

200)
N22 agk
no. 16

United States

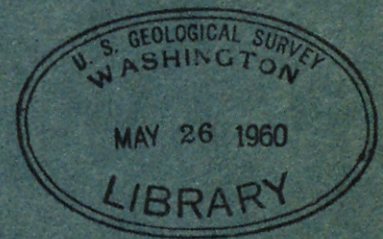
✓ Department of the Interior

U.S. Geological Survey

Geological Investigations

Naval Petroleum Reserve No. 4

Alaska



Report No. 16

STRATIGRAPHY AND STRUCTURE OF THE AREA OF THE
TITALUK RIVER AND UPPER PART OF IAPIKPUK RIVER, ALASKA

1948

Previous reports on investigations by the Geological Survey in Naval
Petroleum Reserve No. 4, Alaska

- No. 1 Stratigraphy and structure of the area of the Killik, Chandler, Anaktuvuk, and Colville Rivers, Alaska. (1946)
- No. 2 Magnetic survey of part of Naval Petroleum Reserve No. 4 by airborne magnetometer. (1946)
- No. 3 Stratigraphy and structure of the Umiat anticline. (1947)
- No. 4 Stratigraphy and structure of the area of Maybe Creek. (1947)
- No. 5 Stratigraphy and structure of the area of the Kurupa, Colamnagvik, Killik, and Colville Rivers. (1947)
- No. 6 Stratigraphy and structure of the area of the Meade and Kuk Rivers and Point Barrow. (1947)
- No. 7 Progress report on taxonomic and stratigraphic study of microfossils. (1947)
- No. 8 Progress of microfossil investigations, Naval Petroleum Reserve No. 4, Alaska. (Revised) (1947)
- No. 9 Reservoir characteristics indicated by thin section analyses of sand cores from Umiat Test No. 1. (1947)
- No. 10 Aeromagnetic survey of Naval Petroleum Reserve No. 4 and adjacent areas. (1947)
- No. 11 Core analysis report on Simpson Test Well No. 1. (1948)
- No. 12 Stratigraphy and structure of the area of the Colville River north of Umiat, Alaska. (1948)
- No. 13 Stratigraphy and structure of the Wolf Creek anticline, Alaska. (1948)
- No. 14 Stratigraphy and structure of the area of the Ipnarik River, Alaska. (1948)
- No. 15 Stratigraphy and structure of the area of the Colville River between Ninuluk Creek and Umiat Mountain, Alaska. (1948)

200)
N22 agr
no. 16

United States

Department of the Interior

✓ U.S. Geological Survey

Washington

Geological Investigations

Naval Petroleum Reserve No. 4

Alaska

Report No. 16

STRATIGRAPHY AND STRUCTURE OF THE AREA OF THE
TITALUK RIVER AND UPPER PART OF ISPIKPUK RIVER, ALASKA

By

E. J. Webber

1948

CONTENTS

	<u>Page</u>
Introduction.....	1
Stratigraphy.....	2
General lithology.....	2
Paleontology and correlation.....	3
Thickness.....	4
Structure.....	4
Stratigraphic position at the high part on the Oumalik anticline.....	4

ILLUSTRATIONS

Geologic map of the area of the Titaluk, Upper Ikpikpuk, and Meade Rivers, Naval Petroleum Reserve No. 4, Alaska. (Separate)

STRATIGRAPHY AND STRUCTURE OF THE AREA OF THE
TITALUK RIVER AND UPPER PART OF IKPIKPUK RIVER, ALASKA

By

E. J. Webber

INTRODUCTION

Geological Survey Party No. 4 was assigned to investigate in 1947 the area of the Ikpikpuk and Titaluk Rivers and the East Fork of the Ikpikpuk River. The primary purpose of the investigation was to obtain stratigraphic and structural information which could be of use in determining the stratigraphic position of the rocks that underlie the area of the Cunalik anticline and other nearby areas investigated by United Geophysical Company seismograph parties.

A total of five days was spent in geological investigations of the Titaluk River with a Cub plane equipped with pontoons. The party was composed of the geologist and Don Hulshizer, pilot of Wien Alaska Airlines. The geologist and Ronald K. Sorem, field assistant, traversed the Ikpikpuk River by boat from the junction of Maybe Creek and the Kigalik River to the vicinity of the junction of the East Fork of the Ikpikpuk River. From the northernmost point reached by boat traverse, the river was examined by plane to north of latitude 70° N., but no outcrops or rubble indicating bedrock were seen. The East Fork of the Ikpikpuk River was also examined from the air, but no outcrops or rubble were observed.

