park City Formation, as does also *Hustedia phosphoriensis* and the pectenoid pelecypod *Cyrtorostra varicostata*. The species referred here to *Hustedia*, *Leiorhynchus*, *Rhynchopora*, and "*Spirifer*", occur also in the Edna Mountain Formation near Golconda, Nev., locally in a rock type almost

A326

identical with that of this collection. The name "Edna Mountain Formation" certainly is a candidate for use in the Owyhee and Mountain City quadrangles to be applied to these beds of Permian age.

Mackenzie Gordon, Jr.

June 8, 1964

A 327

Field No.	Collection	Location	Quadrangle
62NC102	21586-PC	(coordinates, Nevada E. zone)	The Narrows

Collectors

R. R. Coats

K. A. Howard

E. 495,300 ft,
N. 2,348,500 ft

Composita sp.

Crurithyris? sp. indet.

Echinauris sp.

Hustedia cf. *H. phosphoriensis* Branson

Leiorhynchus? sp.

Punctospirifer n. sp.

spiriferoid brachiopod, indet.

Waagenoconcha sp.

Aulosteges? sp.

This collection, from a limestone bed, is likewise equivalent to part of the Park City Formation. The small *Punctospirifer* appears to be the same as that which is abundant in the uppermost of four informal units of Permian age mapped by Smith and Ketner (1978) in the Carlin region; in fact, it occurs in the highest fossiliferous bed in their Permian section.

Mackenzie Gordon, Jr.

June 8, 1964

A328

Field No.	Collection	Location	Quadrangle
62NC302	---	(Coordinates, Nevada E. zone)	Double Mountain
Collector		E. 460,450 ft	
K. A. Howard		N. 2,455,800 ft	

Pugnoides sp.

Rhynchopora cf. *R. taylori* Girty?

"*Spirifer*" cf. "*S.*" *texanus* Meek

Hustedia cf. *H. phosphoriensis* Branson

Beecheria? sp. indet.

Nuculoidea sp.

pleurotomariacean gastropod, indet.

Same fauna and formation as colln. 21593-PC.

Mackenzie Gordon, Jr.

June 19, 1964

A 329

Field No.	Collection	Location	Quadrangle
63NC50	---	(Coordinates, Nevada E. zone)	The Narrows
Collector		E. 496,250 ft	
R. R. Coats		N. 2,345, 250 ft	

bryozoans

Waagenoconcha? sp. indet.

Echinauris sp.

spinose productoid, gen. and sp. indet.

Hustedia cf. H. phosphoriensis Branson?

pectenoid pelecypod, indet. (2 fragments)

This collection is post-Wolfcampian (Permian). Lithologically and in faunal composition it rather resembles colln. 21586-PC (field no. 62NC102) (loc. SW-62-23) but is more meager in the number of species present.

Mackenzie Gordon, Jr.

June 22, 1964

A330

Field No.	Collection	Location	Quadrangle
65NC6	24685-PC	(coordinates, Nevada E. zone)	Delaplain
Collector		E. 728,000 ft,	
R. R. Coats		N. 2,603,300 ft	

North side of unmapped road west of Contact, Nev., sec. 5, T. 46 N., R. 64 E.

Ostracoda:

Cavellina? sp. steinkerns only

Gen. aff. *Geisina* sp. or spp.

I. G. Sohn

December 8, 1971

Ellisonia sp.

Neostreptognathodus sulcoplicatus (Youngquist, Hawley, and Miller)

This fauna indicates an Early Permian (Leonardian) [Roadian] age. It is roughly equivalent to the Meade Peak Phosphatic Shale member of the Phosphoria Formation. The conodont color-alteration index is 4, indicating maximum host-rock temperatures of 190o to 230oC.

B. R. Wardlaw

November 3, 1977

A331

Field No.	Collection	Location	Quadrangle
65NC7	24686-PC	(Coordinates, Nevada E. zone)	Delaplain
Collector		E. 727,150 ft,	
R. R. Coats		N. 1,603,700 ft	

Ostracoda

Cavellina? sp., steinkerns only

Gen. aff. *Geisina* spp.

Gen. indet., small, smooth

I. G. Sohn

December 8, 1971

Ellisonia sp.

Neostreptognathodus n. sp.

This fauna indicates an Early Permian (Leonardian [Roadian], or Guadalupian [Wordian] age. It also is roughly equivalent to the Meade Peak Phosphatic Shale member of the Phosphoria Formation. The color-alteration index is 3-1/2, indicating maximum host-rock temperatures of 190o to 230oC.

B. R. Wardlaw

November 3, 1977

A332

Field No.	Collection	Location	Quadrangle
65NC9	24687-PC	(Coordinates, Nevada E. zone)	Contact
Collector		E. 711,500 ft,	
R. R. Coats		N. 2,604,230 ft	

West of divide between Salmon Falls Creek and Cottonwood Creek, sec. 2, T. 46 N., R. 64 E.

Ostracoda

Cavellina? sp. 1 steinkern

Gen. aff. *Geisina* sp. more elongate than any above.

Gen. indet., small, smooth

I. G. Sohn

December 8, 1971

Conodonts

Ellisonia sp.

Neostreptognathodus n. sp.

This fauna indicates the same age as for colln. 24686-PC, Early Permian (Roadian or Wordian).

B. R. Wardlaw

November 3, 1977

A333

Phosphoria Formation

A334

Field No.	Collection	Location	Quadrangle
60NC10	---	(Coordinates, Nevada E. zone)	Wild Horse
Collector		E. 449,100 ft,	
R. R. Coats		N. 2,530,400 ft	

The following species were identified from this collection:

Cavusgnathus sp. A	43
Gondolella cf. *idahoensis*	5
Hindeodellid fragments	10
Idiognathodus sp. A	325
Idiognathoides sp. A	12
Ligonodina sp.	1
Ozarkodina sp.	10
Prioniodina sp.	1
Streptognathodus sp.	1

In addition to other fragments of conodonts the collection also contains fish teeth, foraminifers, and ostracodes. Permian(?).

