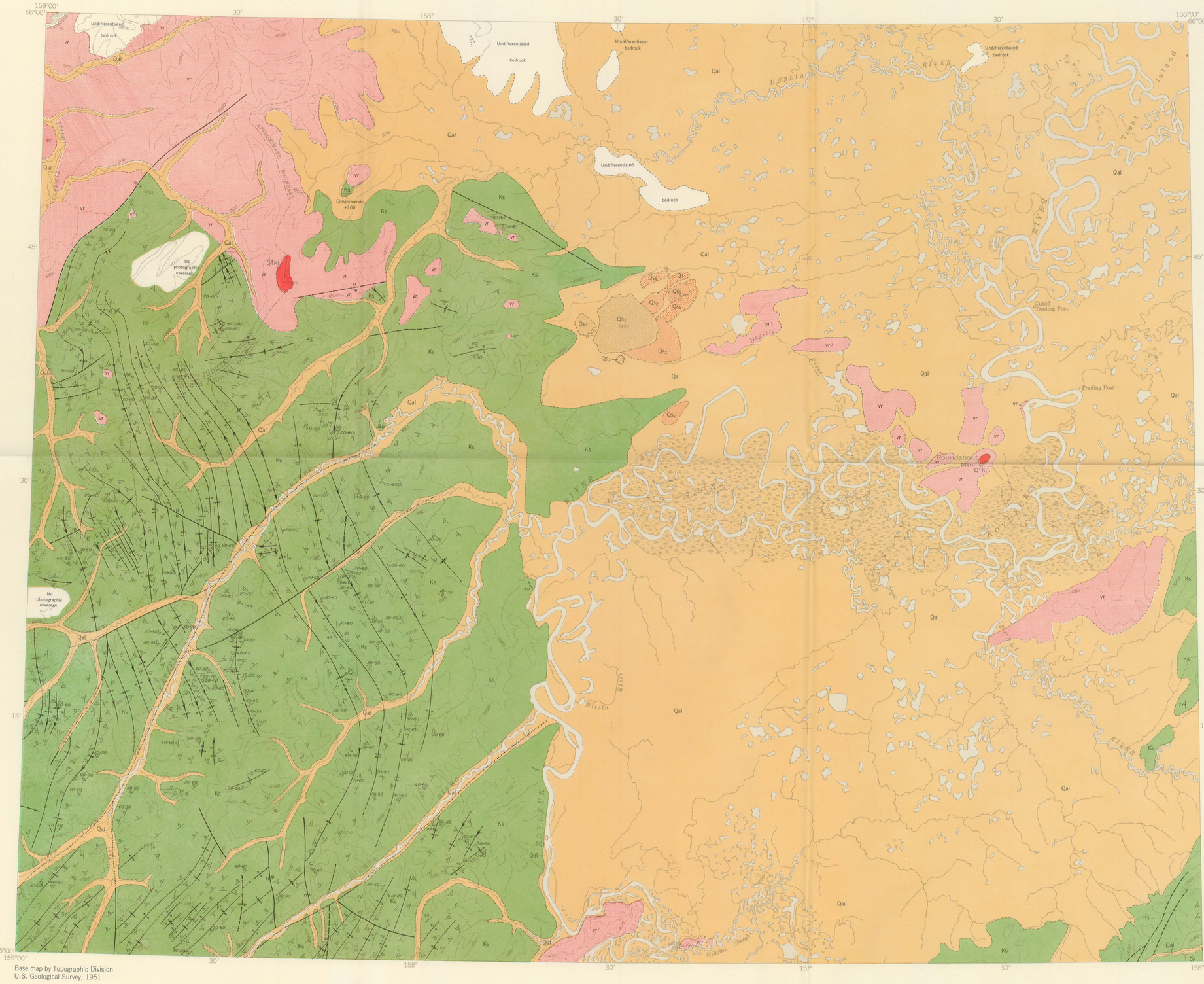
DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY

MISCELLANEOUS GEOLOGIC INVESTIGATIONS
MAP I-243



Base map by Topographic Division
U.S. Geological Survey, 1951

EXPLANATION

QUATERNARY

Qs3 Qs2 Qs1 — Sand dunes

Dunes consist of quartz sand, coarse-grained on west edge of dune area and decreasing in grain size toward east edge. Sand appears to have been blown in from westerly and northwesterly directions. Relative ages of dunes are based on limited field data, on the type and distribution of vegetation and drainage patterns, and on relative degree of erosion, as determined by examination of aerial photographs.

Qal — Alluvium

Silt, sand, and gravel of river flood plains and stream beds. Includes alluvial terraces and other older, unconsolidated deposits.

CRETACEOUS(?), TERTIARY(?) AND QUATERNARY(?)

