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A reconnaissance report on parts of the stratigraphy in northeastern Aroostook County, Maine

Douglas Smith

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A Reconnaissance Report on Parts of the Stratigraphy
in Northeastern Aroostook County, Maine

Douglas Smith

A B S T R A C T

Ten weeks were spent in the field in northern Maine mapping Ordovician, Silurian, and Siluro-Devonian sediments in parts of Caribou, Stockholm, Van Buren, and Grand Isle quadrangles. Detailed mapping was done only along the contact between the Middle Ordovician Meduxnekeag formation and the Silurian Perham formation. The contact is disconformable and lithologically gradational. The Perham formation is overlain by undifferentiated Siluro-Devonian siltstones, shales, slates, and argillites in Stockholm and Grand Isle quadrangles. The "Sheridan sandstone," Unit S₁, crops out in an anticline(?) in northwestern Caribou quadrangle. Tight isoclinal folding is present in most of the area; fold axes strike about N20E.

T A B L E O F C O N T E N T S

Subject	Page
ABSTRACT.....	I
TABLE OF CONTENTS	II
INTRODUCTION	1
STRATIGRAPHY	
ORDOVICIAN SYSTEM.....	2
Meduxnekeag Formation	2
Lithology	2
Age	4
SILURIAN SYSTEM.....	4
Perham Formation	4
Lithology of the lower member	5
Lithology of the Sweden facies	7
Lithology of the upper member.....	7
Age	9
Contact with the Meduxnekeag formation	9
Unit S ₁ , the "Sheridan sandstone"	11
Lithology.....	11
Age	12
Contact Relationships	12
SILURO-DEVONIAN SYSTEM	13
STRUCTURE.....	14
METHOD OF NOTATION IN FOOTNOTES	16
LIST OF FOSSIL LOCALITIES	17
BIBLIOGRAPHY	18

I N T R O D U C T I O N

Ten weeks were spent mapping in the Ordovician, Silurian, and Siluro-Devonian sediments in northeastern Aroostook County in northern Maine, in the area encompassed by Presque Isle, Caribou, Stockholm, Van Buren, and Grand Isle quadrangles. The primary purpose of the mapping was to determine the stratigraphic relationship between the Middle Ordovician ribbon rock member of the Meduxnekeag formation and the overlying Lower Ludlow Perham formation. The secondary purpose was to do reconnaissance work for the forthcoming geological map of Maine. Detailed mapping was in general done only in the immediate vicinity of the contact, and little attempt was made to determine the structure outside this vicinity.

The formations were accepted as defined by Boucot, et. al. Richard Naylor, one of the authors of that report, spent several days in the field outlining the units and inspecting work in progress. His advice and his reconnaissance map of the Caribou quadrangle (unpublished) were heavily relied upon and formed the base upon which most of the work was done. Dr. A. J. Boucot, of the California Institute of Technology, and Louis Pavlides and Robert Neuman, both of the U. S. G. S., spent a day in the field with the author. William Forbes, of Washburn, Maine, found several valuable fossil localities. The work was supported by the Maine Geological Survey.

S T R A T I G R A P H Y

ORDOVICIAN SYSTEM

MEDUXNEKEAG FORMATION

The ribbon rock member of the Meduxnekeag formation is exposed throughout the eastern half of Caribou quadrangle, the southeast corner of Stockholm quadrangle, and extensively in Van Buren quadrangle. The lower contact of the formation was not observed, and its thickness, probably some thousands of feet, is unknown. It is overlain by the Silurian Perham formation. The history of the formation may be found in Boucot, et. al.

Lithology

The most common ribbon rock lithology is about 90% dark blue-gray, light blue-gray or tan weathering "limestone"¹ in $\frac{1}{2}$ inch to 6 inch beds, averaging about $1\frac{1}{2}$ inches. The limestone, always argillaceous and frequently silty, often shows fine raised laminations on weathered surfaces; the laminations occasionally show crossbedding. Bedding surfaces are often gently undulating and bear thin layers of phyllitic shale. Small calcite veins often cut the beds. Black noncalcareous shale, and rarely, calcareous siltstone, in up to 6 inch intervals, form the remaining 10% of the section. Drag folding is common on a scale of several inches to several feet; variations in attitude of 15 to 20° are common in any 100 foot section. Good exposures of the lithology may be

1. The field term, "limestone," is used throughout the report for rocks which technically might be termed very calcareous mudstones. In fact, true limestones, composed of over 50% CaCO_3 , may not exist anywhere in the area mapped. Neither thin sections nor chemical analyses were made of any of the rocks. Shales, mudstones, siltstones, and limestones were distinguished by breaking, parting, and weathering characteristics and hand lens appearances.

seen on the banks of the Aroostook River west of Washburn.¹ The above lithology, the only one diagnostic of the ribbon rock, forms perhaps $\frac{1}{2}$ of the ribbon rock member.

Much of the ribbon rock is considerably shalier than that described above. Shales vary from highly calcareous, thickly cleaved, platy, blue-gray shales to medium gray or black, noncalcareous, finely cleaved shales like those of the Perham formation. Most sections have lithologies intermediate between pure shales and the distinctive ribbon rock lithology; such a section is that at fossil locality F-2 just south of the Aroostook River.