J. W. Huddle

March 14, 1963

This sample contains abundant small foram inifers, including:

Abundant small attached forms of several kinds

Bradyina sp.

Climacammina sp.

Tetrataxis sp.

A335

Several small fusulinid foraminifers are also present. The adsence of inner volutions suggests that what is preserved is the outermost volution of the shells available. Although definite identification can be made, suggest that these forms represent an early Middle Pennsylvanian (late Atokan) age. If the forms preserved are parts of juvenile specimens, the data do not warrant an age determination narrower than Pennsylvanian. It is unlikely that these forms could have originally been deposited during the Permian, although they could possibly have been reworked into deposits of Permian age.

R. C. Douglass

April 18, 1963

A336

Field No.	Collection No.	Location	Quadrangle
60NC11	---	(Coordinates, Nevada E. zone)	Wild Horse
Collector		E. 449,120 ft	
R. R. Coats		N. 2,530,400 ft	

This collection contains the following conodonts:

Bryantodus sp.	1
Cavusgnathus sp. A	119
Gnathodus sp.	7
Gondolella cf. *idahoensis*	38
Hibbardella sp.	1
Idiognathodus sp. A	115
Idiognathoides sp. A	259
Ligonodina sp.	3
Neoprioniodus sp.	2
Ozarkodina sp.	3
Prioniodina sp.	4
Spathognathodus sp.	1
Streptognathodus sp. A	2
Streptognathodus? sp. B	22

Also in the collection are numerous fragments of conodonts and poorly preserved fish teeth, foraminifers, and ostracodes.

A337

Field Nos. 60 NC 10 and 60 NC 11 are regarded as Permian (?). Gondolella idahoensis was described from the Phosphoria Formation in Idaho has never been reported from any other horizon. However, Late Pennsylvanian and Permian faunas are not well known and the fauna represented by the Elko County, Nev., collections is much larger than the Phosphoria fauna described by Youngquist and others (1951).

The other genera in the two collections indicate a Middle Pennsylvanian to Permian age.

J. W. Huddle

March 14, 1963

This sample contains a few foraminifers including:

Bradyina sp.

Climacammina sp.

?Endothyra sp.

Preservation in this sample is very poor, and 50 little more can be said of the age significance of the foraminifers than late Paleozoic.

R. C. Douglass

April 18, 1963

A338

Field No.	Collection	Location	Quadrangle
61NC29	21582-PC	(Coordinates, Nevada E. zone)	Wild Horse
Collector		E. 446,700 ft,	
R. R. Coats		N. 2,527,050 ft	

The gastropods in this sample were identified by E. L. Yochelson, and the rest of the fossils by Mackenzie Gordon Jr. Details of the collections follow.

Paleozoic graphitic siltstone. SW1/4SE1/4 sec. 21, T. 44 N., R. 55 E., 400 ft E. of road near crest of small ridge.

horn corals

bryozoans

crinoid columnal

Rhipidomella cf. *R. carbonaria* (Swallow)

Chonetes sp.

small semireticulate productoid brachiopod, indet.

spiriferoid brachiopod, indet. (fragmentary molds)

Nuculoidea sp.

Parallelodon sp.

Schizodus sp.

Cypricardella sp.

bellerophontacean, indet.

Peruvispira sp.

Trepospira sp.

pleurotomariacean cf. Glabrocingulum sp. indet.

pleurotomariacean, indet.

Donaldina? sp.

Meekospira? sp.

Paleostylus? sp.

Ianthinopsis sp. indet.

Anomphalus sp.

The fauna, in general, has a Carboniferous to Permian aspect and it is the gastropods, of which 10 species are recognized, that are of most help. Regarding them, E. L. Yochelson stated, "Peruvispira seems to be a good indicator of Permian age. However, with such scanty material, I hesitate to make a definite statement." Peruvispira is reported in the "Treatise on Invertebrate Paleontology" to range from Lower to Middle Permian, or approximately through the Lower Permian of U.S. Geological Survey usage. It has turned up, however, in at least one Nevada collection in association with fusulinids considered by R. C. Douglass to be late Virgilian (latest Pennsylvanian).

Mackenzie Gordon, Jr.

June 18, 1964

A 340

Field No.	Collection No.	Location	Quadrangle
64G27	22815-PC	(Coordinates, Nevada E. zone)	Wild Horse

Collectors

Machenzie Gordon, Jr.

R. R. Coats

Don Dean

E. 449,100 ft

N. 2,530,200 ft

Limestone float on low ridge trending north-south, approx 1,500 ft S. of road where it trends north toward Poorman Creek. NW1/4 NW1/4 sec. 22, T. 44 N., R. 55 E. (same location as loc. 188).

Gondolella cf. *G. clarki* Koike	3
Idiognathoides sinuata Harris and Hollingsworth	31
Streptognathodus meekerensis Murray and Chronic	138

This collection is probably Early Pennsylvanian, but it might be as young as Middle Pennsylvanian.

This collection also contains ostracodes and foraminifers.

J. W. Huddle

April 19, 1968

A341

Field No.	Collection	Location	Quadrangle
64G27A	22816-PC	(Coordinates, Nevada E. zone)	Wild Horse

Collectors

Mackenzie Gordon, Jr.,

R. R. Coats

Don Dean

E. 449,100 ft

N. 2,530,400 ft

NW1/4 NW1/4 sec. 22, T. 44 N., R. 55 E. (same as Coats sta. 188 and Gordon field No. 64G27, but on east side of road), 1,300 ft S. of Humboldt National Forest boundary. Bryozoans in unnamed limestone.

Horn coral, indet.

Crinoid debris

Fistuliporoid bryozoans, bilamellar fronds

Rhombotrypella sp.

Stenoporiod bryozoan debris, indet.

Rhomboporoid bryozoans, indet.

Fenestella sp.

shell fragments

The rock is a conglomeratic limestone in which the fossils are clastic particles, mostly too fragmentary for identification. The presence of Rhombotrypella indicates that the beds in question are Pennsylvanian or Permian. The fistuliporoid and Rhyombotrypella seem to be much like those in

collns. 22811-PC and 22817-PC, which is supposed to have come from the Sunflower Formation of Coash (1967) and was dated at Late Pennsylvanian by R. C. Douglass (report of Aug. 3, 1967).

