

Short Papers in Geology Hydrology, and Topography Articles 120-179

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*Scientific notes and summaries
of investigations prepared by
members of the Geologic, Water
Resources, and Topographic Divisions
in the fields of geology, hydrology,
topography, and related sciences*



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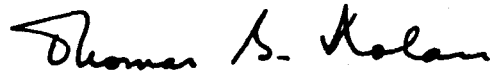
GEOLOGICAL SURVEY

Thomas B. Nolan, *Director*

FOREWORD

This collection of 60 short papers on subjects in the fields of geology, hydrology, topography, and related sciences is the third of a series to be released during the year as chapters of Professional Paper 450. The papers in this chapter report on the scientific and economic results of current work by members of the Geologic, Water Resources, and Topographic Divisions of the United States Geological Survey. Some of the papers announce new discoveries or present observations on problems of limited scope; other papers draw conclusions from more extensive or continuing investigations that in large part will be discussed in greater detail in reports to be published in the future.

Chapter A of this series, to be published later in the year, will present a synopsis of results from a wide range of work done during the present fiscal year.



THOMAS B. NOLAN,
Director.

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133. JURASSIC STRATIGRAPHY IN THE MCCARTHY C-5 QUADRANGLE, ALASKA

By E. M. MacKEVETT, JR., and R. W. IMLAY, Menlo Park, Calif., and Washington, D.C.

Previously undescribed fossiliferous Jurassic marine sedimentary rocks having a cumulative thickness of more than 9,000 feet are well exposed in the McCarthy C-5 quadrangle, Alaska, where they were mapped by MacKevett and M. C. Blake, Jr., during 1961. Provisional field identifications of fossils by D. L. Jones, of the U.S. Geological Survey, facilitated the mapping, and paleontologic studies by Imlay determined the geologic ages of the Jurassic rocks.

The 15- by 22½-minute McCarthy C-5 quadrangle is in rugged terrain having a relief in excess of 11,000 feet on the southern flank of the Wrangell Mountains, about 200 miles east of Anchorage (fig. 133.1).

Moffit (1938), during his extensive reconnaissance mapping in the general region, recognized only two small patches of Jurassic rocks within the McCarthy C-5 quadrangle, and he grouped most of the Jurassic rocks with Cretaceous rocks or with the McCarthy Shale of Late Triassic age.

The nearest exposed Jurassic sequence that has been mapped in detail is in the Talkeetna Mountains A-1, A-2, and B-1 quadrangles in the Nelchina area, about 150 miles northwest of McCarthy (fig. 133.1). Grantz (1960a, b) described this fossiliferous Jurassic section as being over 15,000 feet thick and consisting of Lower Jurassic submarine volcanic and sedimentary rocks, Middle Jurassic nearshore sandstone, and Upper Jurassic siltstone, sandstone, and conglomerate.

The Jurassic rocks in the McCarthy C-5 quadrangle consist of fossiliferous shelf strata of Early, Middle(?), and Late Jurassic age. These rocks occupy a belt as much as 10 miles wide that extends north-westward across the quadrangle (fig. 133.2). Most of the rocks dip northward at low angles, but locally they form open folds. Faults that cut the Jurassic strata commonly strike northward, are nearly vertical, and have apparent right-lateral displacement.

The Jurassic rocks consist of a conformable sequence that appears to overlie the McCarthy Shale of Late Triassic age conformably, and is unconformably overlain by Cretaceous marine sedimentary rocks or by Tertiary continental and lacustrine sedimentary rocks that are intercalated with the basal part of the Wrangell Lava. A hiatus separates the rocks of Early Jurassic age from younger Jurassic rocks, and other gaps probably occur within the Jurassic sequence despite the apparent conformity of the stratigraphic succession.

The Lower and Middle(?) Jurassic strata, which constitute about a third of the Jurassic section, consist chiefly of limestone and shale. The overlying thick Upper Jurassic sequence consists dominantly of shale but locally contains sandstone and conglomerate in its higher part.