Quartzites and mudstones are found in several places in the ribbon rock, but form less than 1% of the member. The quartzites are medium to dark gray, noncalcareous or slightly calcareous, and very fine-grained. They generally weather to a thick orange rind. They occur in massive one hundred to two hundred foot thick units. An attempt was made to map the quartzites, but it was unsuccessful due to the difficulty of mapping such thin units. The mudstones, dark gray to black, silty, and blocky, occur in a few small (less than 50 foot) sections. The section at the fossil locality near the Woodland School (loc. F-5) well shows the lithologic range of the ribbon rock member, many rock types being well exposed.

1. At C(04590187), #1273; and at C(03700148), #111
See appendix for a discussion of the notation used. -P16

Most carbonates in the area commonly weather to a thick soft brown rind, probably implying an ankeritic nature. As beds lacking a rind may develop one on strike in a distance of a few inches, the presence or absence of a rind does not necessarily reflect differences in initial composition of beds. The presence of the rind often makes lithologic distinctions and comparisons difficult.

Age

The following paragraph has been taken from R. S. Naylor:

"The ribbon rock member of the Meduxnekeag formation has recently been dated as of Middle Ordovician age (Pavlidis, et. al., in press). The critical fossils for dating this unit were found by W. H. Forbes in 1960 near Colby (fossil loc. F-6*). A list of the graptolites identified from this outcrop by W. B. N. Berry is given in Pavlidis, et. al. (in press) and Boucot, et. al., (in preparation). Graptolites discovered by R. G. Neuman and W. H. Forbes in an outcrop south of the Aroostook River (fossil loc. F-2*) have also been dated by Berry (W. B. N. Berry, personal communication, 1961) who believes them to be of the same age as the fossils from loc. F-6*. Loc F-2* appears to be stratigraphically very near the top of the ribbon rock unit."

In addition, W. H. Forbes has discovered two more Ordovician graptolite localities in Caribou quadrangle just west of the Woodland School (fossil loc. F-5), one of them apparently in the same horizon as that at Colby.

SILURIAN SYSTEM

PERHAM FORMATION

The Perham formation is exposed in a belt, up to about eight miles wide, in the Caribou, Stockholm, Van Buren, and Grand Isle

*The numbers given for the fossil localities are those from my map.

quadrangles. The history of the formation may be found in Boucot, et. al. As in Presque Isle quadrangle the formation has two distinct parts: a lower member, which consists of noncalcareous shales and argillites, and occasionally bears sedimentary iron-manganese deposits; and an upper member, which consists of mudstones, shales, and sandstones. In addition, from the vicinity of Woodland Center north to the St. John River, in a belt less than two miles wide west of the Meduxnekeag-Perham contact, are occasional outcrops of a highly phyllitic shale containing limestone beds; this lithology will be referred to as the Sweden facies of the Perham, because of several good exposures near the town of Sweden.

Lithology of the Lower Member

The most common lithology in the lower member is a medium to dark gray, noncalcareous finely cleaved shale, in places tending to a slate; the shale is commonly chippy, readily breaking into small fragments. Bedding is occasionally revealed by thin white laminations. Rarely, one inch beds of sandy argillite are present. Large exposures of the lithology distinguish the lower member from the Meduxnekeag; the latter only rarely contains sections of the lithology greater than four or five feet thick (the section at the Woodland fossil locality being an obvious exception (16c. F-5)).

The diagnostic lithologies of the lower member are red and green shales, slates, and argillites, frequently with red iron-manganese stains on parting surfaces, and occasionally associated

with low grade iron-manganese ore. These occur randomly in the lower member throughout the mapped area.

Detailed mapping of the iron-manganese deposits was done by Miller (1947). Deposits found not mapped by Miller include two 2 to 4 foot sequences of low quality ore northwest of Carson,¹ and badly contorted red shales with associated low grade ore in a seventy-five foot section two and one-half miles south of the town of Van Buren.² The deposits all are within the lower member, but they are lensoidal and do not always occupy the same stratigraphic horizon within it.

The member is best exposed in an east-west section which includes the top of the Meduxnékeag, the entire lower member of the Perham formation, and part of the upper member along a field road and ditch one and one-half miles northeast of the town of Perham.³ It is the best section of the Perham found and is suggested as a possible type section of the formation. The contact between the upper and lower members is gradational, and it is arbitrarily set at the top of a two foot bed of typical low grade ore. The lower member here consists of gray to gray-green shale and argillite, sometimes showing iron-manganese stains. The argillites, commonly in one inch beds, are occasionally sandy. The lithology differs from typical lithologies in that bedding has been preserved in much of the argillite. The member is approximately 1200 feet thick here.

1. Near C(03980749), #663; and at C(04000788), #672
2. At VB(02590838), #935
3. Near C(03980749), #663

Lithology of the Sweden facies

Typically 90% of the lithology consists of medium gray shale, generally highly phyllitic with paper-thin cleavage. The remaining 10% consists of $\frac{1}{4}$ inch to 2 inch beds of medium gray limestone; they occur both in groups and scattered randomly throughout the shale section. The thickness of the facies is unknown. Good exposures of the lithology may be seen west of Colby¹ and south of Van Buren². The unfossiliferous lithology is believed to belong to the Perham formation for two reasons. First, in the vicinity of Woodland Center, and along the northwest trending road two miles south of Van Buren, the lower member appears to grade into a lithology very similar to the Sweden facies by the gradual acquisition of limestone beds. Second, if the Sweden facies were a facies of the ribbon rock folded into its present position, one would expect to find it to the east of the contact defined by the lower member of the Perham; it is never found there.