Helen Duncan

August 30, 1967

A743

Gerster and Phosphoria Formations

A344

Field No.	Collection No.	Location	Quadrangle
C35	---	(Coordinates, Nevada E. zone)	Dairy Valley
Collector		E. 901,250 ft	
R. A. Hope		N. 2,472,150 ft	

SE1/4 sec. 11, T. 42 N., R. 69 E., near top of approx 6,280(-) ft summit along ridge just south of Long Canyon.

Two samples were submitted, both contain brachiopods. The first contained a few chonetids and is being returned. The second contained silicified productids, among other things, and is being retained for the reference collection.

Neochonetes sp.

This form ranges from the Pennsylvanian through the Permian. If Grant Steele found Permian fusulinids in this unit, the brachiopods do not contradict that determination; however, neither do they confirm it.

R. E. Grant

December 16, 1968

A345

Field No.	Collection No.	Location	Quadrangle
C41	23747-PC	(Coordinates, Nevada E. zone)	Dairy Valley
Collector		E. 902,700 ft	
R. A. Hope		N. 2,481,400 ft	

SW1/4 sec. 36, T. 43 N., R. 69 E.

Composita? sp.

Just an edge is visible.

Derbyia sp.

Plicated and rugose, as in so many Permian species of this genus, perhaps "*Plicatoderbyia*" of Thomas, a Phosphoria form.

Waagenoconcha sp.

This confirms a Permian age (*Waagenoconcha* is very rare and only doubtfully documented outside the Permian). The genus ranges through much of the Permian, however, and so this occurrence cannot be used to date the sample precisely. It is most abundant in rocks of Leonardian and Guadalupian age.

R. E. Grant

December 16, 1968

A 346

Edna Mountain Formation

A 347

Field No.	Collection No.	Location	Quadrangle
62NC12	---	(Coordinates, Nevada E. zone)	Double Mountain
Collectors		E. 458,200 ft	
R. R. Coats		N. 2,450,200 ft	
K. A. Howard			

Hustedia cf. *H. phosphoriensis* Branson

Leiorhynchus? sp.

Pugnoides sp.

"*Spirifer*" aff. "*S.*" *texanus* Meek

Mackenzie Gordon, Jr.

June 19, 1964

A 348

Field No.	Collection No.	Location	Quadrangle
62NC13	21594-PC	(Coordinates, Nevada E. zone)	Double Mountain
Collectors		E. 457,800 ft	
R. R. Coats		N. 2,449,100 ft	
K. A. Howard			

horn coral

sponge spicules

Strophalosia sp.

Leiorhynchus sp.

Leiorhynchus? sp. indet.

Pugnoides sp.

"*Spirifer*" aff. "*S.*" *texanus* Meek

Hustedia cf. *H. phosphoriensis* Branson

Cleiothyridina sp. indet. .(fragment)

Same fauna and formation as the preceding (62NC12).

Mackenzie Gordon, Jr.

June 19, 1964

A-349

Field No.	Collectoin	Location	Quadrangle
62NC39	21585-PC	(Coordinates, Nevada E. zone)	Wild Horse
Collectors		E. 450,550 ft	
R. R. Coats		N. 2,459,900 ft	
K. A. Howard			

horn coral

Orbiculoides sp.

Strophalosia sp.

Pugnoides sp.

Leiorhynchus 2 sp.

"*Spirifer*" aff. "*S.*" *texanus* Meek

Spirifer? sp. indet.

Hustedia cf. *H. phosphoriensis* Branson

Cleiothyridina sp.

This collection also is believed to represent the Edna Mountain Formation in this area and is Permian.

Mackenzie Gordon, Jr.

June 8, 1964

A350

Field No.	Collection	Location	Quadrangle
62NC319	21587-PC	(Coordinates, Nevada E. zone)	Mountain City
Collector		E. 447,400 ft	
K. A. Howard		N. 2,557,200 ft	

Conocardium? sp. indet.

Crurithyris sp.

Leiorhynchus sp.

Pelecypods, indet.

squid pen?

There is much less to go on in this collection, but the brachiopods and lithology both suggest that it belongs with the preceding collections in the Edna Mountain Formation or equivalent beds.

Mackenzie Gordon, Jr.

June 8, 1964

Field No.	Collection	Location	Quadrangle
64NC132	23778-PC	(Coordinates, Nevada E. zone)	Wild Horse
Collector		E. 444,000 ft	
R. R. Coats		N. 2,464,000 ft	

Sta. 951, SW1/4 sec. 21, T. 42 N., R. 55 E., near prominent ledge of conglomerate, on brow of slope southwest of sharp bend in gulch. Brachiopod molds in sandstone, Edna Mountain Formation.

Hustedia aff. *H. phosphoriensis* Branson

Spiriferella sp. A.

Pelecypod, indet.

Rhynchonelloid, gne. and sp. indet.

Terebratuloid, gen. and sp. indet.

Mackenzie Gordon, Jr.

April 25, 1969

A352

Field No.	Collection	Location	Quadrangle
64NC133	---	(Coordinates, Nevada E. zone)	Wild Horse
Collector		E. 444,100 ft,	
R. R. Coats		N. 2,462,900 ft	

NW1/4 NW1/4 sec. 28, T. 42 N., R. 55 E., Brachiopod molds in sandstone.

Spiriferella sp. A

Mackenzie Gordon, Jr.

April 25, 1969

A353

Field No.	Collection No.	Location	Quadrangle
64NC134	---	(Coordinates, Nevada E. zone)	Wild Horse
Collector		E. 445,600 ft,	
R. R. Coats		N. 2,458,200 ft	

S1/2 sec. 28, T. 42 N., R. 55 E., approx 0.5 mi W. of Divide Triangulation Station. Sandstone with brachiopod molds. Edna Mountain Formation.