Outcrops are limited to cutbanks along the streams, and many of these are sloughed with no rock in place. Bedding traces are present on the upper parts of the Titaluk and Ikpikpuk Rivers, but elsewhere the Gubik sand mantles the underlying beds.

STRATIGRAPHY

General Lithology

The bedrocks are of Cretaceous age and are largely shale and sandstone. Pebbly sandstone, coal, bentonite, plastic clay, and sublithographic limestone are also present in thin beds throughout most of the area.

The sandstones are of three general types. One type is light to gray and buff and usually very fine to fine grained. The bedding is well developed. Some of the beds are friable, calcareous and have low to high porosity. Porosity determinations, made on the most porous specimens, were 13 to 17 percent. The other type is greenish, very fine to fine grained, hard, dense, indistinctly bedded, and has low porosity. These two types of sandstone are interbedded. Marine fossils are found in both types but are more abundant in the greenish sandstone. Presumably the gray sandstone represents shoreline and littoral elements whereas the greenish sandstone is offshore marine. A third type of sandstone which is found only in the northern part of the area is loosely consolidated. Individual beds exhibit uneven and pockety cementation. Interbedded clays are almost unconsolidated. The best exposure of these beds is at Little Supreme Bluff, where a 100-foot section is well exposed. It overlies well consolidated sandstone and the marked break in degree of cementation can be followed along the face of the cliff. This break may have stratigraphic significance. Microfaunal and megafaunal assemblages, however, suggest that the loosely consolidated sandstones and clays belong to the same part of the Upper Cretaceous as the underlying sandstones.

Shales do not crop out well in any part of the area studied and are found only as rubble or are weathered to clay.

Rubble of black paper shale with thin interbeds of bentonite is found at several localities along the Ikpikpuk River between Camps August 17 and August 22 and halfway between Camp August 26 and August 30. Megafossils were not found, but the shale is believed to be Zone F. At one locality below Camp August 21 satin spar (fibrous calcite) in beds one half inch thick is found in the shale.

Pebbly sandstone, commonly in lenses, is found at many localities. At some places the pebbles are dominantly quartz and at others dark chert. The pebbles are well rounded and are from one quarter to three quarters of an inch in diameter. Between Camps August 21 and August 22 a shiny, smooth, oval pebble of chert was found in gray sandstone. It is thought to be a gastrolith. Several highly polished chert pebbles which are faceted and pitted are probably ventifacts.

Seams of coal, mostly less than a foot thick, are found at about one out of five localities throughout the area. Much of it is lignite and bony coal. A few of the seams are as much as two to three feet thick. Plastic clay underlies almost all of the coal seams and probably is fire clay.

Beds of gray sublithographic limestone, which is somewhat ferruginous, are found, and some are in close association with coal. The weathered surfaces of some beds are a net of small polygonal shaped pits about one quarter of an inch in diameter and one-sixteenth of an inch deep.

Bentonite was found along the rivers traversed except in the part of the Titaluk River lying west of about longitude 155° 50' W. Most of the beds are thin; the thickest observed was ten inches thick. This bed was exposed beneath a coal seam between Camps August 21 and August 22.

Clay ironstone galls and wood and plant remains are found at all outcrops. Well preserved leaf imprints and fossilized wood and plant detritus are found in fine sandstone and sublithographic limestone along the Ikpikpuk and Titaluk Rivers. Fossil wood in slabs as much as three feet long and one foot wide are weathered out of the cutbanks between Camps August 26 and August 30. The diameter of the trees must have been at least several feet. The size of the trees and the presence of fossilized bark on the outside suggests that they were not transported far from their point of origin.

Paleontology and correlation

All fossil collections have been examined by Mr. George Gryc of the Geological Survey and generic identifications made. Fossil identifications and localities are shown on the map. Specimens of *Veniella* sp. (*Roudiaria*) are especially abundant in the rocks studied. *Veniella* sp. has been identified in Faunal Zones 1, 2, and possibly 4. Abundant specimens of *Veniella* sp. are known only from Faunal Zone 2 in Zone E. Several specimens have been found in Faunal Zone 1, and one specimen may possibly be from Faunal Zone 4.

Additional specimens of the *Inoceramus* sp. with chevron-type growth ridges collected by P. S. Smith in 1924 were sought from the same fossil locality between his Camps August 26 and August 30, but only specimens of *Veniella* sp., *Panope* sp., and *Mytilus* sp. were found. *Inoceramus* sp., with chevron-type growth ridges, is diagnostic of Faunal Zone 2.

The preponderance of paleontologic evidence suggests that rocks of Zone E underlie all of the area except that of the upper part of the Titaluk River, which is probably Zone D, and small areas on the Ikpikpuk River, which may be Zone F.

