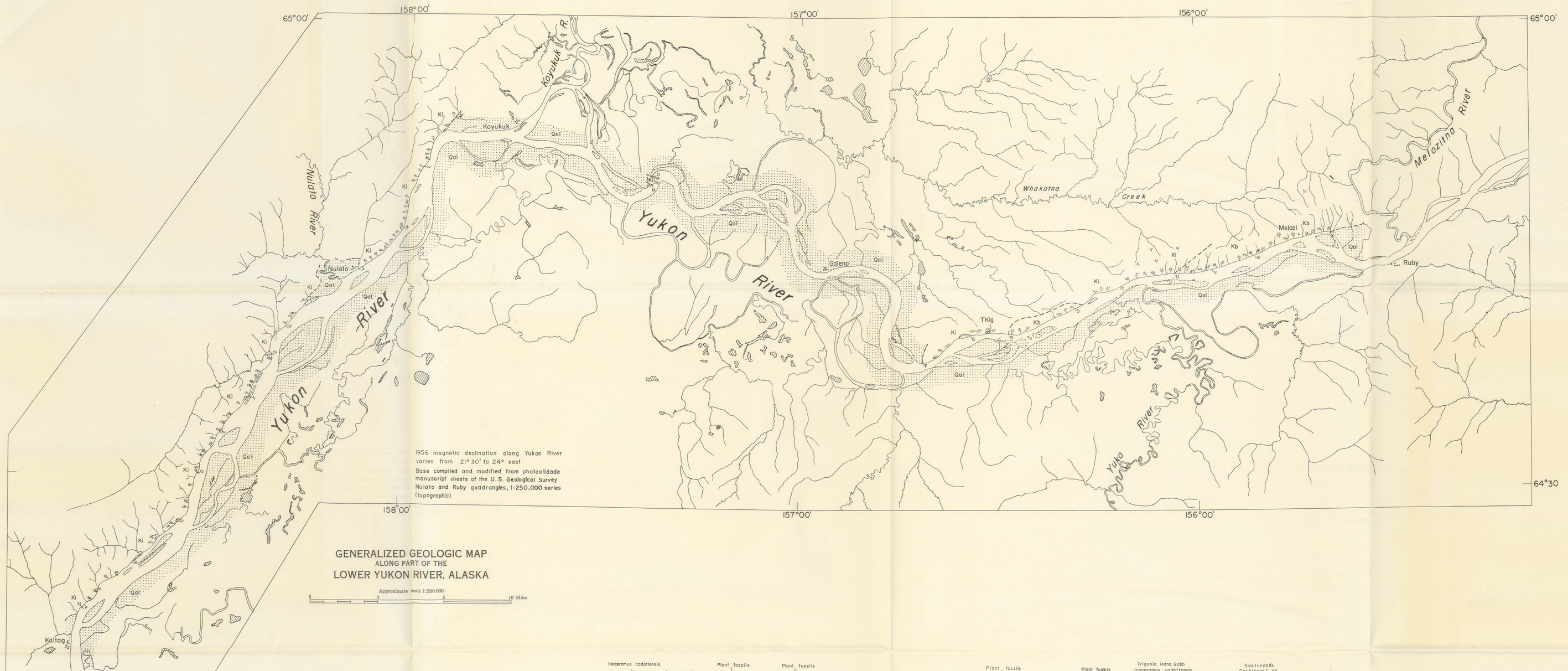
DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY

MISCELLANEOUS GEOLOGIC INVESTIGATIONS
MAP I-197



1956 magnetic declination along Yukon River varies from 21°30' to 24° east

Base compiled and modified from photooffset manuscript sheets of the U.S. Geological Survey Nulato and Ruby quadrangles, 1:250,000 series (topographic)

GENERALIZED GEOLOGIC MAP
ALONG PART OF THE
LOWER YUKON RIVER, ALASKA

Approximate scale 1:200 000

5 0 5 10 Miles

EXPLANATORY NOTES

The U. S. Geological Survey began stratigraphic and structural studies in the southern half of the Koyukuk Cretaceous basin in 1954. During July and August 1954, the lower Yukon River was traversed by boat between Ruby and Kaltag. The specific details of the cutbank exposures along the river are shown in the sections A-X. The map, at a smaller scale, gives the location of the sections and a generalized picture of the geology.