Spiriferella sp. A

Mackenzie Gordon, Jr.

April 25, 1969

A 352

Field No.	Collection	Location	Quadrangle
64NC142	23779-PC	(Coordinates, Nevada E. zone)	North Fork
Collector		E. 450,500 ft	
R. R. Coats		N. 2,452,750 ft	

Near and on south side of crest of ridge trending southwest, 50 ft SE. of and below prominent ledge on brow of hill. Float, but nearly in place. Brachiopod molds in sandstone, Edna Mountain Formation.

Chonetid, gen. and sp. indet.

Rhynchopora sp.

Spiriferella sp. A

Straparollus? sp. indet.

Mackenzie Gordon, Jr.

April, 25, 1969

A355

Field No.	Collection	Location	Quadrangle
64NC147	23780-PC	(Coordinates, Nevada E. zone)	North Fork
Collector		E. 453,000 ft	
R. R. Coats		N. 2,449,500 ft	

Near ctr. sec. 3, T. 41 N., R. 55 E., on top of 20-ft-high hill between two higher hills. Brachiopod and cephalopod molds in sandstone. Edna Mountain Formation.

Rhynchopora? sp.

Spiriferella sp. A

Cleiothyridina sp.

Beecheria? sp. indet.

Phestia sp.

Conocardium? sp. indet.

Pleuronautilus (*Huanghoceras*) sp.

Mackenzie Gordon, Jr.

April 25, 1969

A 356

Field No.	Collection	Location	Quadrangle
67NC42	23216-PC	(Coordinates, Nevada E. zone)	North Fork
Collector		E. 450,600 ft	
R. R. Coats		N. 2,450,900 ft	

NE1/4SW1/4 T. 41 N., R. 55 E., Mold fauna in Edna Mountain Formation.

Orbiculoidea sp.

Rhynchopora? sp.

Spiriferella sp.

Cleiothyridina sp.

Like numerous other collections on the Wells 2o AMS sheet, this collection is from the Edna Mountain Formation and is dominated by an undescribed species of Spiriferella with obsolete sculpture. Part of the collection is being retained pending a possible overall study of this fauna.

Mackenzie Gordon, Jr.

January 30, 1968

A 359

Field No.	Collection	Location	Quadrangle
70NC38	24778-PC	(coordinates, Nevada E. zone)	California Mountain
Collector		E. 399,350 ft,	
R. R. Coats		N. 2,440,550 ft	

Lower east slope of Independence Mountains, approx 1 mi NW. of Evans Ranch headquarters, south side of knoll, just east of pass.

Beecheria sp.

Cancrinella cf. *C. phosphatica* (Girty)

Chonetid, gen. and sp. indet.

Composita cf. *C. mira* Girty

Hustedia cf. *H. phosphoriensis* Branson

Rhynchopora cf. *R. taylori* Girty

Sphenosteges aff. *S. hispidus* (Girty)

Spiriferella sp. A

Xestotrema aff. *X. pulchrum* (Meek)

Yakovlevia aff. *Y. multistriata* (Meek)

At this time, I am listing these species as either comparable or related to well-known Great Basin and Rocky Mountain species of Permian brachiopods. Before any publishing is done on this fauna, it should be studied in more detail. Several are close to species of the "*Spiriferina pulchra*" fauna of Late Permian age, although they do not seem to be identical. There is no question, however, as to the late Permian age of this assemblage. *Sphenosteges*, for example, is only known from Upper Permian rocks. The

Spiriferella and Hustedia resemble the species in the Edna Mountain Formation, but the others are closer to Park City and Phosphoria forms.

Mackenzie Gordon, Jr.

April 24, 1972

A 359

Field No.	Collection	Location	Quadrangle
71NC59	24877-PC	(Coordinates, Nevada E. zone)	Mount Velma
Collector		E. 484,450 ft	
R. R. Coats		N. 2,541,625 ft	

Conodonts:

Neogondolella idahoensis (Youngquist, Hawley, and Miller)

Neostreptognathodus cf. *N. sulcoplicatus* (Youngquist, Hawley, and Miller)

bar fragments

This collection is Permian, Leonardian Series, Roadian Stage. It is equivalent to the Meade Peak Phosphatic Shale Member of the Phosphoria Formation.

B. R. Wardlaw

November 3, 1977

A360

Field No.	Collection	Location	Quadrangle
74G7	25308-PC	(Coordinates, Nevada E. zone)	Hubbard Basin
Collector		E. 664,500 ft	
R. R. Coats		N. 2,504,600 ft	

SE1/4 SE1/4 SW1/4 sec. 10, T. 43 N., R. 62 E., in south-trending wash 450 ft due west of 6518-ft hill. Slab loose but not far out of place.

Spiriferella sp.

This *Spiriferella* is nearly identical to a form found in the Edna Mountain Formation. The age of the Edna Mountain is Wordian (earliest Early Permian). This age assignment should be considered only tentative because it is based on a single incomplete specimen; nevertheless, we suspect that it is correct.

B. R. Wardlaw

Mackenzie Gordon, Jr.

November 28, 1975

Field No.	Collection	Location	Quadrangle
75NC34	26118-PC	(Coordinates, Nevada E. zone)	Summer Camp
Collector		E. 686,010 ft	
R. R. Coats		N. 2,402,050 ft	

On top of 7,286 ft hill SE1/4 SE1/4 of sec. 13, T. 40 N., R. 62 E.

The fauna consists of Neophricadothyris sp. Neophricadothyris is commonly found in the Grandeur Member of the Park City Formation. This tax on suggests a Leonardian (Roadian of Texas) age (Late Early Permian).

B. R. Wardlaw

November 18, 1975

A362

Meade Peak Phosphatic Shale Member of the Phosphoria Formation

Field No.	Collection No.	Location	Quadrangle
72CR88	26149-PC	(Coordinates, Nevada E. zone)	Elk Mountain
Collector		E. 607,570 ft	
L. D. Cress		N. 2,570,400 ft	

Crurithyris? sp. indet.

Echinalosia sp.

Linoproductus sp.