Lithology of the Upper Member

The following lithologies are common in the upper member:

- 1) gray shale, often silty or sandy;
- 2) medium gray mudstone, breaking readily into small blocks, frequently laminated and occasionally showing crossbedding
- 3) gray to medium blue-gray sandy siltstone, often hard and slabby

1. Particularly at C(04011068), #373
2. Particularly at VB(02130919), #931

4) silty fine-grained sandstone, often hard and slabby, often sparkly on broken surfaces

5) medium gray fine-grained rock, occasionally with volcanic fragments, appearing to be a volcanic ash

Bedding commonly ranges from 1 inch to 36 inches, averaging about 4 inches; thicker beds are occasionally present. Bedding planes are usually straight. Thick beds are often characterized by blocky, jointed weathering surfaces. The lithologies are noncalcareous to moderately calcareous; they commonly weather orange-brown or brown, occasionally gray. Shale is the most common rock type in the member. The percentages of the other types vary greatly from one exposure to another.

Lithologies rarely seen in the member include quartzite and limestone. Quartzites very similar to those in the Meduxnekeag are present in four to five foot beds in several localities¹. The limestone, in one inch to two inch beds, was found interbedded with shale in several small sections;² they could easily be mistaken for Meduxnekeag sections.

The contact with the lower member is gradational, as is probably the contact with the Sweden facies. The thickness of the member is unknown. Typical exposures of the lithology may be seen at the suggested type section³, west of Perham⁴, and two and one-half miles west of Van Buren⁵. Despite its varied lithology, the upper member is usually easily recognizable.

1. For instance at S(07300090), #446
2. For instance at VB(00521074), #1084
3. Near C(03980749), #663
4. At C(01230653), #651
5. Near VB(00521074), #1084

Age

The age of the upper member of the Perham formation has been determined as Lower Ludlow in Presque Isle quadrangle (Boucot, et. al.). Naylor writes that Berry has collected Lower Ludlow graptolites from localities F-3 and F-9. Collections of graptolites were sent to Berry from localities F-4, 8, 10, 12, and 14; all these are believed to lie within the upper member. Locality F-4 is in the suggested type section. The Sweden facies and the lower member are unfossiliferous. The latter may be approximately dated by the fact that in Presque Isle quadrangle it overlies the "Sheridan sandstone" (Unit S₁) (Boucot, et. al.), which is C3 to Wenlock in age.

Lower Contact with the Meduxnekeag Formation

The contact between the Meduxnekeag and Perham formations is believed to be a lithologically gradational disconformity. No evidence was found suggesting faulting along the contact. Attitudes in both formations approximately parallel the contact; however, due to the rapid local variation of attitudes in the region, a small angular unconformity might exist undetected. The exact area of the contact is exposed in two places -- in a road ditch two and one-half miles south of Van Buren¹, and in a field road at the suggested type section². In the former locality the area of the contact may be restricted to a 50 foot section, in the latter

1. At (02610834), #454, #936, #1165

2. At (03920750), #663, #1161, #1181

to a 20 foot section. In both spots the limestone and shale of the ribbon rock seem to grade into the shale of the Perham formation by the gradual elimination of the limestone. In neither locality is it possible to point out any one spot as the contact. In both localities the spotty nature of the exposures allows the possibility of an angular unconformity of at most a few degrees. The lithologic gradation is possibly due to a re-working of the Meduxnekeag during deposition of the Perham.

In Presque Isle quadrangle the "Sheridan sandstone" (Unit S₁) and the "Nubbly formation" (Unit Om(?)) occur along the contact (Boucot, et. al.). Neither was found along the contact in the area mapped.

In most of Caribou quadrangle the contact is reflected by a change in soil type; soil types 272 and 290 customarily overlie the Perham, types 115 and 130 the ribbon rock. The soil change generally stays within a half mile of the contact. However, north of Caribou quadrangle and in Presque Isle quadrangle, the correlation between soil type and rock unit is poor. The types reflect the manner of drainage as well as the chemical composition of soils. The information on soils was obtained from the offices of the Central Aroostook Soil Conservation District in Presque Isle: the numbers used are theirs.

UNIT S₁

Unit S₁, formerly known as the Sheridan sandstone, is exposed in the northwest portion of Caribou quadrangle in an area three and one-half miles long and a mile wide, probably in the core of an anticline. It is surrounded by the Perham formation. In Presque Isle quadrangle the unit underlies the Perham formation and overlies a western facies of Ordovician rocks probably equivalent in age to the ribbon rock member of the Meduxnekeag formation (Boucot, et. al.). The history of the unit may be found in Boucot, et al.

Lithology

Typically the unit is composed of medium to dark gray, rarely yellow-brown, fine to medium-grained, poorly sorted sandstone, occasionally containing slate chips and other lithic fragments. The rock is noncalcareous. Bedding thickness ranges from one inch to six feet, averaging about one foot; bedding surfaces are planar. The rock crops out in hard, smooth, massive, light gray exposures. Sandy shales, interbedded with the sandstone, form about 5% of the unit. Numerous good outcrops of the typical lithology may be seen on the east-west road three-fourths of a mile south of Fogelin Hill.

Rarely, as at fossil locality F-16, the unit contains conglomerates. Subangular to subrounded clasts, averaging one half inch,

and ranging up to three halves inches in diameter, are embedded in a matrix of the typical sandstone. The most common clast lithologies are: red and white aphanitic volcanic(?) rock; green and gray chert; black slate and argillite; feldspar; and quartz. Associated with the conglomerates at the fossil locality are beds of clean-washed, fine to medium grained, quartz-rich sandstone.