Five Jurassic units are delineated on the map (fig. 133.2), and a summary of the lithology, the indicated geologic age, and the stratigraphic range of the important fauna of the Jurassic rocks is shown in figure 133.3. The lowermost of these, J1, is composed of light- to medium-brown-weathering silty limestone and shale, contains mollusks of Sinemurian age, and overlies the evenly bedded McCarthy Shale, which weathers dark brown. This unit is overlain by a distinctive sandy and silty limestone unit, J1s, that contains abundant fossils of the Early Jurassic pectenid *Weyla*. Prof. S. W. Muller, of Stanford University, has examined several of the *Weylas* and believes that they are indicative of a Pliensbachian (Early Jurassic) age (oral communication, 1961). The unit forms bold outcrops and is an excellent marker that is traceable across the quadrangle.

These Lower Jurassic rocks are locally overlain by reddish-brown shale and limestone, J2, that contain diagnostic ammonites indicative of a Middle(?) or possibly an early Late Jurassic age.

A widespread unit composed mainly of shale, Jsh,

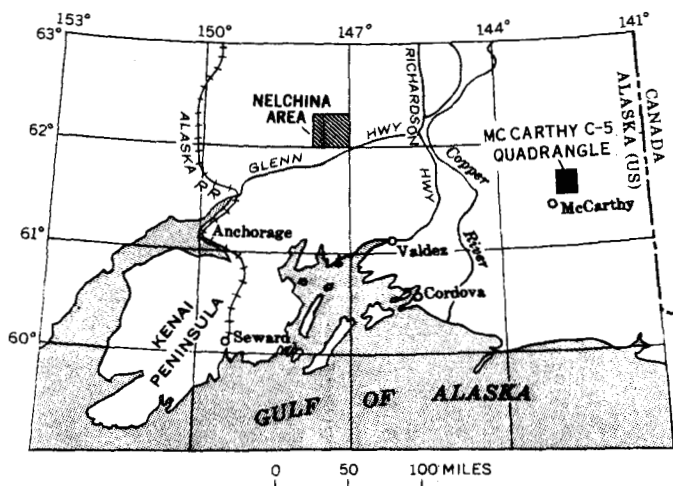
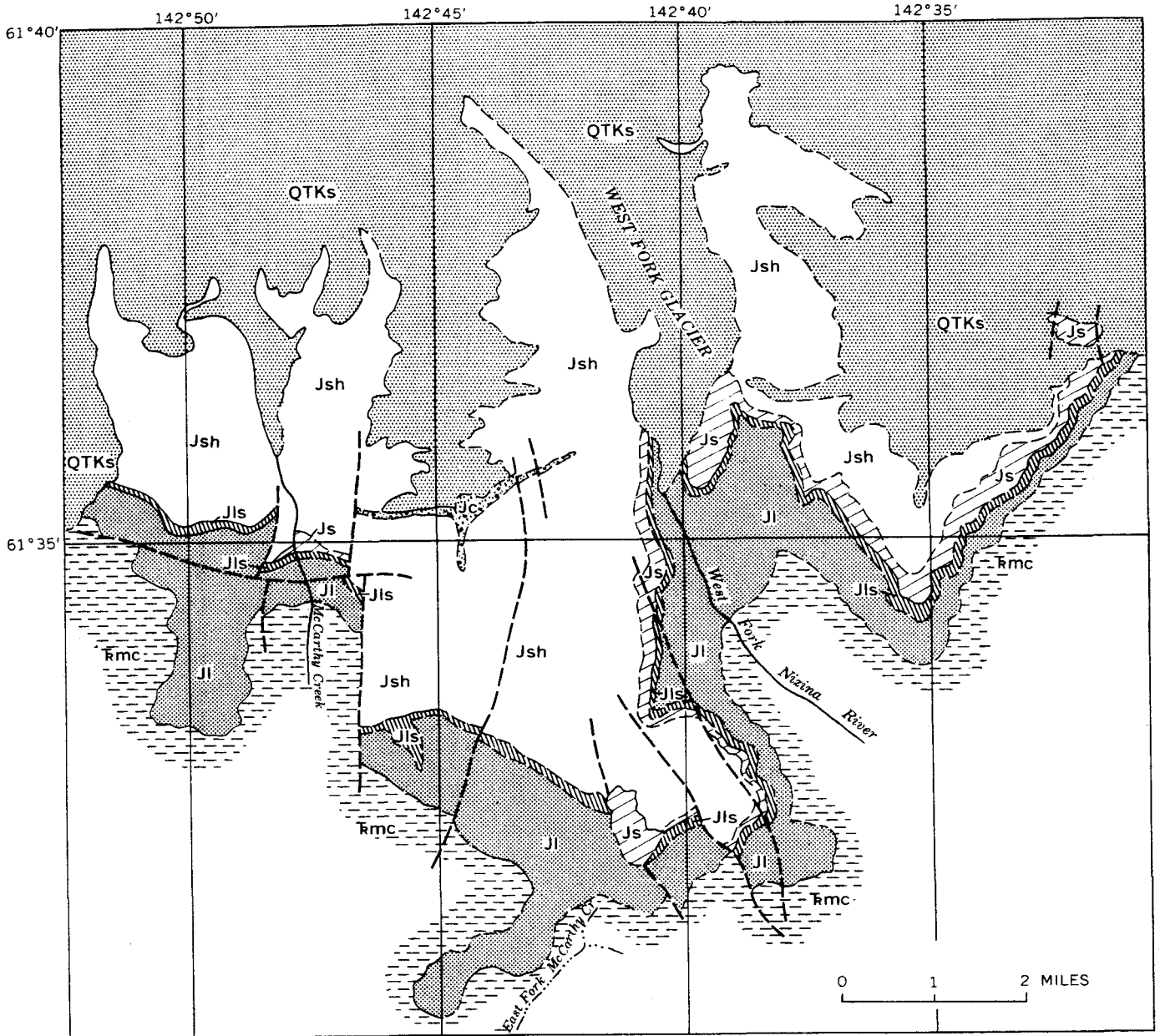