Neophricadothyris sp.

The age is probably latest Leonardian (Roadian of Texas). The containing beds are equivalent to either the upper part of the Grandeur Member or the Meade Peak Phospatic Shale Members of the Phosphoria Formation of Idaho.

B. R. Wardlaw

Mackenzie Gordon, Jr.

December 23, 1975

A364

Field No.	Collection No.	Location	Quadrangle
72D27	26121-PC	(Coordinates, Nevada E. zone)	Elk Mountain
Collector		E. 606,020 ft	
D. B. Crocker		N. 2,567,280 ft	

The fauna consists of:

Crurithyris sp.

Neophricadothyris?

Leiorhynchoidea cf. L. *nobilis* (Girty)

Paranorella?

This fauna is Roadian (Uppermost Lower Permian) and typical of the upper part of the Meade Peak Phosphatic Shale Member of the Phosphoria Formation in Idaho and Utah.

Mackenzie Gordon, Jr.

B. R. Wardlaw

December 23, 1975

A 365

Field No.	Collection	Location	Quadrangle
72D30	26150-PC	(Coordinates, Nevada E. zone)	Elk Mountain
Collector		E. 604,800 ft	
D. B. Crocker		N. 2,566,640 ft	

Cancrinella? sp. indet.

Forms of this kind indicate a Middle Pennsylvanian to Permian age, but because of similarity to the above collections, we favor a Permian age for this collection.

B. R. Wardlaw

Mackenzie Gordon, Jr.

December 23, 1975

Field No.	Collection	Location	Quadrangle
72D44	26151-PC	(Coordinates, Nevada E. zone)	Elk Mountain
Collector		E. 606,320 ft	
D. B. Crocker		N. 2,567,100 ft	

Abundant sponge spicules

Leiorhynchoidea nobilis Girty

Neophricadothyris sp.

Crurithyris sp.

The age of this collection is Latest Leonardian (Roadian), equivalent to the upper part of the Meade Peak Phosphatic Shale Member in Utah and Idaho.

B. R. Wardlaw

Mackenzie Gordon, Jr.

December 23, 1975

Field No.	Collection	Location	Quadrangle
75NC35	26119-PC	(coordinates, Nevada E. zone)	Hot Creek
Collector		E. 605,000 ft,	
R. R. Coats		N. 2,495,750 ft	

In arroyo of Wildcat Creek drainage near ctr. N. boundary of SW1/4 sec. 21, R. 60 E., T. 43 N., on north side where 6,340-ft contour crosses arroyo.

Crurithyris and *L. nobilis* are abundant in the upper part of the Meade Peak Phosphatic Shale Member of the Phosphoria Formation and rarely co-occur elswhere. This fauna suggests a Roadian (latest Early Permian) age.

B. R. Wardlaw

November 18, 1975

A368

MESOZOIC ERA

TRIASSIC SYSTEM

Marine Sedimentary Rocks

A 369

Field No.	Collection	Location	Quadrangle
---	M6586	(coordinates, Nevada E. zone)	Goose Creek
Collector		E. 894,900 ft,	
R. A. Hope		N. 2,624,300 ft	

As you have already surmised on lithologic grounds, the rocks at your locality in the SE1/4NE1/4SE1/4 sec. 21, T. 47 N., R. 69 E., are Early Triassic on the basis of the following ammonoids:

Juvenites septentrionalis Smith

Meekoceras cf. *M. bridgesi* (Smith)

Arctoceras sp.

Deineroceras sp.

These ammonoids are indicative of the lower Smithian *Meekoceras gracilitatis* Zone.

N. J. Silberling

February 25, 1970

A 370

CENOZOIC ERA

TERTIARY SYSTEM

Eocene and Oligocene Epochs

Limestone, siltstone, and shale (in part bituminous)

Field No.	Collection	Location	Quadrangle
B-156	---	(Coordinates, Nevada E. zone)	Elko 2°
Collector		E. 666,700 ft	
R. A. Hope		N. 2,125,500 ft	

Limy tuff beds in T. 31 N., R. 62 E., exposed in pediment approx 2 mi NE. of Valley Mountain and west of U.S. Highway 93, are crowded with smooth freshwater ostracodes. The weathered surface exposed steinkerns of several genera. It is improbable that identifiable specimens can be obtained either by crushing or etching this rock, and I suggest that softer sediments in the section be collected for extraction of the ostracodes.

I have the impression that this rock is older than Pliocene because ostracodes of the Candona type, common in Plio-Pleistocene freshwater sediment, were not seen on the surfaces. This impression is subject to change with the next collection.

I. G. Sohn

November 16, 1967

A322

Field No.	Collection	Location	Quadrangle
61NC7	---	(Coordinates, Nevada E. zone)	The Buttes
Collector		E. 484,500 ft	
R. R. Coats		N. 2,319,700 ft	

Two samples, 61NC7a of limestone and 61NC7b of 2 in. of calcareous silt, 8 in. below the limestone of 61NC 7a, were processed for ostracodes. The limestone yielded few steinkerns, the silt yielded abundant fair to poorly preserved ostracodes and chara. The question is whether the sediment is Oligocene or Miocene. I do not have any standard of collections for comparison, and the ostracodes of this age interval are not described from the United States. Among the specimens is a large faintly notched genus of the subfamily Cyprideinae, related to the species illustrated by Peck (1951). The recorded range of this subfamily is Triassic to Lower Cretaceous, but in the United States I have seen its representatives from the Lower Cretaceous to Paleocene. I consider the range of this subfamily to be Middle Jurassic through Eocene (Sohn, 1958, p. 122), but colleagues from England (?, written commun, 19 ?) a notched form in the Oligocene. On the basis of this information, I would consider the age of the sediments to be Oligocene or older, but not older than Early Cretaceous.

The age designation of probable Oligocene is based on the assumption that field evidence limits the age to either Oligocene or Miocene. I might add that the faunule does not resemble a Lower(?) Cretaceous assemblage I have from the Railroad mining district in Smith and Ketner's (1976) area.

