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HEADQUARTERS
QUARTERMASTER RESEARCH & ENGINEERING COMMAND
U S ARMY

TECHNICAL REPORT
EP-92

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ARLINGTON 12, VIRGINIA

ATTN: TISSIS

ATLAS OF MOUNTAIN GLACIERS
IN
THE NORTHERN HEMISPHERE



QUARTERMASTER RESEARCH & ENGINEERING CENTER
ENVIRONMENTAL PROTECTION RESEARCH DIVISION

ASTIA



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JUNE 1958

NATICK, MASSACHUSETTS

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HEADQUARTERS
QUARTERMASTER RESEARCH & ENGINEERING COMMAND, US ARMY
OFFICE OF THE COMMANDING GENERAL
NATICK, MASSACHUSETTS

Major General Andrew T. McNamara
The Quartermaster General
Washington 25, D. C.

Dear General McNamara:

The inclosed report, "Atlas of Mountain Glaciers in the Northern Hemisphere," shows the distribution of a special type of environment that military forces may encounter in many parts of the world. The atlas shows in considerable detail where mountain glaciers may be found, not only in well-known regions such as the European Alps and the Rockies of North America, but also in the remote mountain ranges of Asia, northern Alaska and Arctic Canada, and the coastal regions of Greenland. Although glaciers are found in all latitudes and on all but one of the continents, their study derives an added significance from the increasing military concern with environments of high-latitude regions.

Research teams from various technical services, universities and other agencies both in the United States and in foreign countries, are engaged in extensive investigation of glaciers and glaciology as part of the International Geophysical Year program currently in progress. The atlas is submitted as a contribution to these efforts.

Sincerely yours,

C. G. Calloway
C. G. CALLOWAY
Major General, USA
Commanding

1 Incl
EP-92

HEADQUARTERS QUARTERMASTER RESEARCH & ENGINEERING COMMAND, US ARMY
Quartermaster Research & Engineering Center
Natick, Massachusetts

ENVIRONMENTAL PROTECTION RESEARCH DIVISION

Technical Report
EP-92

ATLAS OF MOUNTAIN GLACIERS IN THE NORTHERN HEMISPHERE

William O. Field
and Associates

Department of Exploration and Field Research

American Geographical Society

Project Reference:
7-83-01-005A

June 1958

Contract No:
DA19-129-QM-409

FOREWORD

Regions of forbidding terrain and climate are acquiring an increasing significance in present-day military planning. Mountain glaciers with their associated climates constitute one such adverse environment in which military units require special equipment and techniques. While such information has been published about the glaciers of the world, it has not heretofore been summarized in a convenient reference work. To assemble this information in a form accessible to military users, and to supplement it with new information derived from the study of air photos and reports of expeditions, a contract was let with the American Geographical Society for a geographic study of mountain glaciation. Mr. William O. Field, head of the Society's Department of Exploration and Field Research, acted as principal investigator.

The final report of the mountain glaciation contract occupies several volumes which are available in a limited edition only. When assembly has been completed, copies of the report will be placed in the libraries of the Quartermaster Research & Engineering Center, the American Geographical Society, the Department of the Army, and other agencies having a special interest in glacial regions. This atlas is Part 10 of this complete contract report "Geographic Study of Mountain Glaciation in the Northern Hemisphere," and has been published separately to give wider circulation to the maps which summarize the distributional aspects of the study. To acquaint potential users with the scope and content of the complete report, its table of contents is included as the Appendix of this atlas.

The maps were drawn by the cartographic staff of the American Geographical Society, under the direction of William B. Briesemeister. Individuals who participated in this work are John Philip, Augustus Schweitzer, Norman Swanston, Margaret Tegebo, Andrew Tomko, Douglas Waugh, and Augustus Waldon. The maps were edited by Marie T. Hatcher, Camilla McCauley, and Charles C. Morrison. Overlays of glacial areas were prepared at the Quartermaster Research & Engineering Center by William Loughlin and Andrew D. Hastings, Jr. Technical aspects of the contract and preparation of the atlas were supervised by Robert L. Anstey and William C. Robison under the over-all direction of Peveril Meigs, Chief of the Regional Environments Research Branch.

Appreciation is expressed to the Duke University Press, publisher of "Ecological Monographs," for permission to reproduce Calvin Heusser's map of ice fields and glaciers in the Canadian Rocky Mountains.

Approved:

WILBUR M. SKIDMORE, Colonel, QMC
Commanding Officer
QM R and E Center Laboratories

AUSTIN HENSCHER, Ph.D.
Chief
Environmental Protection Research
Division

A. STUART HUNTER, Ph.D.
Scientific Director
QM Research & Engineering Command

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ABSTRACT

Forty-eight maps show in detail the distribution of mountain glaciers of the Northern Hemisphere. Differentiation is made between large, known glaciers and small glaciers reported but not reliably mapped.

This atlas is Part 10 of the report, "Geographic Study of Mountain Glaciation in the Northern Hemisphere."