Age

Fossil locality F-16, about two miles west of the town of Sweden, contains a fauna of shells and corals. Material from the locality has been sent to A. J. Boucot at the California Institute of Technology. Preliminary examination of the material by Boucot showed it to be from C3 to Wenlock in age.

Contact Relationships

Several small outcrops of lower Perham-like shales are found in one locality immediately east of Unit S_1^1 . Immediately overlying Unit S_1 on the west is a section predominately of shale with some fine-grained generally thin-bedded sandstone, lithologically belonging to the upper member of the Perham formation. A graptolite locality (loc. F-7, material sent to Berry) and a shell locality (loc. F-7a, material sent to Boucot) were found within a few hundred feet of the supposed contact. The graptolites, collected by a field group, were thought to be pre-Ludlow.

1. At (04201485), #1016

Possibilities are: (1) that the localities are in a sandy equivalent of the lower member of the Perham formation; (2) that the upper part of Unit S₁ is predominately shale, and that the lower member of the Perham formation overlies these localities but was not observed or recognized.

SILURO-DEVONIAN SYSTEM

Several days were spent doing reconnaissance mapping in Grand Isle quadrangle and northern Stockholm quadrangle, working part of the time with R. S. Naylor. No attempt was made to extend the mapping beyond areas easily reachable by road; however, exposures were in general plentiful.

Cropping out over much of the area is a complex of dark gray to black shaley siltstone and black sandy shale, slate, and argillite. On the east-west road to Long Lake are exposed medium gray slates, occasionally with fine white laminations. The lithologies resemble those of Silurian and Devonian rocks elsewhere in the region (Boucot, Naylor). Near Lower Beaulieu Brook a mile and a half northwest of Grand Isle, the lithology becomes that of dark bluish-black slate with occasional light-colored sandy layers, probably belonging to the Seboomook formation (Boucot, Naylor - oral communication). The supposed contact between the Seboomook formation and older strata occurs along a pronounced topographic lineament, the land underlain by the Seboomook being higher and more rugged than that to the east.

In northeastern Stockholm quadrangle south of Parent siding are several sections of dark blue-gray limestone interbedded with shale¹, looking like typical ribbon rock sections. One section exposes about 350 feet of the lithology; several of the thin limestone beds in it include numerous small fossil fragments (loc. F-11, collected by R. Neuman, U. S. G. S.). To the west, along a north-south field road², are poor exposures of a noncalcareous medium gray shale and several small intervals (about two feet thick) of ribbon rock-like lithology. The shale seems to grade into the overlying Siluro-Devonian slates. It is quite possible, if not probable, that the limestones are present as lenses within the Siluro-Devonian rocks. If they do belong to the Meduxnekeag formation, then the Perham formation must be faulted out of the section, for Siluro-Devonian sediments are exposed immediately to the west of the limestones.

S T R U C T U R E

Tight isoclinal folding is present in most of the area mapped. With rare exceptions the strikes of bedding and cleavage lie between N and N40E and the dips between 70E and 70W. The folding is revealed by opposing directions of tops of bedding and by repeated exposures of the thin lower member of the Perham formation to the west of the Meduxnekeag-Perham contact. Little attempt was made to map the folds, and their plunge is unknown. Their axial planes

1. At (S10201413), #1141; at S(10071413), #1142; at S(10201601), #1122; at S(10451474), #1195
2. At and near S(09051455), #1152 and #1224

are presumed to strike about N20E and to be approximately vertical.

The exposures of Unit S₁, the "Sheridan sandstone," in the northwest part of Caribou quadrangle, and of the Perham formation in Grand Isle quadrangle are thought to lie in the cores of anticlines. Immediately northwest of the town of Carson in Caribou quadrangle are numerous exposures of gray noncalcareous Perham-like shale; these are thought to lie in the trough of a syncline. The above relationships are unproven. The fact that the contact was not found to be folded may in part be due to the difficulty of detecting such folds, because of the lithologic similarities of the units involved.

No major faulting was observed.

Notation Used in Footnotes

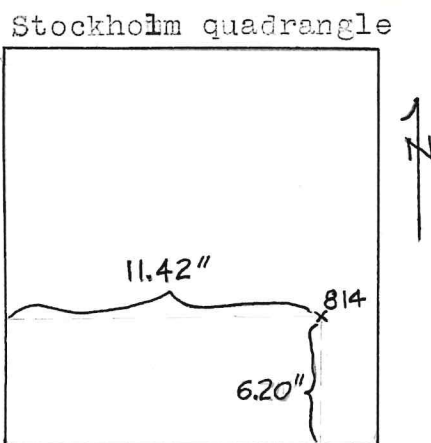
Positions on the accompanying 15 minute quadrangle maps are referred to by a system of notation which gives both the exact location of the position and the number which is written on the map by the position. The number in turn gives the location of the discussion about the position in the field notes. An example will explain the methods used.

Sample reference: At C(05501050), #1372

The letter "C" indicates that the point is in Caribou quadrangle ("S" indicates Stockholm quadrangle, "VB" Van Buren, and "GI" Grand Isle). The first four figures of the number give the distance in inches of the point from the west edge of the map; in the example given, the point is 5.50 inches east from the west edge. The second four figures give the distance in inches of the point from the south edge of the map; in the example given, the point is 10.50 inches north of the south edge.