I. G. Sohn

March 26, 1962

A374

Field No.	Collection	Location	Quadrangle
61NC37	---	(Coordinates, Nevada E. zone)	Kittridge Springs
Collector		N. 433,500 ft,	
R. R. Coats		N. 2,239,300 ft	

Fossils identified:

Metasequoia glyptostroboides Hu and Cheng

Conifer, *incertae sedis*

"*Myrica*" *metzeli* Becker

Potentilla salmonensis Brown

Age: Possibly Oligocene or late Eocene. This is by far the best collection submitted on this shipment and is very intriguing. The undetermined conifer appears related to the typical Permian and Triassic conifers, and, if so, this would be an extremely interesting relictual occurrence.

J. A. Wolfe

March 8, 1962

A 375

Field No.	Collection	Location	Quadrangle
70NC105	---	(Coordinates, Nevada E. zone)	Mount Blitzen
Collector		E. 253,300 ft	
R. R. Coats		N. 2,445,000 ft	

Last month I received from E. L. Yochelsona limestone sample (field No. 70NC105 submitted for gastropods (Tertiary?). The etched residue contained very poorly preserved steinkerns, and the subsequently crushed limestone yielded additional poorly preserved steinkerns of typically freshwater ostracodes representing genera similar in shape to forms in the Green River Formation. One fragment resembles a specimen from loc. PM-69-6 (E. L. Yochelson and I. G. Sohn, written commun., 1969).

on the basis of this scrappy material, I suggest that the rocks are Tertiary, probably Eocene, which may, by inference, also be the age of field No. 69NC12B.

I. G. Sohn

August 2, 1971

Oligocene and Miocene Epochs

Conglomerate, sandstone, shale, lignite, and tuff

Field No.	Collection	Location	Quadrangle
71NC290	D4745	(Coordinates, Nevada E. zone)	Little Rock Creek
Collector		E. 240,550 ft	
R. R. Coats		N. 2,393,550 ft	

The sample contains rather weathered but abundant pollen and spores. About half of the conifer grains are broken. A list and tally follow:

Carya	2
Pinus	53
Picea	26
Cedrus type	3
Juniperus type	1
cf. *Typha angustifolia*	1
Ulmus-Zelkova	2
cf. Rosaceae	9
Sparganium type	8
Salix	1
cf. *Corylus*	2
Cyperaceae	3
Ericales	1
Viburnum	1
cf. *Acer*	2
probable NAP (non-tree)	20

Field No. 71NC290--Continued

Monocots undet.	1
Dicots undet.	3
Trilete spores (fern?)	1
Algal cysts	2
Total grains	142

This flora is suggestive of a mixed coniferous (pine-spruce) forest or woodland, with a few hardwoods (hickory, elm, maple type). An abundance of monocots and some algal cysts suggest an aquatic environment of deposition. The abundance of Picea suggests at least cool temperate conditions, although without knowing the present elevation of the site, that climate is hard to interpret in terms of modern local environments.

The flora is obviously Tertiary, undoubtedly older than Pliocene. (Some typical and common late Tertiary groups are missing: Compositae, Chenopodiaceae, Onagraceae.) As little as we know of Tertiary pollen from Nevada, this flora could be pre-Miocene. By comparing it with the Raine Ranch and Brock Formations and Stewart Springs flora, a Miocene age is a reasonable guess.

E. B. Leopold

August 23, 1972

Field No.	Collection	Location	Quadrangle
62NC91		(Coordinates,	Mountain City
	D3985	Nevada E. zone)	
Collectors		E. 417,900 ft	
R. R. Coats		N. 2,579,300 ft	
K. A. Howard			

This assemblage is primarily coniferous, and mainly spruce, with minor pine and fir. Hemlock and an Oligocene species of Ephedra are present. Dicots are poorly represented, but these include birch, alder and Ostrya. I have compared this sample with two others from Nevada (see table below); colln. D1594, collected by you from beneath the Idavada Volcanics and a sample of the Copper Basin flora (Axelrod, 1966) from northeastern Nevada, dated at (40 m.y. (late Eocene). Your colln. D1594 is extremely rich in species. It contains a mainly coniferous flora but is of a highly exotic composition; it also contains several of types now distributed in warm temperate parts of Asia (Pterocarya, probable Keeteleria, Tsuga cf. T. chinesis group, as well as forms that now characterize the mixed hardwood and conifer forests of the Eastern United States. The Copper Basin pollen flora, like the leaf flora, is heavily coniferous and sparse in species; Axelrod (1966) pointed out that it was deposited in a highland situation and is of cool temperate character, in spite of its age.

Assuming that the pollen of Artemisia (sage) is in place, colln. D1594 is late Oligocene or Miocene. Coln. D3985, containing a species of Ephedra so far known only from the Oligocene, appears to be Oligocene. The diversity of this flora is less than that of colln. D1594 is consistent with it connoted a cool temperate rather than a warm temperate flora.

A table listing the results of a tally for the three samples is provided below.

Nevada USGS Palcobot. loc.	Cougar Point Post-Jarbidge rhyolite MD-59-25 59NC38 D1594	SW-62-26 62NC91 D3985	Copper Basin flora Axelrod 1966 11064
Tsuga cf. chinensis	6		
Tsuga	7	1	2
Tsuga cf. canadensis	3		
Pinus sp.	5	17	31
Pinus cf. strobus			1
cf. Cedrus	2	9	11
Picea	2	61	35
Abies cf. lasiocarpa			1
Abies cf. concolor	2		
Abies sp.	8	9	17
cf. Keeteleria	3		
Cycadaceae cf. Cycas	3		
Pinaceae undet.	18	15	
Ephedra, White R type		1	
Symphoricarpos-Lonicera	1		
Pterocarya	1		
Carya	2		

Juglans	5		
Ulmus-Zelkova	1		
Eleagnus	1		
Quercus	1		
Apocynaceae		1	
Ostrya		1	
Betula	7	1	
Salix	1		
cf. Taxodiaceae		3	
Alnus p3		1	
p4	2		
p6	1		
cf. Polypodiaceae	2	1	
Osmunda	3		
Gramineae?	1		
Sporites arcifer	1		
Dicots undet.	6		
Chenopodiaceae	+		
Artemisia	+		
cf. *Cedrella*	+		
cf. *Sequoia*	+		
cf. *Galium*	+		
Total count	95	121	98

E. B. Leopold

March 25, 1971

A382 – 383 Merged

Field No.	Collection No.	Location	Quadrangle
65NC3		(coordinates,	Mountain City
	D4440	Nevada E. zone)	
Collector		E. 400, 950 ft,	
R. R. Coats		N. 2,557,800 ft	

2,000 ft S. along State Highway 11-A from intersection with State Highway 53.