Stratigraphy

The rocks of Cretaceous age that are exposed along the Yukon River have been subdivided into the Ungalik conglomerate and the Melozi, Nulato, and Kaltag formations by Martin (1926). In this report, two different sequences of Cretaceous rocks are recognized: a border facies and an interior facies. Each facies is tentatively subdivided into unnamed, mappable units. The border facies occurs along the southeastern margin of the Koyukuk Cretaceous basin. It crops out on the north bank of the Yukon River between the Melozitna and Yuko Rivers and also 6 to 10 miles below the Yuko River. The interior facies crops out below the mouth of the Yuko River in the central part of the basin. The border facies is believed to grade into the interior facies, but a precise correlation is not yet possible because the two facies apparently are in fault contact.

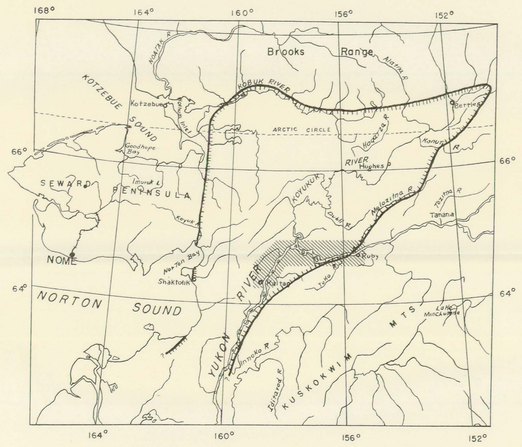
Marine mollusks from the lower and middle units of the interior facies have been assigned a late Early Cretaceous age by R. W. Imlay, based principally on the occurrence of *Inoceramus cadottensis* and *Gastropldes* sp. Plant remains from the upper unit of the interior facies are of Late Cretaceous age according to R. W. Brown.

Structure

The Cretaceous rocks strike northeastward and in places are complexly folded and faulted. The structure sections along the north and west bank of the Yukon River between *A* and *X* were plotted in the field at a scale of 1:10,000. They have been generalized and reduced to the present scale, and smaller faults and folds, which were found at many of the outcrops, have not been shown. Blank intervals in the sections represent covered areas. Only a few of the strikes and dips that were recorded in the field and used in preparing the structure sections are shown on the geologic map.

Literature cited

Martin, G. C., 1926, The Mesozoic stratigraphy of Alaska: U. S. Geol. Survey Bull. 778, 493 p.



Approximate border of Koyukuk Cretaceous basin

Area covered by this report

50 0 50 100 150 MILES

INDEX MAP OF WEST-CENTRAL ALASKA

EXPLANATION FOR GEOLOGIC MAP

- Qal — Unconsolidated deposits — QUATERNARY
- TKig — Igneous rock — CRETACEOUS OR TERTIARY
- Kb — Border facies: *Upper and lower units undifferentiated.* — CRETACEOUS
- Ki — Interior facies: *Upper, middle, and lower units undifferentiated.* — CRETACEOUS
- Contact: *Includes both faulted and normal contacts.*
- 31 — Strike and dip of beds from field observation
- Strike and dip of beds interpreted from aerial photographs
- 57 — Strike and dip of overturned beds from field observation
- Lake

EXPLANATION FOR SECTIONS

Igneous rock, TKig
Porphyry intrusive.

Border facies

Includes most of the rocks exposed along the north bank of the Yukon River between the Melozitna River and the Yuko River; near the southeast margin of the Koyukuk Cretaceous basin.