The illustration below shows the position of another example.

Example: S(11420620), #814



The number written on the map beside the point (#1372 in the first example) locates the discussion of the point in the field notes. The last figure of the number is the number of the entry on a page; the preceding figures constitute the page number. In the first example the discussion is in the second entry on page 137. In the second example the discussion is in the fourth entry on page 81.

The above system of notation was suggested by R. S. Naylor. The most outstanding advantage in its use is that it does not tie critical locations to the location of cultural features subject to change with time.

Locations of Fossil Localities

The notation is explained on page 15.

F-1 Presque Isle quadrangle at (07031591), #884

F-2 At C(03360130), #091

F-3 At C(01230653), #651

F-4 At C(03620749), #663

F-5 At C(06800877), #555

F-6 At C(07631060), #531

F-7 At C(03201525), #973

F-7a At C(03251526), #1041

F-8 At C(04721741), # 1064

F-9 At S(04980063), #371

F-10 At S(08501147), #1252

F-11 At S(10201413), #1141

F-12 At VB(00251102) #1101

F-13 At GI(06590093), #1202

F-14 At GI(04470137), #1212

F-15 At GI(02620077), #1214

F-16 At C(03381325), #963

B I B L I O G R A P H Y

Boucot, A. J., M. T. Field, Raymond Fletcher, W. H. Forbes,
R. S. Naylor, Louis Pavlides, in preparation: Reconnaissance
Bedrock Geology of the Presque Isle Quadrangle, Maine; Maine
Geological Survey, Quadrangle Mapping Series

Miller, R. L., 1947: Manganese deposits of Aroostook County,
Maine; Maine Geological Survey, Bull. 4

Naylor, R. S., 1961: Preliminary Reconnaissance Report on the
Stratigraphy of the Caribou Quadrangle, Maine; unpublished

Supplementary Map Legend

After completion of the maps they were shown to Dr. A. J. Boucot. He suggested that the subdivisions of the Perham formation as defined in the report be indicated where possible on the map. However, no work was ever done for the purpose of mapping the structures or distribution of units in the Perham formation. Mapping was done in the outcrop area of the Perham formation for the following purposes: (1) to obtain an idea of the lithologies overlying the ribbonrock; (2) to ascertain if any ribbonrock were definitely exposed there; (3) to find the distribution of the "Sheridan sandstone". The structure in the area is believed to be complicated, and the information obtained is not sufficient to permit mapping of the units within the Perham formation.

However, the approximate distribution of outcrops of the three subdivisions has been shown in some areas on the map as follows: *Spu*, upper member (siltstones, sandstones, silty and sandy shales, and mudstones); *Sps*, Sweden facies (highly phyllitic shale with occasional thin interbeds of limestone); *Spl*, lower member (shale, argillite, and occasional sedimentary manganese deposits). The lines separating the subdivisions are drawn dashed and in pencil, as they do not represent geologic contacts, and they have no place on a proper geologic map. The lines serve one useful purpose -- they allow approximate outcrop areas to be determined for parts of the region without recourse to my field notes. They are undoubtedly inaccurate even where they are indicated, and they should not be taken seriously.

Some data taken by Richard S. Naylor has been shown in the northern part of Stockholm quadrangle and the western part of Grand Isle quadrangle. It is shown with a number and the initials RN; the number refers to his field notes.

Siluro-Devonian System

SDs

Seboomook formation: Dark bluish-black slate with occasional light-colored sandy layers

SDu

Undifferentiated sediments: Dark gray to black shales, slates, and siltstones

Silurian System

Sp

Perham formation: A lower member of shale and argillite with occasional sedimentary manganese deposits; an upper member of siltstones, sandstones, silty and sandy shales and mudstones

Ss

Unit S₁, the Sheridan sandstone: Dark gray, resistant, poorly-sorted sandstones

Ordovician System

Omr

Meduxnekeag formation, ribbonrock member: Blue-gray, thin-bedded, argillaceous limestone interbedded with a subordinate amount of shale

392 $\left\{ \begin{array}{l} 70 \\ 037 \\ 70 \end{array} \right.$

$\left\{ \begin{array}{l} 037 \\ 70 \end{array} \right.$

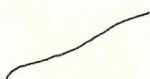
1031x

Cleavage attitude; 3 or 4 figure number refers to field notes

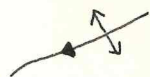
Bedding attitude; 3 or 4 figure number refers to field notes

$\left\{ \begin{array}{l} \text{vertical} \\ \text{cleavage} \\ \text{vertical} \\ \text{bedding} \end{array} \right.$

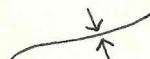
Outcrop; bedding and/or cleavage not obtainable



Contact: the certainty of its location can readily be ascertained by reference to the location of outcrops. A dashed line, --- , has been reserved for areas totally without information or where assignment of outcrops is questionable.