PART I. GLACIERS OF NORTH AMERICA

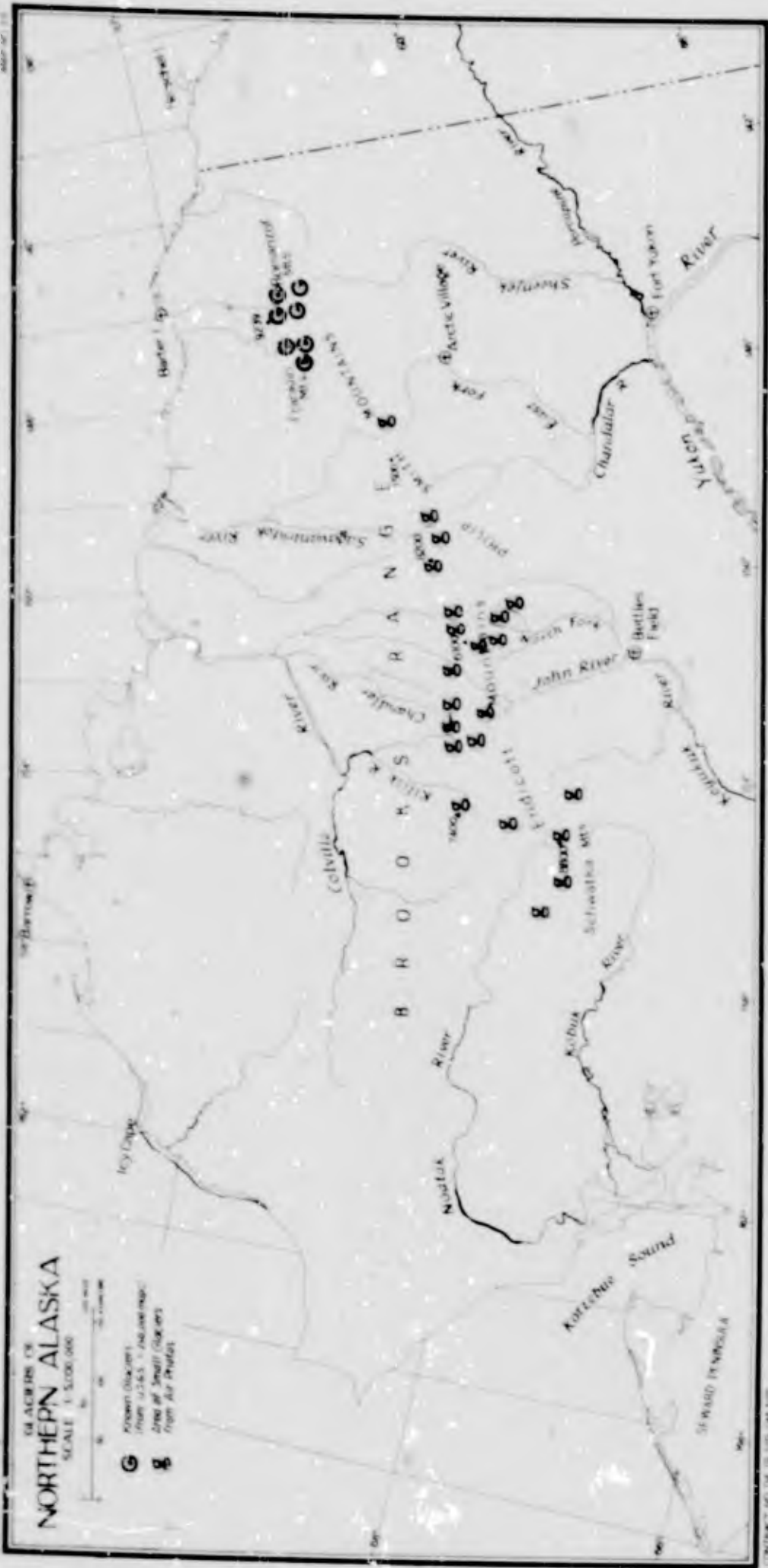
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64 ACRES OF NORTHERN ALASKA

SCALE 1:500,000

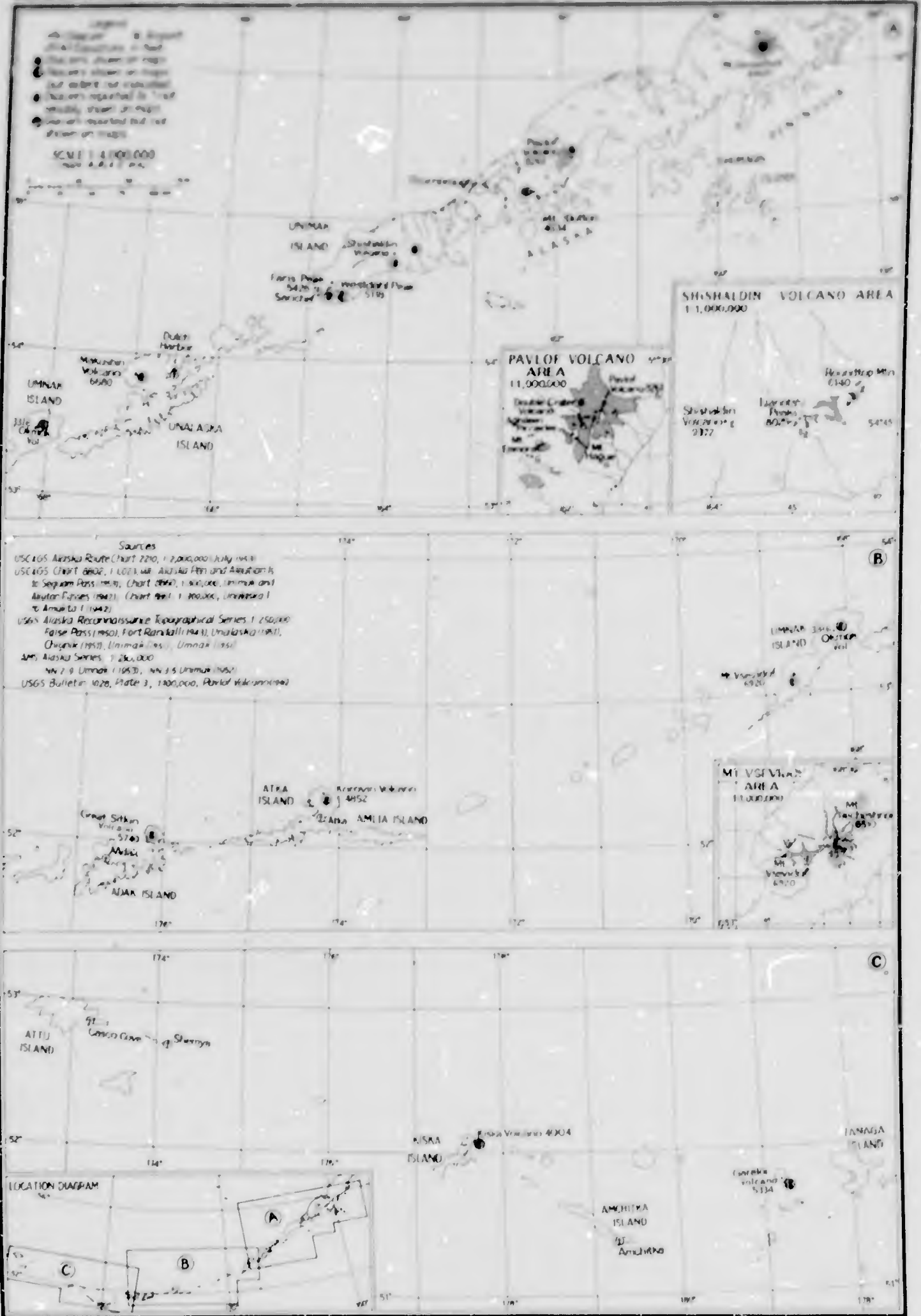


- Known (clickers) from 1:250,000 scale map
- Area of small (clickers) from Air Photos