Upper unit (Kbu). *Variable lithology. Mostly yellowish-orange, yellowish-gray, and gray, ferruginous, in places calcareous, shale, siltstone, sandstone, and conglomerate. Sandstone is fine to coarse grained and thin to thick bedded. Conglomerate is usually granular, rarely pebbly; in places feldspathic. Subordinate greenish-gray graywacke conglomerate, pale-olive sandstone, and dark-green siltstone. Thickness unknown. Plant remains. Thought to be chiefly nonmarine in origin.*

Lower unit (Kbl). *Mostly greenish-gray graywacke conglomerate and sandstone. Conglomerate is lenticular, poorly sorted, and poorly stratified. Contains subangular to round pebbles and cobbles of mafic and acidic intrusive and extrusive igneous rocks, varicolored chert, quartz, schist, and, in lesser amounts, limestone, quartzite, gneiss, slate, and shale imbedded in a muddy matrix. Sandstone is very fine to coarse grained, thin to thick bedded, and lenticular; bedding commonly graded. Subordinate shale and siltstone, dark-gray; locally calcareous. Near the top yellowish-orange conglomerate with subangular pebbles of chert, quartz, and schist in a hard, siliceous matrix and yellowish-orange feldspathic sandstone. Grades into upper unit. Base not exposed. Minimum thickness of 1,200 feet measured between Melozitna River and Yuko River. Marine mollusks and worm tubes. Probably of marine origin.*

Interior facies

Includes most of the rocks exposed along the north and west bank of the Yukon River between the Yuko River and Kaltag; in central part of the Koyukuk Cretaceous basin.

Upper unit (Kiu). *Mostly dark-gray and olive-gray shale and siltstone. Siltstone is micaceous. Near base, fine- to coarse-grained, lenticular, crossbedded, locally friable, thick-bedded, salt-and-pepper sandstone; locally some thin lenses of quartz and chert granule and pebble conglomerate. Subordinate very fine to fine-grained, micaceous, thin- to medium-bedded, gray to yellowish-orange sandstone. Bituminous coal in beds as much as 20 inches thick. Thickness, 1,100 feet, measured between Koyukuk and Nulato. Plant remains abundant. Fresh- and brackish-water mollusks. Nonmarine origin.*