Anticline axis, showing plunge



Syncline axis

F16

A fossil locality

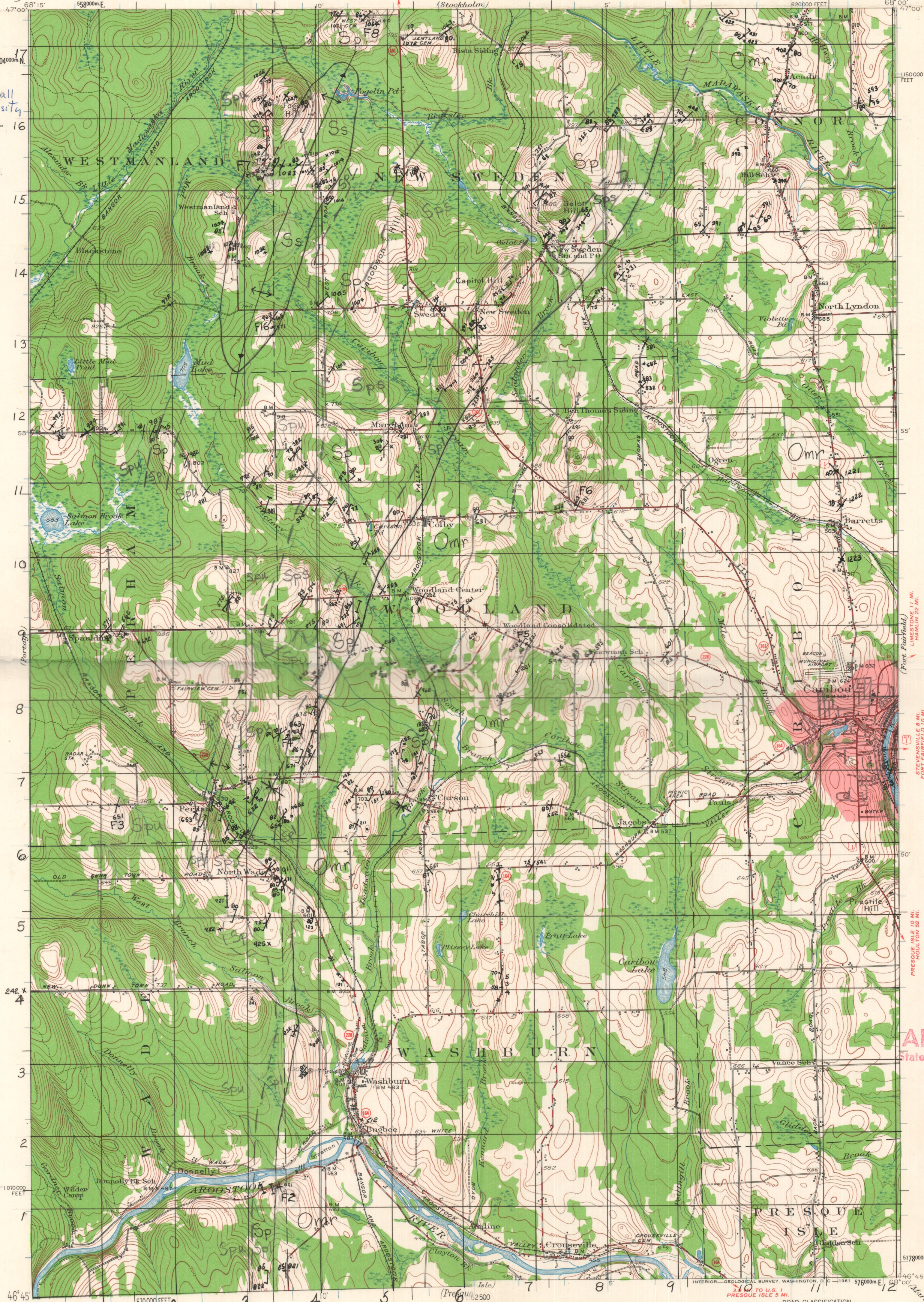
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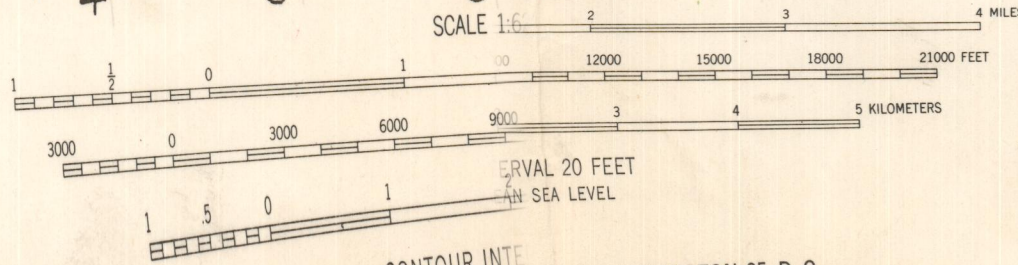


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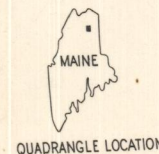
Control by USGS and USC&GS

Culture and drainage in part compiled from aerial photographs
Topography by planetable surveys 1929. Revised 1953

Polycyclic projection. 1927 North American datum
10,000-foot grid based on Maine coordinate system,



CONTOUR INTERVAL 20 FEET
DATUM IS 1927 NORTH AMERICAN DATUM
AND SYMBOLS IS AVAILABLE ON REQUEST



QUADRANGLE LOCATION

ROAD CLASSIFICATION
Heavy-duty ——— Light-duty ———
Medium-duty ——— Unimproved dirt ———
U. S. Route ——— State Route ———

CARIBOU, ME.
N 4645-W 6800/15

1953

ROY'S
ARMY & NAVY
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Sportsman
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UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