This sample contains weathered pollen of the Pinaceae, with 80 percent Pinus, 9 percent Picea, Abies 1 percent, and undet., Pinaceae 11 percent, and cf. Cercocarpus 1 percent. There is not enough variety in this sample to give a clue as to age other than that it looks like a late Tertiary sample. The dominance of forest or woodland types may contrast with the local ecology today.

E. B. Leopold

March 26, 1971

A384

Miocene Epoch

Sedimentary rocks

Tuffaceous sand and silt, diatomite

A 385

Field No.	Collection	Location	Quadrangle
55NC304	Diatom 4586	(Coordinates, Nevada E. zone)	Jarbidge
Collector		E. 571,600 ft	
Harry Smith		N. 2,615,000 ft	

The following assemblage of freshwater diatoms was obtained from this collection. Relative abundances are indicated by: A, abundant, C, common: F, frequent; and R, rare.

Caloneis schumanniana Cleve	F
Cocconeis placentula var. *euglypta* (Ehrenberg) Cleve	R
Cymbella cistula var. *maculata* (Kutzing) Van Heurck	R
Diploneis ovalis (Hilse) Cleve	F
Fragilaria sp. A*	F
sp. A var. A*	F
sp. B*	R
Melosira granulata (Ehrenberg) Ralfs	C
solida Eulenstein	A
undulata (Ehrenberg) Kutzing	F
Navicula scutelloides Wm. Sm.	R
sp. A*	F
Opephora martyi Heribaud	R

A 356

Tetracyclus ellipticus (Ehrenberg) Grunow	R
javanicus Hustedt	F
sp. A*	F
sp. B*	R
sp. C*	C
sp. D	F
sp. E*	R
sp. F*	F
sp. G*	R
sp. H*	R

This assemblage bears a remarkable similarity to the one from USGS diatom loc. 4249 (see Report on Referred Fossils MD-56-11, dated March 5, 1958) because it is dominated by the same extinct species, *Melosira solida*, and contains a large proportion of the other extinct species found at loc. 4249. There is a much greater proliferation of the genus *Tetracyclus*, all extinct species. As in the earlier report, named species marked with an asterisk are extinct new species that I have named and described (K. E. Lohman, unpub. data, 1958).

The age of this collection must be nearly the same as that given for loc. 4249, namely, early Pliocene or possibly late Miocene, with a preference for early Pliocene.

K. E. Lohman

March 17, 1958

Field No.	Collection	Location	Quadrangle
59NC38	Paleobotany D1594	(Coordinates, Nevada E. zone)	Owyhee 15'
Collectors		E. 375,800 ft	
R. R. Coats		N. 2,604,400 ft	
Amar Mukherjee			

This report concerns your field No. 59NC38 from Elko County, Nev., a brown tuff underlying volcanic rocks correlative with Idavada Volcanics of Malde and Powers (1962).

After treatment with organic solvents and hydrofluoric acid, the organic material was floated off on a zinc chloride solution. The sample contains large amounts of pollen, for example, several hundred pollen grains per gram of sediment. Preservation of the pollen is quite excellent. Below is a list of plant forms determined on the basis of contained pollen and spores:

Gymnosperms:

Pinus

Picea

Tsuga cf. *T. heterophylla*

cf. *T. diversifolia*

Abies cf. *A. grandis*

cf. *A. lasiocarpa*

Sequoia

cf. *Sciadopitys*

Larix

A 385

Angiosperms:

Betula

Quercus

**Lonicera* cf. *L. dioecia*

**Juglans*

**pterocarya*

**Carya*

**Galium*

**Ulmaceae: *Ulmus* or *Zelkova*

cf. *Cedrella*

Chenopodiaceae (*Chenopodium* type)

Alnus

Artemisia type 1

cf. Eleagnaceae

Anemone

Sagittaria

* Forms now exotic to the region

Ferns:

Osmunda

In your sample, the genus *Tsuga* (hemlock) is the dominant form. *Abies* is also common, and the combination of the two strongly suggests that conditions were wet and humid, and probably cool or montane at the site of deposition. The numerous exotics (for example genera now characteristic of the Appalachians or of Asia) suggest that this flora is probably slightly older than the overlying Idavada volcanics, which I understand is perhaps earliest

Pliocene, according to vertebrate evidence. The Salt Lake Formation containing Hemphillian vertebrates, and the Payette(?) Formation of probable Clarendonian age in the Goose Creek area, contain between 22 and 25 percent exotic plant genera. On the other hand, pollen samples from the somewhat older "Latah equivalent" volcanic rocks in the Hazard Creek, Idaho, area indicate a flora of which one-half of the genera do not now grow in the region.

H. A. Powers and I think it is reasonable to suppose that the cool-loving forms suggest that the beds were laid down after uplift had provided the Jarbidge area with at least low mountains, and that the numerous exotics support a probable late Miocene age for the rock. The presence of the genus Artemisia removes the possibility of a pre-Miocene age for your sample.

E. B. Leopold

July 31, 1961

Field No.	Collection	Location	Quadrangle
59NC45-E	Paleobotany	(Coordinates,	Owyhee 15'
	D3278	Nevada E. zone)	
Collectors		E. 375,800 ft	
R. R. Coats		N. 2,604,400 ft	
Amar Mukherjee			

Beds underlying the "Idavada Volcanics.