CONTINUED ON THE REVERSE

GLACIERS OF THE ALEUTIAN ISLANDS



GLACIERS OF THE ALASKA PENINSULA

MT. KATMAI AREA

SCALE 1:100,000

- 1. Glacier
- 2. Retreating Glacier
- 3. Ice Stream
- 4. Ice Cap
- 5. Ice Shelf
- 6. Ice Piedmont
- 7. Ice Margin
- 8. Ice Front
- 9. Ice Lobe
- 10. Ice Dam
- 11. Ice Barrier
- 12. Ice Wedge
- 13. Ice Sheet
- 14. Ice Mass
- 15. Ice Field
- 16. Ice Complex
- 17. Ice Massif
- 18. Ice Plateau
- 19. Ice Basin
- 20. Ice Depression
- 21. Ice Hollow
- 22. Ice Trough
- 23. Ice Valley
- 24. Ice Gorge
- 25. Ice Canyon
- 26. Ice Ravine
- 27. Ice Gully
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Source Maps
 1955 Alaska Reconnaissance
 Topographic Series (1:50,000)
 1. Katmai
 2. Mt. Katmai
 3. Mt. Katmai
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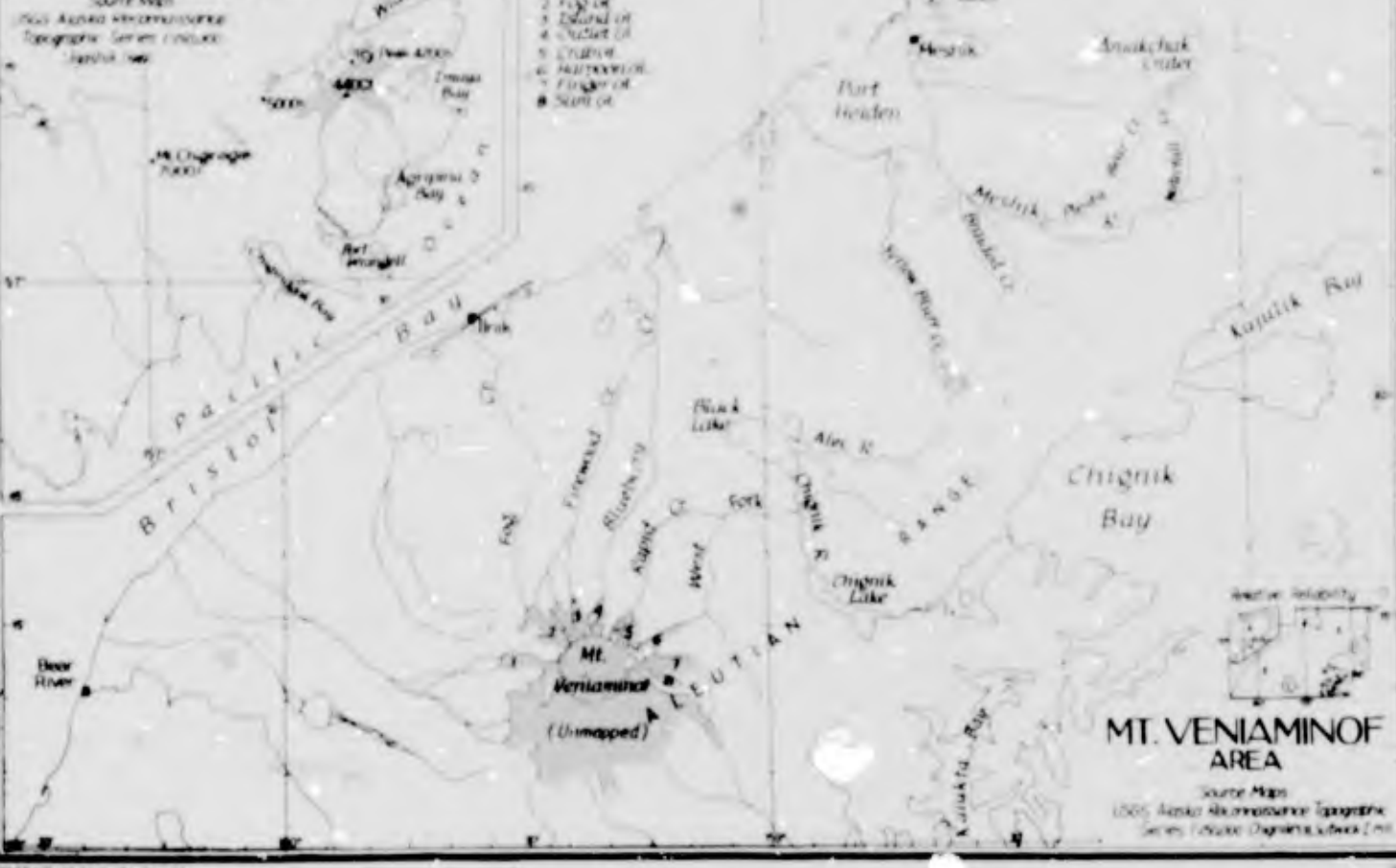
- Relative Stability
1. First Stage (Retreating)
 2. Second Stage (Retreating)
 3. Third Stage (Retreating)
 4. Fourth Stage (Retreating)
 5. Unmapped



MT. CHIGINAGAK AREA

SCALE 1:100,000
 1955 Alaska Reconnaissance
 Topographic Series (1:50,000)
 1. Chignik