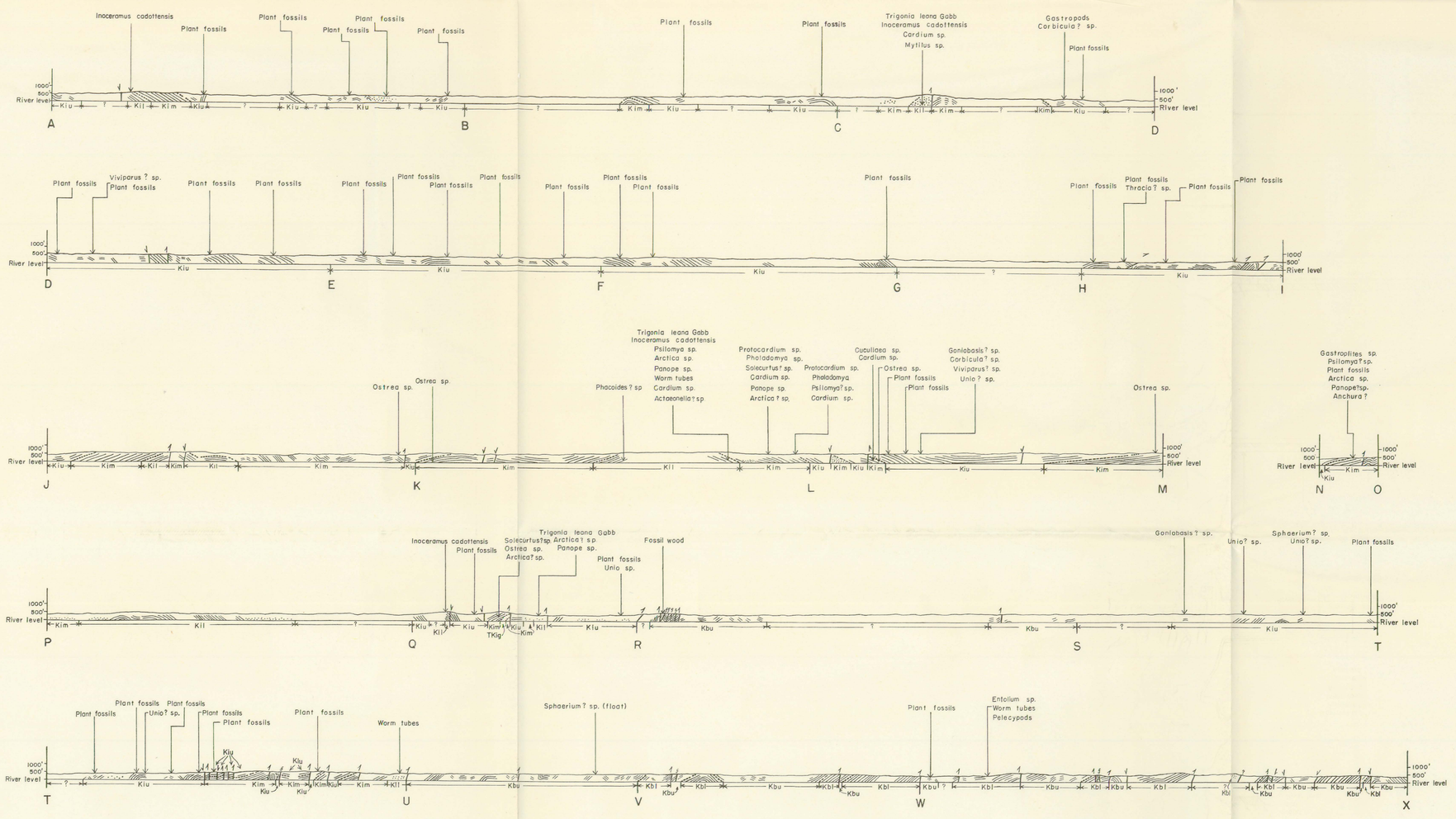
Middle unit (Kim). *Mostly sandstone: near top dominantly pale-olive to medium-gray, fine- to medium-grained, thick-bedded, crossbedded, and lenticular; near base dominantly dark greenish-gray, muddy, very fine to fine-grained, and thin- to thick-bedded. Subordinate dark-gray siltstone and shale. Grades into upper unit. Thickness, 1,100 feet, measured between Koyukuk and Nulato. Marine mollusks abundant. Littoral marine origin.*

Lower unit (Kil). *Dominantly sandstone, dark-gray and dark greenish-gray, muddy, thin- to thick-bedded, very fine to fine-grained. Subordinate dark-gray shale and siltstone. Grades into middle unit. Base not exposed. Maximum thickness of 800 feet measured between Koyukuk and Nulato. Marine mollusks abundant. Offshore marine origin.*

CRETACEOUS OR TERTIARY

CRETACEOUS

- Bedrock — *Exposed and in place.*
- Talus or float
- Contacts — *Normal contact indicated by heavy dashed line.*
- Fault — *Arrow indicates direction of relative displacement.*
- Fault — *Direction of displacement not known.*



SECTIONS ALONG WEST AND NORTH BANKS OF YUKON RIVER FROM A TO X

1 ½ 0 1 2 3 Miles

Four times geologic map scale

GEOLOGIC MAP AND STRUCTURE SECTIONS ALONG PART OF THE LOWER YUKON RIVER, ALASKA

By
William W. Patton, Jr., and Robert S. Bickel

1956

INTERIOR—GEOLOGICAL SURVEY, WASHINGTON, D. C. MR-3245

MISCELLANEOUS GEOLOGIC INVESTIGATIONS
MAP I-197

For sale by U.S. Geological Survey, price 50 cents