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MAPS SHOWING FOSSIL LOCALITIES AND CHECKLISTS OF JURASSIC AND
CRETACEOUS MACROFAUNA OF THE NORTH SLOPE OF ALASKA

by

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INTRODUCTION

A compendium of Jurassic and Cretaceous macrofaunal data for the North Slope of Alaska has not heretofore been compiled. The compilation of such a data base will help in analyses of sedimentation patterns, structure, and paleobiogeography in this resource-rich region. This report brings together a large portion of the macrofaunal information available for northern Alaska for the first time. It documents the Jurassic and Cretaceous macrofaunal occurrences at most U. S. Geological Survey localities that have been reported on in the past. This faunal data combines information from unpublished reports requested of USGS paleontologists (which has not been checked to verify identifications) and from the following publications: Imlay (1955, 1961), Detterman et al. (1975), Jones and Gryc (1960), Jones and Grantz (1964), and Brosgé and Whittington (1966).

The report consists of three maps (Plates 1-3), four fossil checklists (Tables 1-4), and this explanatory text. Plates 1 and 2 map most of northern Alaska. Plate 1 shows localities where Late Jurassic or Early Cretaceous *Buchia* have been reported; different symbols denote the species present (see key for Plate 1). Plate 2 shows localities for Jurassic and Cretaceous macrofossils other than *Buchia*; map symbols on Plate 2 indicate strata of different ages (see key for Plate 2). Plate 3 shows localities for both types of data in the Demarcation Point 1:250,000 quadrangle; map symbols are explained in the key. The map numbers plotted on these plates represent one or more macrofossil localities.

Checklists of taxonomic occurrences at the reported localities are provided in Tables 1 through 4. Table 1 shows occurrences at Jurassic and Lower Cretaceous localities where *Buchia* have been found. Tables 2 through 4 show occurrences at other Jurassic localities, other Lower Cretaceous localities, and at all Upper Cretaceous localities, respectively. Table 5 shows the quadrangle names equating to the quadrangle abbreviations used in Tables 1 through 4, and Table 6 shows the ages equating to the age abbreviations used in Tables 1 through 4; Tables 5 and 6 are included in this text portion.

Because of the age diagnostic importance of *Buchia* in Upper Jurassic and Lower Cretaceous strata, localities where this genus has been reported are plotted on a separate map and checklist (Plate 1 and Table 1), and thus these localities are not included on the checklists for other Jurassic and Lower Cretaceous localities (Tables 2 and 3). However, taxa listed on Table 1 that belong to genera other than *Buchia* also may be listed on Tables 2 or 3.

The data included in this report provide a basis for expanding and further testing various biozonations proposed for northern Alaska and will eventually assist in the development of a composite biostratigraphy. Compilation, assessment, and inter-regional comparisons of these northern Alaskan biostratigraphic data to those of southern Alaska and Canada are still in a preliminary stage. However, a tentative *Buchia* zonation for northern Alaska is discussed briefly below.

PRELIMINARY *BUCHIA* ZONATION

Fossil bivalves of the genus *Buchia* are found in Upper Jurassic and Lower Cretaceous strata at many localities in the Arctic Foothills of the Brooks Range. Although *Buchia* species were previously considered of little biostratigraphic value, they are now regarded as very useful stratigraphic markers, assisting in the mapping of stratigraphy and structure in the rocks where they are found.

Intraspecific morphological variation and deformation of *Buchia* have resulted in numerous synonymous species names. In spite of this problem, Imlay (1959) reduced the number of species and suggested a provisional stratigraphic succession for *Buchia*. Imlay (1955, 1961) studied Jurassic and Lower Cretaceous fossils from northern Alaska and suggested a *Buchia* biozonation (Table 7). This faunal succession was confirmed in *Buchia*-bearing strata in the Richardson Mountains by Jeletzky (1960, 1961). Jones and Grantz (1964) found *Buchia sublaevis* to be a very useful fossil in the evaluation of Valanginian rocks in northern Alaska. In addition, Jeletzky (1965) proposed several *Buchia* zones for Upper Jurassic and Lower

Cretaceous rocks in western Canada, and Jeletzky (1984) described the *Buchia* zones in the Jurassic-Cretaceous boundary strata of western and Arctic Canada.

In southern Alaska, a *Buchia* zonation has been described for the Upper Jurassic rocks of the Alaska Peninsula by Miller and Detterman (1985), and a preliminary zonation was suggested for the Lower Cretaceous rocks of this region by Miller and Jones (1981). These studies established *Buchia*'s usefulness in geologic mapping and stratigraphic investigations on the Alaska Peninsula. A tentative comparison of the northern Alaskan *Buchia* zonation with that of southern Alaska is shown in Table 8. Two species not previously reported in northern Alaska are included in this preliminary zonation: *Buchia unshensis* of Tithonian age and *Buchia keyserlingi* of Valanginian age.