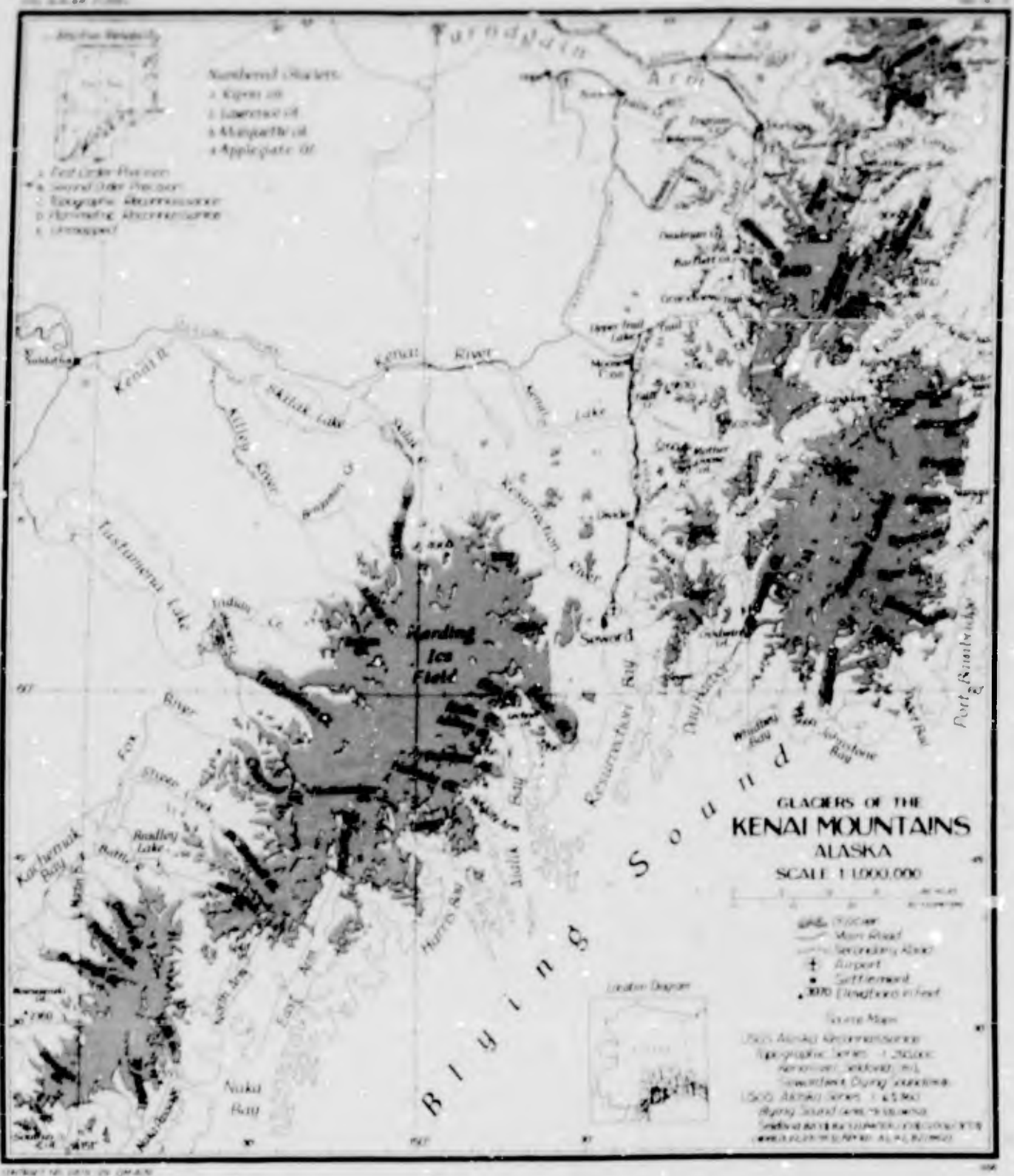
- Numbers of Glaciers
1. Core of
 2. Edge of
 3. Island of
 4. Outlet of
 5. Tributary
 6. Tributary
 7. Finger of
 8. Spur of



MT. VENIAMINOF AREA

SCALE 1:100,000
 1955 Alaska Reconnaissance
 Topographic Series (1:50,000)
 1. Veniaminof





Copyright © 1975 by USGS

**GLACIERS OF THE
CHUGACH MTS.
MT MARCUS BAKER AREA**

SCALE 1:1000 (MM)

- Glacier Map**
- 1. Active glacier
 - 2. Glacier with moraine
 - 3. Glacier
 - 4. Glacier
 - 5. Glacier
 - 6. Glacier
 - 7. Glacier
 - 8. Glacier
 - 9. Glacier
 - 10. Glacier
 - 11. Glacier
 - 12. Glacier
 - 13. Glacier
 - 14. Glacier
 - 15. Glacier
 - 16. Glacier
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 - 23. Glacier
 - 24. Glacier
 - 25. Glacier
 - 26. Glacier
 - 27. Glacier
 - 28. Glacier
 - 29. Glacier
 - 30. Glacier
 - 31. Glacier
 - 32. Glacier
 - 33. Glacier
 - 34. Glacier
 - 35. Glacier
 - 36. Glacier
 - 37. Glacier
 - 38. Glacier
 - 39. Glacier
 - 40. Glacier
 - 41. Glacier
 - 42. Glacier