The sample contains excellent pollen and spores representing a rich flora of dicotyledonous plants. The recognizable forms are listed in the attached table, along with a list of the forms found in colln. D1594.

Colln. D3278 contains mainly dicotyledonous pollen, where as colln. D1594 is dominated by hemlock (Tsuga), and fir (Abies) is also quite conspicluous. If the two samples are really from the same sequence, this discrepancy suggests that some change occurred either in the amount of relief or in the climate (or both) while the beds were being deposited. The actual composition of the flora in the two samples is similar, and a good representation of deciduous hardwoods (for example, of the walnut and elm families),as well as various herbs, shrubs, and conifers that now grow in the region, is present in the collection. The flora in colln. D1594, however, is somewhat richer in total forms.

In colln. D3278, some 6 out of 16 (38 percent) of the identified plant genera are now exotic to the region, in comparison with 33 percent exotics in colln. D1594. In terms of angiosperm genera, 50 percent of the angiosperms are now exotic in colln. D3278, and 42 percent in colln. D1594. These similarities for the two localities substantiate that they are of about the same age.

Under the Reid hypothesis, progressively older floras contain progressively more genera that are now exotic to the region. This concept is substantiated by our pollen data from well-dated floras in Idaho, and some of those data are compared below with the flora from your samples:

	Percent exotic genera	Percent exotic angiosperm genera
Salt Lake Formation (Goose Creek area) Pliocene, (Hemphillian)	22	28
Payette Formation (Goose Creek area) Pliocene, Clarendonian	25	25
Pre-Idavada volcanics (Owyhee quad.), colln. D1594	33	42
D3278	38	50
"Latah equivalent" Riggins area, Idaho, upper Miocene	47	60

I pointed out earlier that the presence of Artemisia in colln. D1594 prohibits a pre-Miocene age for the beds. The new data ascertain that the age of your material is either late Miocene or early Pliocene.

E. B. Leopold

April 20, 1964

Floral list: Pre-Idavada Volcanics; (x) indicates forms that are now exotic to the region.

	D3278	D1594
	59 NC45-E	59 NC-38
Osmunda	x	x
Picea	x	x
Abies cf. *grandis*	x	x
Abies cf. *lasiocarpa*	x	
Pinus	x	x
Juglans	(x)	(x)
Betula	x	x
Salix	x	
Alder P4-6	x	x
Ulmus-Zelkova P3-5	(x)	(x)
Pterocarya P6-7	(x)	(x)
Carya	(x)	(x)
Chenopodiaceae undet.	x	x
Sarcobatus vermiculatus	x	
Quercus	x	x
Petalostemon?	x	
Lonicera	(x)	(x)
Polemoniaceae; *Collinsia*?	x	
Acer	x	
Ilex	(x)	

Floral list:

	D3278 59 NC45-E	D1594 59 NC-38
Tsuga	x	x
Sequoia-Glyptostrobus group		(x)
cf. *Sciadopitys*		x
Cedrus?		x
Larix		x
Galium		x
Cedrella?		x
Artemisia		x
Eleagnus		x
Sagittaria		x
Number of identified genera	16	18
Number of identified genera now exotic to the region	6	6
percent of genera now exotic	38	33
Number angiosperm genera	12	12
Number angiosperm genera now exotic	6	5
percent of angiosperm genera now exotic	50	42

Field No.	Collection	Location	Quadrangle
59NC45F	Paleobotany	(coordinates,	Owyhee 15'
through 59NC45I	D3509	Nevada E. zone)	
Collectors		E. 375,800 ft,	
R. R. Coats		N. 2,604,400 ft	
Amar Mukherjee			

Re your five samples of volcanic tuff underlying volcanic correlatable with the Idavada volcanics of Malde and Powers (162) NW1/4SE1/4 sec. 8, T. 46 N., R. 53 E. Field Nos. 59NC45F through 59NC54I and 59NC45L represent 14.6 ft of section underlying your field No. 59NC45E (our colln. D3278) reported on earlier and are from the same general locality as field No. 59NC38 (colln. D1594) reported on earlier.

The samples in this shipment are not as polleniferous nor as well preserved as the previous two collections from this locality. This feature probably accounts for the shorter list of identified types for the present versus the earlier collections. Field No. 59NC45L was unpolleniferous. A table listing fossil identifications is attached. This assemblage compares well with the middle Miocene Troublesome Formation of Izett of Colorado and is probably younger than the deposits in Hazard Creek, Idaho (Hamilton's collection). The flora is the same age as or younger than (1964) Trapper Creek flora of Idaho (Payette of Mapel and Hail).

Age: middle or late Miocene.

E. B. Leopold

January 28, 1965

SW-65-2D

USGS

Paleobotany

Locality number		D3509			D3278	D1594
Field Number	59NC-45I	-45H	-45G	-45F	-45E	-38
Osmunda				x	x	x
Picea	x				x	x
Abies	x	x		x	x	x
Pinus	x	x	x	x	x	x
Juglans					x	x
Betula	x			x	x	x
Salix					x	
Alnus	x	x			x	x
Alnus cf. *japonica*	x	x		x	?	
**Ulmus-Zelkova* P3-5	x	x		x	x	x
**Pterocarya*	x	x		x	x	x
Carya	x				x	x
Chenopodiaceae	x	x		x	x	x
Sarcobatus verminculatus		x			x	
Quercus	x	x		x	x	x
Petalostemon?					x	
Lonicera					x	x
Collinsia?					x	
Acer					x	
**Ilex*					x	

USGS Paleobotany

		D3509			D3278	D1594
Field Number	59NC-45I	-45H	-45G	-45F	-45E	-38
Tsuga	x	x	x		x	x
Sequoia group						x
cf. *Sciadopitys*	?			x		x
Cedrus				x		
Larix				?		x
Galium						x
Pseudotsuga	x	x	x	x		
Cedrella?						x
Artemisia			x			x
Eleagnus						x
Sagittaria						x
Celtis		x				
cf. *Bidens*		x				
Berberis		x				
Graminae			x	x		
Sporites arcifer				x		