Some interesting patterns of *Buchia* distribution are evident in northern Alaska. Late Jurassic (late Oxfordian-Tithonian) *Buchia* are typically found in shales, mainly to the east of the Sagavanirktok River. However, late Oxfordian and early Kimmeridgian *Buchia* also occur at a few outcrops on the Ipewik River in northwestern Alaska; older Jurassic rocks are found in this area as well. This disjunct distribution suggests a lack of Late Jurassic rocks throughout most of the central portion of the Arctic Foothills of the Brooks Range. *Buchia okensis* and *Buchia subokensis* of Berriasian age are locally abundant throughout the Arctic Foothills belt, as are *Buchia sublaevis* and *Buchia crassicollis solida* of Valanginian age. However, Jones and Grantz (1964) suggested that many of the specimens previously identified as *Buchia crassicollis* are actually *Buchia okensis* and *Buchia subokensis*.

Buchia sublaevis is typically found in a coquinoid limestone that is developed throughout the entire foothills belt and into Canada. Thus, this bed forms a distinctive stratigraphic marker across the entire North Slope of Alaska. Although *Buchia sublaevis* is the only species of *Buchia* present in this coquinoid bed, this species also may be found with *Buchia crassicollis solida* in underlying shaly strata.

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Table 5. Quadrangle abbreviations used in Tables 1 through 4.

Abbreviation	Quadrangle Name
AR	Arctic 1956
CL	Chandler Lake 1956
DM	DeLong Mountains 1955
DP	Demarcation Point 1955
HP	Howard Pass 1956
IR	Ikpikpuk River 1956
KR	Killik River 1956
LR	Lookout Ridge 1956
MK	Misheguk Mountain 1956
MM	Mt. Michelson 1956
PS	Philip Smith 1956
PH	Point Hope 1955
PL	Point Lay 1955
SG	Sagavanirktok 1956
TM	Table Mountain 1956
UM	Umiat 1956
UR	Utukok River 1956

Table 6. Age abbreviations used in Tables 1 through 4.

Abbreviation	Age or Other
Jur	Jurassic
Sinem	Sinemurian
Plien	Pliensbachian
Toar	Toarcian
Baj	Bajocian
Bath	Bathonian
Cal	Callovian
Ox	Oxfordian
Kimm	Kimmeridgian
Tith	Tithonian
Cret	Cretaceous
Neoc	Neocomian
Berr	Berriasian
Val	Valanginian
Haut	Hauterivian
Barr	Barremian
Alb	Albian
Cenom	Cenomanian
Tur	Turonian
Sant	Santonian
Camp	Campanian
E	Early
M	Middle
L	Late
Prob	Probably

Table 7. *Buchia* zonation of northern Alaska established by Imlay (1955, 1961).

Characteristic Species	Probable Age
<i>Buchia crassicollis</i> (Keyserling)	Middle to Late Valanginian
<i>Buchia sublaevis</i> (Keyserling)	Early Valanginian
<i>Buchia okensis</i> (Pavlow)	Middle to Late
<i>Buchia subokensis</i> (Pavlow)	Berriasian
<i>Buchia piochii</i> (Gabb)	Middle to Late Portlandian
<i>Buchia rugosa</i> (Fischer)	Middle Kimmeridgian to
<i>Buchia mosquensis</i> (von Buch)	Early Portlandian
<i>Buchia concentrica</i> (Sowerby)	Late Oxfordian to
<i>Buchia spitiensis</i> Holdhaus	Early Kimmeridgian

Table 8. Preliminary *Buchia* zonation of the North Slope of Alaska compared with the Alaska Peninsula zonation.

JURASSIC LOWER CRETACEOUS	Alaska Peninsula		North Slope
	Val	<i>Buchia crassicollis solida</i>	<i>Buchia crassicollis solida</i>
		<i>Buchia sublaevis</i>	<i>Buchia sublaevis</i>
		<i>Buchia keyserlingi</i>	<i>Buchia keyserlingi</i>
	Berr	<i>Buchia okensis</i>	<i>Buchia okensis</i> = <i>volgensis</i>
<i>Buchia subokensis</i>		<i>Buchia subokensis</i>	
<i>Buchia uncitoides</i>		<i>Buchia uncitoides</i> (doubtful)	
Kimm Tiith Ox	<i>Buchia fischeriana?</i>	<i>Buchia fischeriana</i>	
	<i>Buchia piochii</i>	<i>Buchia piochii</i> (doubtful)	
	<i>Buchia blanfordiana</i>	<i>Buchia unshensis</i>	
	<i>Buchia mosquensis</i>	<i>Buchia mosquensis</i>	
	<i>Buchia rugosa</i>	<i>Buchia rugosa</i>	
	<i>Buchia concentrica</i>	<i>Buchia concentrica</i>	

Note: *Buchia uncitoides* and *B. piochii* are listed as doubtful in the preliminary zonation for the North Slope because only one possible specimen of each species has been identified in that region. In addition to occurrences in the regions noted above, *Buchia fischeriana* and *B. sublaevis* have been reported from southeastern Alaska by Brew, Karl, and Miller (1988) and D. L. Jones (written report, 1964), respectively.