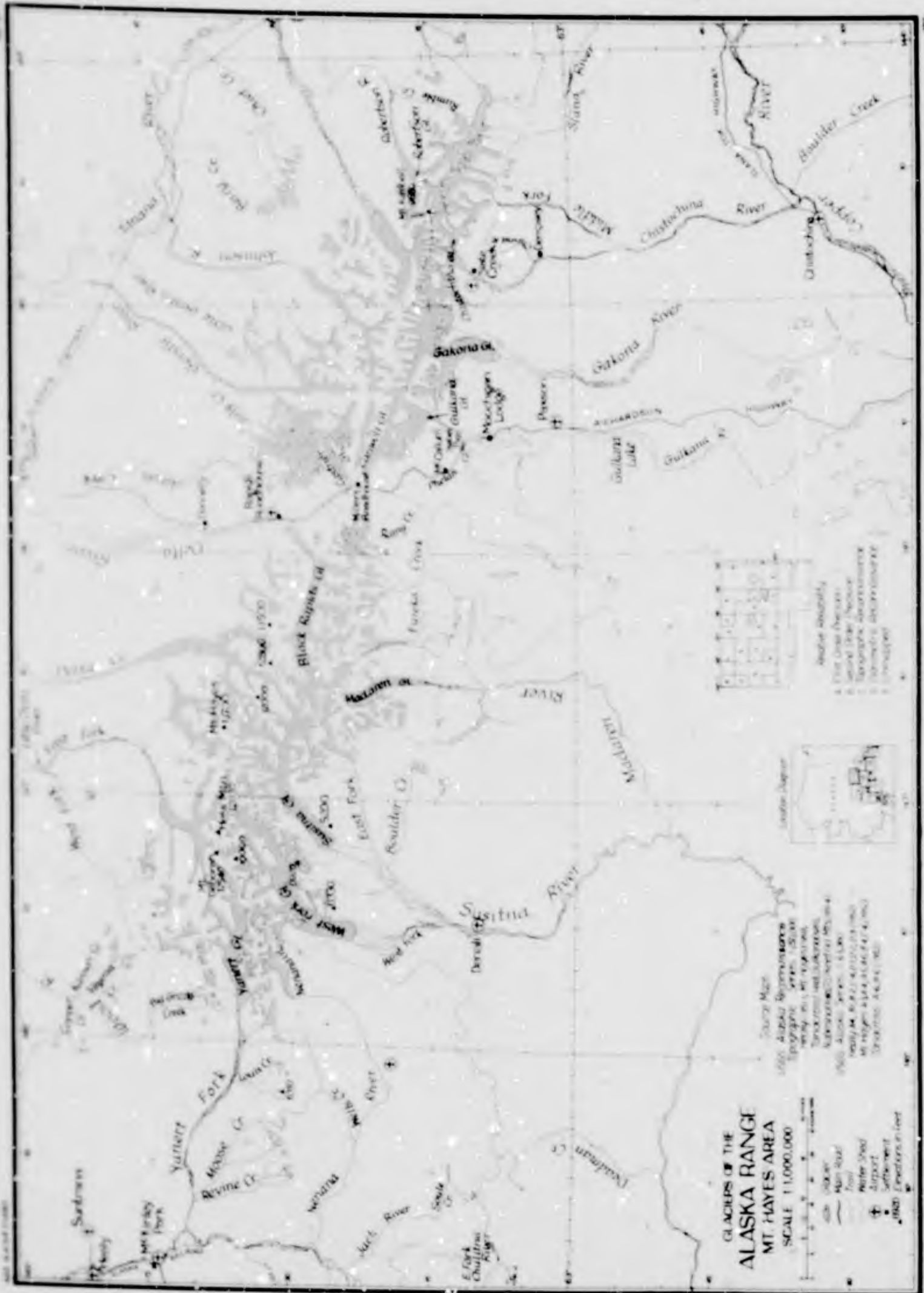
- Numbered glaciers**
- 1. Kluane R.
 - 2. Kluane R.
 - 3. Kluane R.
 - 4. Kluane R.
 - 5. Kluane R.
 - 6. Kluane R.
 - 7. Kluane R.
 - 8. Kluane R.
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 - 25. Kluane R.
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 - 27. Kluane R.
 - 28. Kluane R.
 - 29. Kluane R.
 - 30. Kluane R.
 - 31. Kluane R.
 - 32. Kluane R.
 - 33. Kluane R.
 - 34. Kluane R.
 - 35. Kluane R.
 - 36. Kluane R.
 - 37. Kluane R.
 - 38. Kluane R.
 - 39. Kluane R.
 - 40. Kluane R.
 - 41. Kluane R.
 - 42. Kluane R.

- Numbered glaciers**
- 1. Kluane R.
 - 2. Kluane R.
 - 3. Kluane R.
 - 4. Kluane R.
 - 5. Kluane R.
 - 6. Kluane R.
 - 7. Kluane R.
 - 8. Kluane R.
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 - 30. Kluane R.
 - 31. Kluane R.
 - 32. Kluane R.
 - 33. Kluane R.
 - 34. Kluane R.
 - 35. Kluane R.
 - 36. Kluane R.
 - 37. Kluane R.
 - 38. Kluane R.
 - 39. Kluane R.
 - 40. Kluane R.
 - 41. Kluane R.
 - 42. Kluane R.

Map 1000

Copyright 1910, U.S. Geol. Surv.





**GLACIERS OF THE
ALASKA RANGE
MT. HAYES AREA**

SCALE 1:1,000,000

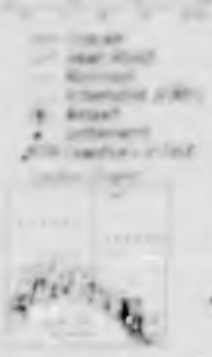
- Glacier
- Main Road
- Trail
- Water Shed
- Airport
- Settlement
- 6825 Elevations in feet

Source: Maps
1955 Alaska Department of
Geography, Series 12500
Scale 1:500,000
1955 Alaska Department of
Geography, Series 12500
Scale 1:500,000
1955 Alaska Department of
Geography, Series 12500
Scale 1:500,000