QTKi — Intrusive rocks

Porphyritic to nonporphyritic, mafic intrusive rocks. The intrusive body north of the Kateel River is porphyritic. It is similar megascopically and may be genetically related to the coarse-grained basalt flows (vr). The intrusive body exposed at Roundabout Mountain is nonporphyritic. Includes numerous unmapped dikes of varied composition and texture.

CRETACEOUS

Ks — Shaktolik group

Graywacke, shale, grit, and conglomerate. Coarse clastic rocks form rubble-covered ridges and hills, shale forms slopes and valleys. Outcrops rare.

The rocks of the Shaktolik group have been described by Schrader (1900, pl. 60) along the lower Koyukuk River; by Smith and Eakin (1911, p. 57-60) and by Patton and Bickel (1956a) at the type section on the Shaktolik River southwest of the Kateel River quadrangle; and by Martin (1926, p. 395-429) and by Patton and Bickel (1956b) along the lower Yukon River immediately south of the Kateel River quadrangle. Smith and Eakin (1911, p. 57, placed all rocks of Cretaceous age above the Ungalik conglomerate in the Shaktolik group. Martin (1926, chart opposite p. 474) divided the Upper Cretaceous rocks above the Ungalik conglomerate into the Kaltag, the Nulato, and the Melozi formations and stated that these three are contemporaneous with the Shaktolik group. Smith (1939, p. 53) did not accept the three formations of Martin as more than a theoretical subdivision. Prior to 1901 the Shaktolik group was considered to be Tertiary in age. These rocks were then shown to be Late Cretaceous in age by Stanton and Knowlton from studies primarily of plant fossils collected by Collier (1903). Imlay and Reeside (1954, p. 225-256) reclassified the marine mollusks of the fossil collections of Collier as late Early Cretaceous in age (Albian). Patton and Bickel (1956b) state that the lower and middle units of the Shaktolik group have been assigned a late Early Cretaceous age, based principally on marine mollusks, whereas the upper units of the Shaktolik group are Late Cretaceous in age based on plant remains. The Shaktolik group exposed along the lower Yukon River trends into the Kateel River quadrangle. Detailed stratigraphic information is insufficient to warrant mapping Martin's three formational equivalents of the Shaktolik group within the quadrangle. The thickness is unknown but is estimated by Martin (1926, p. 395) along the lower Yukon River to be more than 4,800 feet, not including about 3,000 feet of Ungalik conglomerate, which does not appear in the Kateel River quadrangle.

Note.—*Recent field work indicates that north of the Kateel River between long. 157°30' W. and long. 158°00' W. there are extensive exposures of extrusive rock (vr) which have not been mapped separately from the Shaktolik group (Patton and Bickel, 1956, personal communication).*

AGE UNKNOWN

vr — Volcanic rocks

Chiefly basalt and andesite. Rarely rhyolite, tuff, chert, conglomerate, and breccia. In some places flat lying or gently dipping and unaltered, elsewhere highly folded and faulted, and altered. Probably of several different ages.

- Contact — *Long dashes where approximately located; short dashes where gradational or inferred.*
- Fault — *Long dashes where approximately located; short dashes where inferred; dotted where concealed; U, upthrown side; D, downthrown side.*
- Fault, showing relative movement
- Thrust or low-angle reverse fault — T, upper plate.
- Anticline — *Showing crest line and direction of plunge. Long dashes where approximately located; short dashes where inferred; dotted where concealed.*
- Syncline — *Showing trough line and direction of plunge. Long dashes where approximately located; short dashes where inferred; dotted where concealed.*
- Overturned anticline — *Showing crest line and direction of dip of limbs; dashed where approximately located.*
- Overturned syncline — *Showing trough line and direction of dip of limbs; dashed where approximately located.*
- Strike and dip of beds based on field measurement
- Approximate strike and dip of beds based on photointerpretation
- Strike and dip of overturned beds based on field measurement
- Strike and dip of overturned beds based on photointerpretation
- Strike of vertical beds based on photointerpretation
- Trace of beds

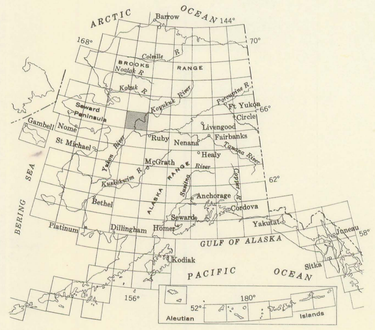
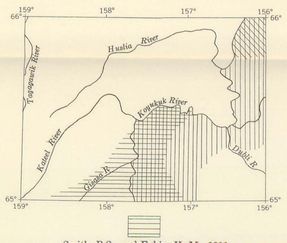