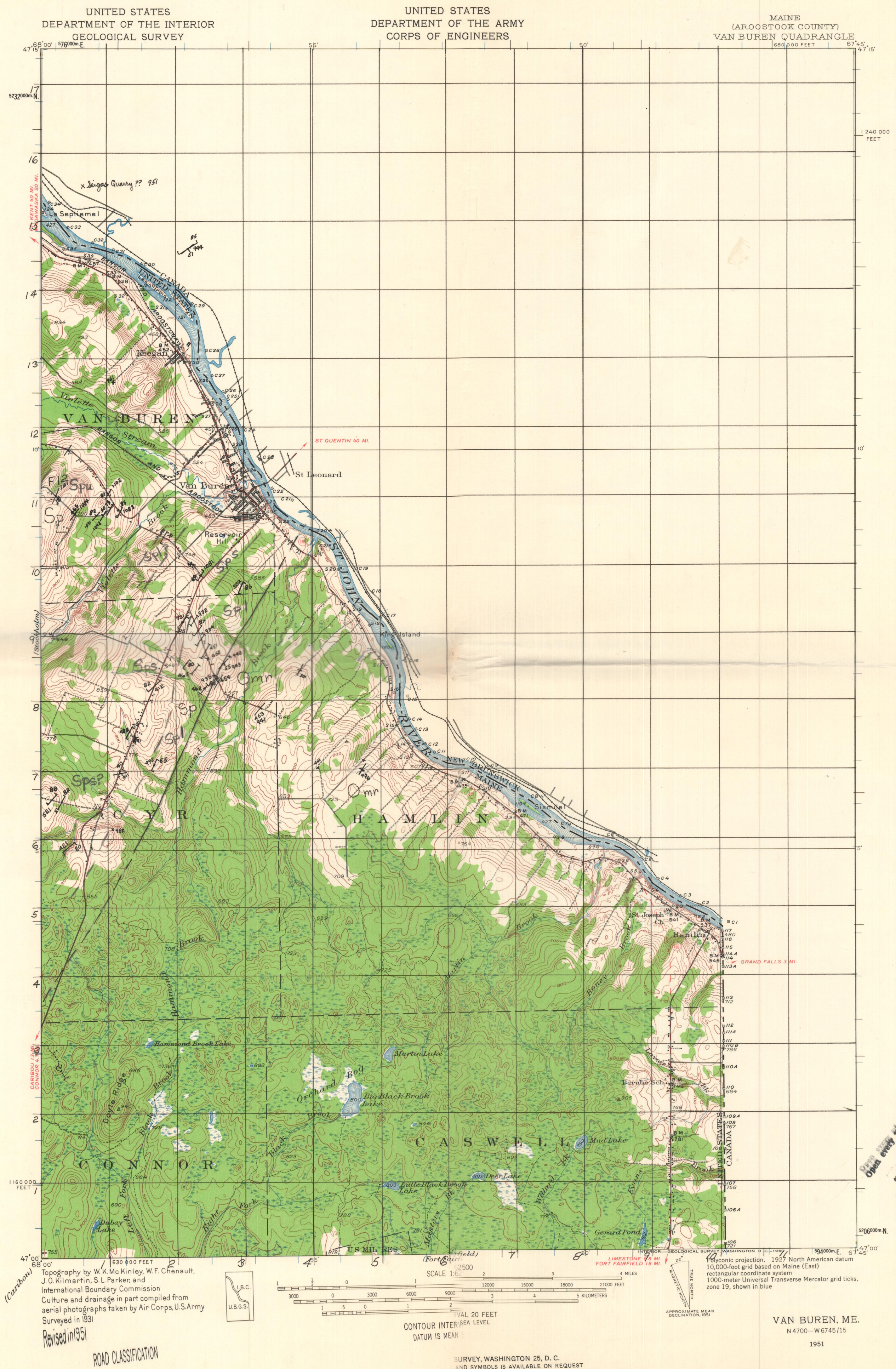
MAINE
(AROOSTOOK COUNTY)
GRAND ISLE QUADRANGLE

Doug Smith

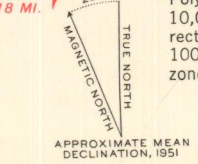
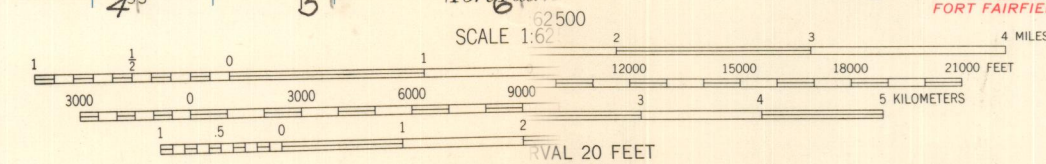
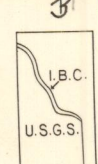
Open every night 'til midnight
A-1
N-1
Maine
Geological Survey, Boston



Doug Smith



Topography by W.K. McKinley, W.F. Chenault, J.O. Kilmartin, S.L. Parker, and International Boundary Commission Culture and drainage in part compiled from aerial photographs taken by Air Corps, U.S. Army Surveyed in 1931
Revised in 1951
ROAD CLASSIFICATION
Light-duty