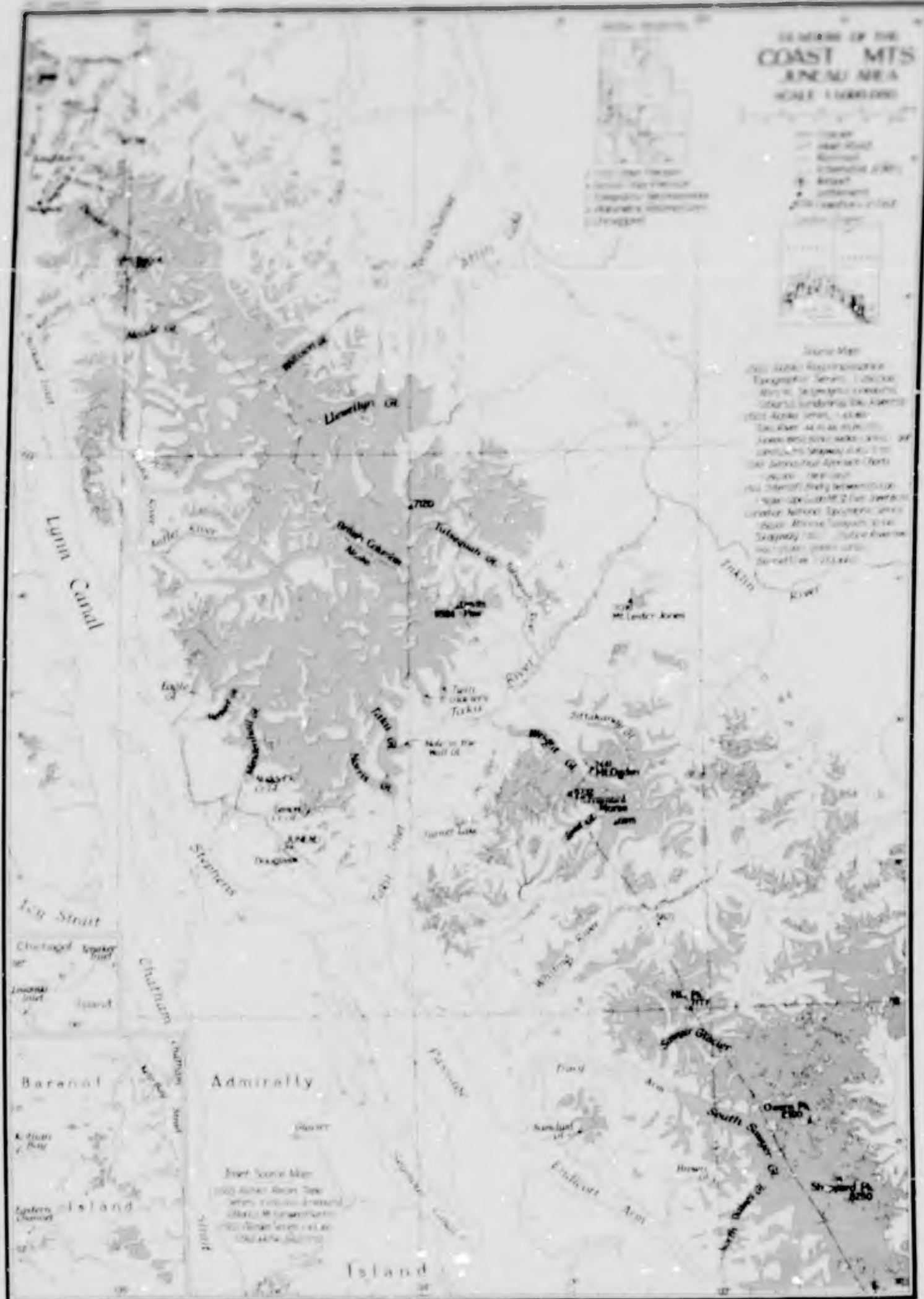


- Map Accuracy
- 1 First Class Accuracy
 - 2 Second Class Accuracy
 - 3 Geographic Accuracy
 - 4 Horizontal Accuracy
 - 5 Vertical Accuracy

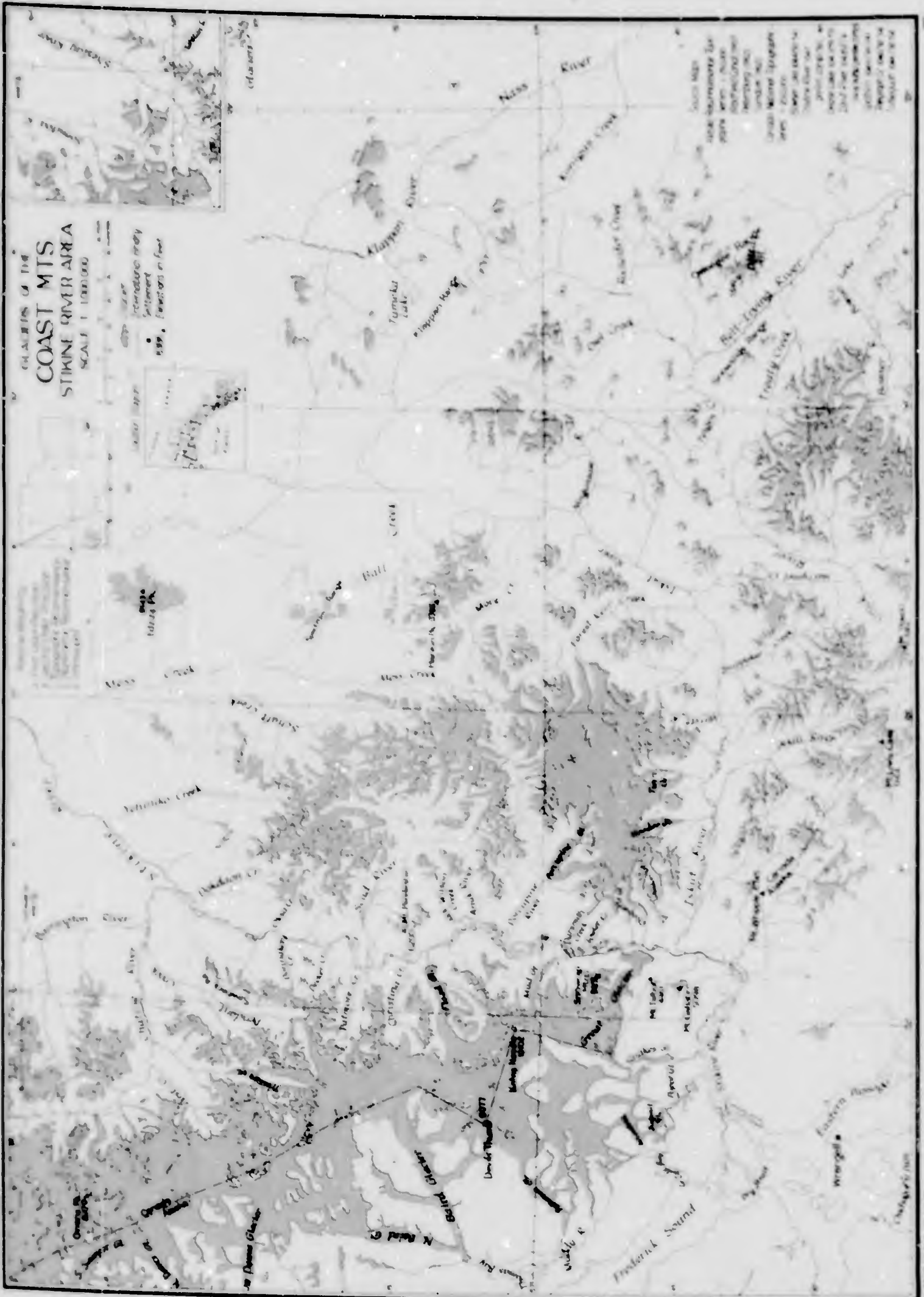
SECTION OF THE
COAST MTS
 KNEAU NEA
 SCALE 1:100,000



Scale Map
 This section represents
 the general features of the
 Coast Mts. It is a general
 sketch of the general
 features of the Coast Mts.
 and is not intended to be
 used for navigation.
 The Coast Mts. are a
 part of the general
 features of the Coast Mts.
 and are not intended to be
 used for navigation.