FIGURE 133.1.—Index map of part of Alaska showing the location of the McCarthy C-5 quadrangle.



EXPLANATION

Contact
Dashed where approximately located

Fault
Dashed where approximately located

FIGURE 133.2.—Generalized geologic map showing the distribution of Jurassic rocks in the McCarthy C-5 quadrangle. QTKs, Sedimentary and volcanic rocks, Cretaceous or Tertiary, and surficial deposits, Quaternary; Jsh, shale, and Jc, conglomerate, Upper Jurassic; Js, shale and limestone, Middle(?) and Upper Jurassic; Jls, limestone, and Jl, limestone and shale, Lower Jurassic; Rmc, McCarthy Shale, Upper Triassic.

LITHOLOGY	Cretaceous or Tertiary rocks	THICKNESS (FEET)	APPROXIMATE RANGE OF CHARACTERISTIC FOSSILS	STAGE	SERIES
Mainly dark-gray shale	Jsh		<i>Belemnites</i>	Kimmeridgian and Oxfordian	Upper Jurassic
Conglomerate	Jc	0-650	<i>Buchia rugosa</i> (Fisher)		
Interbedded conglomerate sandstone and shale			<i>Buchia concentrica</i> (Sowerby) <i>Buchia mosquensis</i> (Von Buch)		
Mainly dark-gray shale that weathers brown, subordinate limestone, siltstone, and limestone concretions	Jsh	5000	<i>Partschiceras</i> sp. <i>Amoeboceras (Prionodoceras)</i> sp.		
Red-brown shale and silty limestone	Jls	0-1000	<i>Reineckeia?</i> , <i>Kheraicerus?</i> sp. <i>Procerites?</i> sp., <i>Inoceramus</i> cf. <i>I. ambiguus</i> Eichwald	Early Callovian and Bathonian(?)	Middle(?) and Upper Jurassic
Mainly silty limestone, minor coquina	Jls	150-300	<i>Weyla</i> sp., <i>Gryphaea</i> sp., <i>Chlamys</i> sp. <i>Crucillobicerus</i> sp.	Pliensbachian	Lower Jurassic
Gray silty limestone and limestone intercalated with dark-gray shale	Jl	1500-2300	<i>Psiloceratacid ammonites</i> <i>Arnioceras</i> sp.	Sinemurian and Hettangian(?)	

McCarthy Shale
(Triassic)

FIGURE 133.3.—Generalized columnar section and descriptions of Jurassic rocks in the McCarthy C-5 quadrangle. Letter symbols in the lithologic section are explained in the caption for figure 133.2.

directly overlies either the shale and limestone unit (Js) or the subjacent limestone unit (Jls) with apparent conformity. It contains abundant *Buchias* and a few diagnostic ammonites. Brown-weathering sandstone that occurs high in the upper shale unit is locally transitional into a pebble or cobble conglomerate, Jc (figs. 133.2, 133.3). An angular unconformity marks the contact between the Jurassic and the Cretaceous or Tertiary rocks.

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