VAN BUREN, ME.
N 4700—W 6745/15
1951

Open every night via satellite
Rover
State St.
Pressure 15.2, 7.1

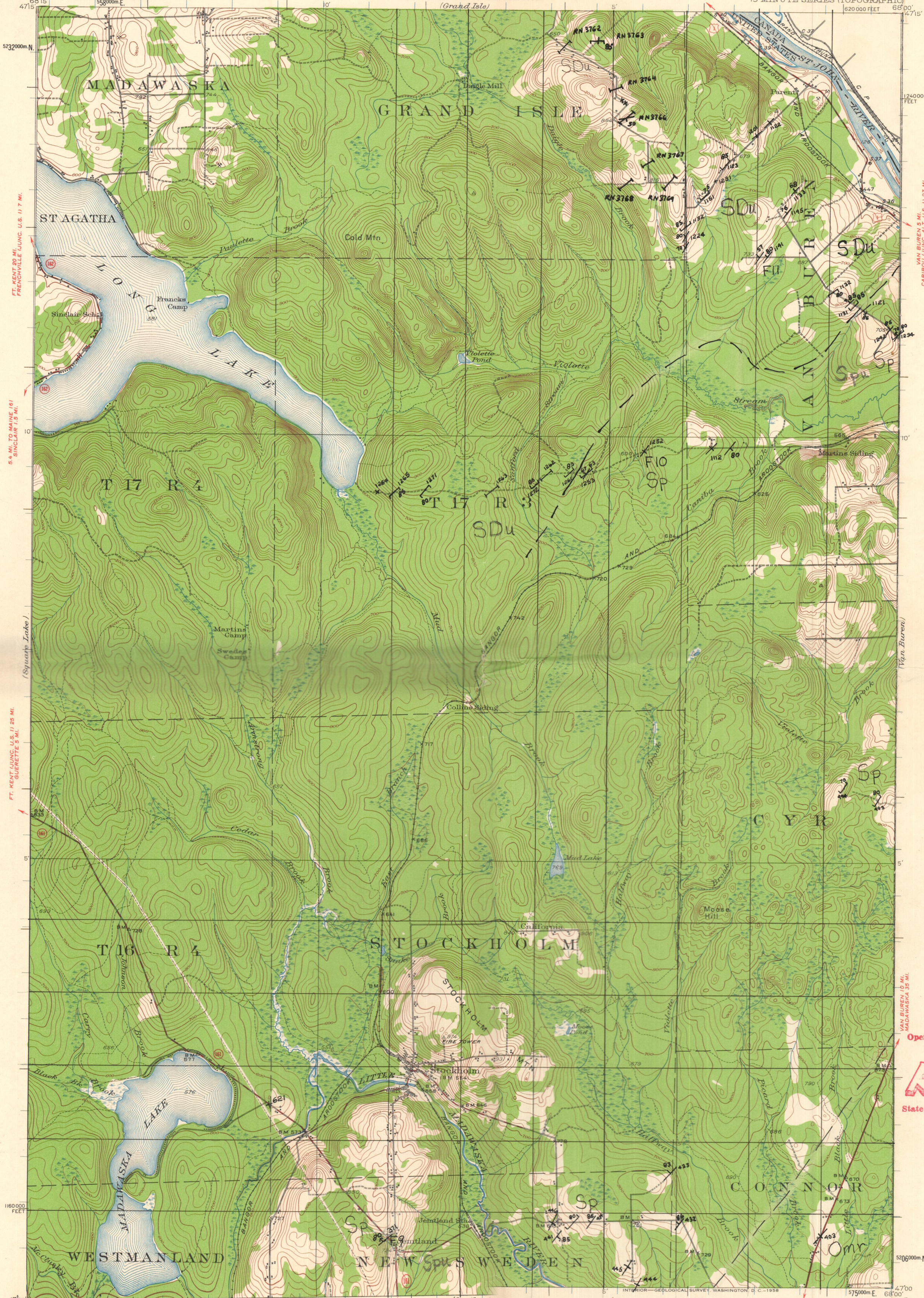
SURVEY, WASHINGTON 25, D. C.
AND SYMBOLS IS AVAILABLE ON REQUEST

Doug Smith

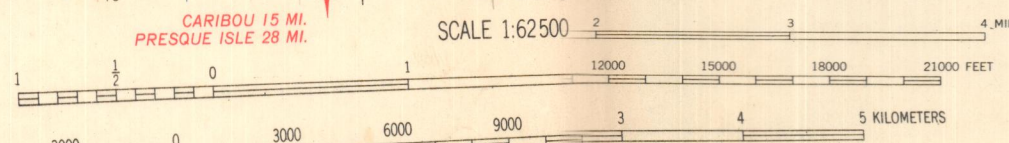
UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

STATE OF MAINE
REPRESENTED BY THE
PUBLIC UTILITIES COMMISSION
(Grand Isle)

STOCKHOLM QUADRANGLE
MAINE - AROOSTOOK CO
15 MINUTE SERIES (TOPOGRAPHIC)



Portage
Mapped, edited, and published by the Geological Survey
Control by USGS, USC&GS, and International Boundary
Commission
Topography by plane-table surveys 1927. Revised 1953
Polyconic projection. 1927 North American datum
10,000-foot grid based on Maine coordinate system, east zone
1,000-meter Universal Transverse Mercator grid ticks,
shown in blue



CONTOUR INTERVAL 20 FEET
DATUM IS MEAN SEA LEVEL
WASHINGTON 25, D. C.
SYMBOLS IS AVAILABLE ON REQUEST

ROAD CLASSIFICATION
Heavy-duty ——— Light-duty ———
Medium-duty ——— Unimproved dirt ———
U. S. Route ——— State Route ———

STOCKHOLM, ME.
N 4700—W 6800/15
1953

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ROCK
State St. Presque Isle, Maine