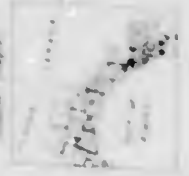
Inset Scale Map
 1000 Feet Scale Map
 This inset map shows the
 general features of the
 Coast Mts. and is not
 intended to be used for
 navigation.



**CHARTERS OF THE
COAST MTS
STIKINE RIVER AREA**
SCALE 1:100,000

1:100,000
1:200,000
1:500,000
1:1,000,000

1:100,000
1:200,000
1:500,000
1:1,000,000



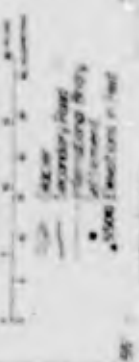
Scale 1:100,000
1:200,000
1:500,000
1:1,000,000

1:50,000



- Numbered Glaciers
- 1. Clackamas
 - 2. Lewis
 - 3. Trout
 - 4. Clackamas
 - 5. Trout
 - 6. Lewis
 - 7. Trout
 - 8. Clackamas
 - 9. Lewis
 - 10. Trout

**GLACIERS OF THE
COAST MTS.
PORTLAND CANAL AREA**
SCALE 1:50,000



1:50,000



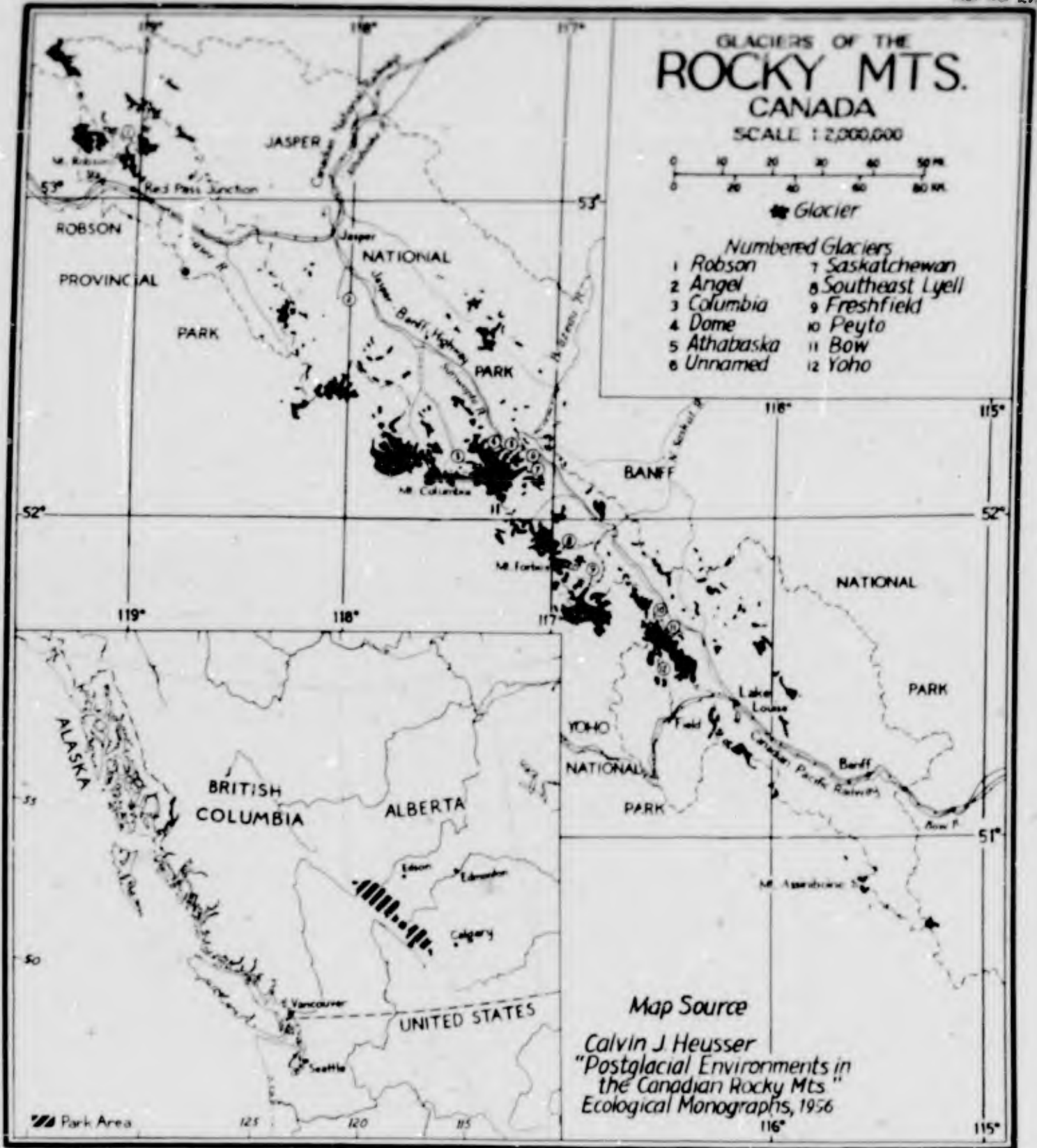
**CLASS OF
NORTHWESTERN
CANADA**

Scale 1:500,000
 1" = 40 Miles