FIG. 3.—INDEX MAP OF ALASKA SHOWING LOCATION OF KATEEL RIVER QUADRANGLE



Smith, P.S., and Eakin, H. M., 1911

Smith, P.S., 1913

Eakin, H. M., 1916

FIG. 1.— INDEX MAP OF KATEEL RIVER QUADRANGLE SHOWING SOURCES OF INFORMATION

INTRODUCTION

The Kateel River quadrangle is one of a group of maps compiled to make available for public use information from reports on early ground surveys that are mostly out of print and new information obtained by interpretation of aerial photographs that have become available since the ground surveys. Interpretation of the aerial photographs has made possible the extension of formations beyond the limits mapped from ground surveys and has added much new information, especially data on the structure of the rocks. Descriptions of the rocks are taken mainly from reports on the earlier ground surveys and therefore may be valid only within the limits of these surveys (see figure 1). Although a formation may be recognized on aerial photographs beyond the limits of an earlier ground survey, it is not possible to determine from the photographs whether or not the rocks of the formation in the extended area differ somewhat from the rocks recognized in the ground survey.

The writer is indebted to the U. S. Army, 30th Engineer Group, for the valuable assistance it gave in helicopter and fixed-wing aircraft transportation, and for the use of the 549th Topographic Engineer Company field camps during the summer of 1954.

SOURCES OF INFORMATION AND METHOD OF COMPILATION

Photogeologic studies of the southern part of the Koyukuk Cretaceous basin were begun in the spring of 1954. These studies were made on north-south flights of 1:40,000 scale, vertical and trimetrogon aerial photography. Three months were spent field checking the photogeology in the summer of 1954, and approximately two weeks of this field time were spent in the Kateel River quadrangle. Helicopter transportation greatly facilitated the field work. Field work was supplemented by information from published sources (see figure 1). All information was compiled on the 1:250,000 scale, U. S. Geological Survey Alaska Reconnaissance Topographic series map of the Kateel River quadrangle during the winter of 1954-55.

STRUCTURE

The Kateel River quadrangle lies near the north side of the southern part of the Koyukuk Cretaceous basin. The dominant structural feature within the southern part of this basin is the strong northeast trend of the folds and faults in the rocks of Cretaceous age. The trend of folding within the Kateel River quadrangle is anomalous to this regional trend. Here the trend of the fold axes forms an arcuate or S-shaped pattern trending northeast in the southern part of the quadrangle, northwest in the central part, and changing again to northeast in the northern part of the quadrangle. In the north part of the Kateel River quadrangle pre-Cretaceous rocks crop out on the south flank of the Hogatza uplift (Payne, 1953).

In the Kateel River quadrangle the axes of the more open folds can be traced for many miles. Cross folding is suggested by the numerous reversals of plunge of the fold axes. Tight folds and drag folds are common where shale is predominant; broader folds are characteristic of areas where graywacke is predominant. Generally the hills and ridges are synclinal and the valleys and gulleys are anticlinal. Overturning of the folds is generally eastward.

At least two ages of faulting are recognized in the Kateel River quadrangle. Reverse faults and strike-slip faults of the earlier period are genetically related to the folding. These faults occur both along the trend and across the trend of the fold axes. Folds passing into faults are common, although these faults cannot be shown at the scale of this map. Exposures in streams show that the major folds have been faulted along the strike of the beds, but this type of faulting is not apparent on the ridges and hills. Many of these strike faults are reverse faults with the upthrown side generally on the west.

Normal faults of the later period cut the flat-lying lava flows in the Kateel River quadrangle. Recent adjustment along many of these later faults is apparent in scarps formed in the Quaternary alluvial fans in the Nulato Hills between Norton Bay and the Yukon River, and along the north flank of the Kaiyuh Mountains immediately south of the Kateel River quadrangle.

The major streams in the western part of the Kateel River quadrangle are controlled by faults, as contrasted to the regional stream control in the southern part of the Koyukuk Cretaceous basin, which is along the strike of the beds, parallel to the fold axes.

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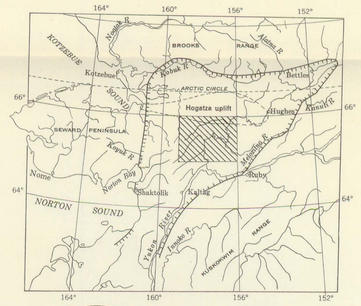

Approximate boundary of Koyukuk Cretaceous basin

Area of Kateel River quadrangle

FIG. 2.—INDEX MAP SHOWING LOCATION OF THE KATEEL RIVER QUADRANGLE AND THE HOGATZA UPLIFT IN THE KOYUKUK CRETACEOUS BASIN

RECONNAISSANCE GEOLOGIC MAP OF THE KATEEL RIVER QUADRANGLE, ALASKA

By
John T. Cass

Scale 1:250 000

5 0 5 10 15 20 Miles

Contour intervals 200 and 1000 feet
Dotted lines represent half-interval contours
Datum is mean sea level

1957 Magnetic declination varies from 21°30' to 24° east

1957

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