 1" = 64 Kilometers

G Geological

Map No. 100, 101, 102, 103, 104

Geological Survey of Canada
 Ottawa, Ontario



FEATURES OF THE
QUEEN ELIZABETH ISLANDS

Scale 1:100,000



GLACIERS OF BAFFIN ISLAND

SCALE 1:500,000



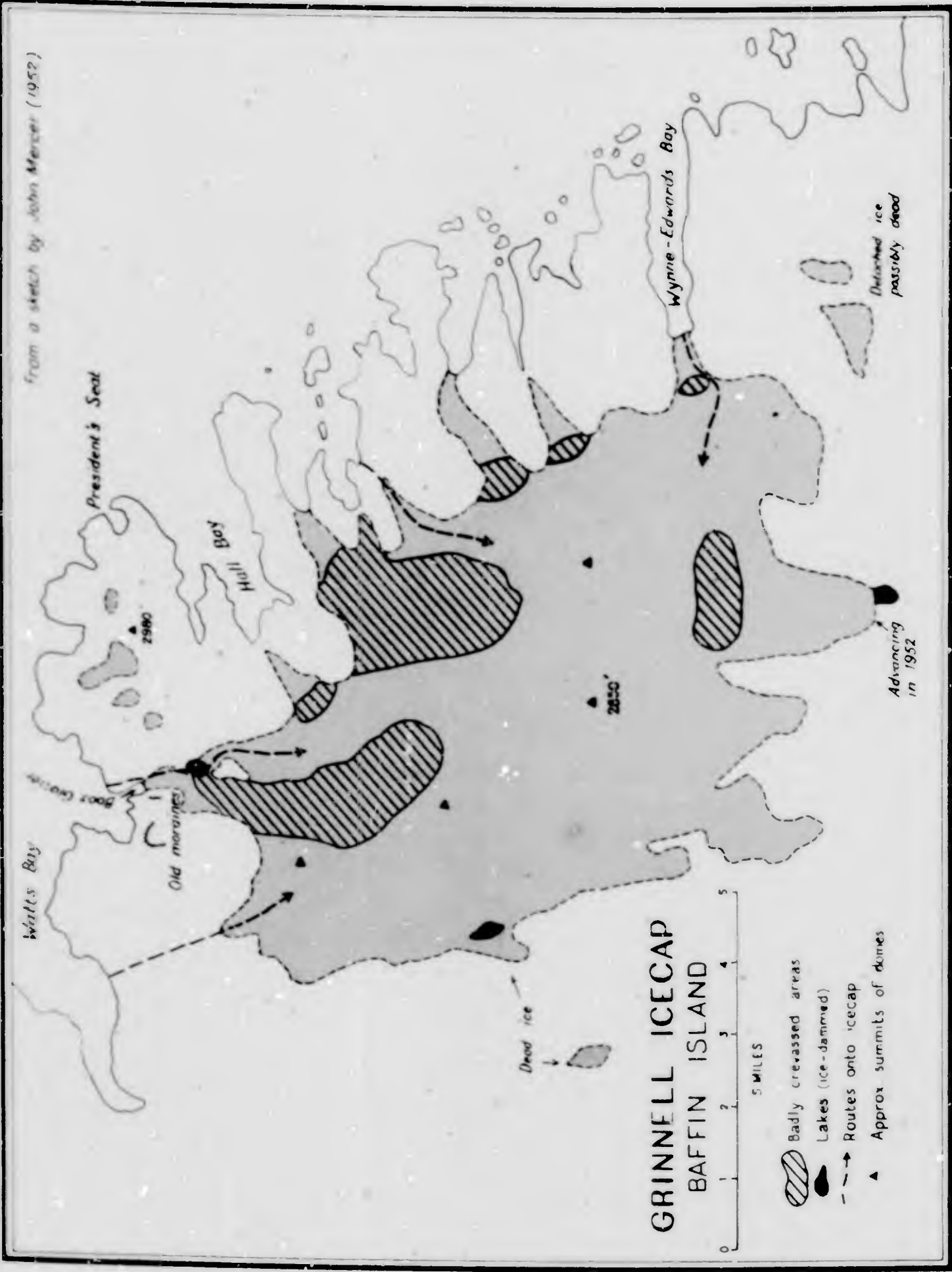
1962 Expedition to the
Arctic Circle
C.B.C. 1962, 1963, 1964, 1965, 1966, 1967, 1968, 1969, 1970, 1971, 1972, 1973, 1974, 1975, 1976, 1977, 1978, 1979, 1980, 1981, 1982, 1983, 1984, 1985, 1986, 1987, 1988, 1989, 1990, 1991, 1992, 1993, 1994, 1995, 1996, 1997, 1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2024, 2025

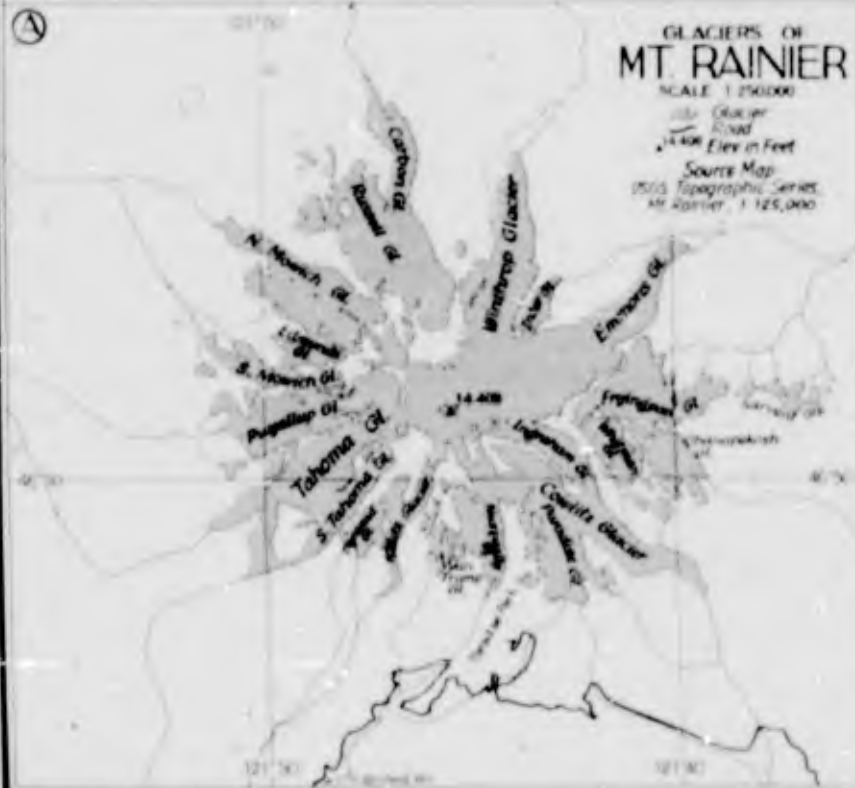


GLACIERS OF NORTHERN LABRADOR

SCALE 1:500,000



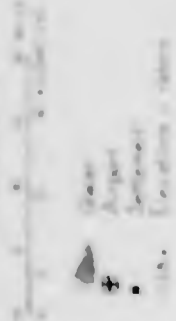




PART II. GLACIERS OF THE NORTH ATLANTIC ISLANDS

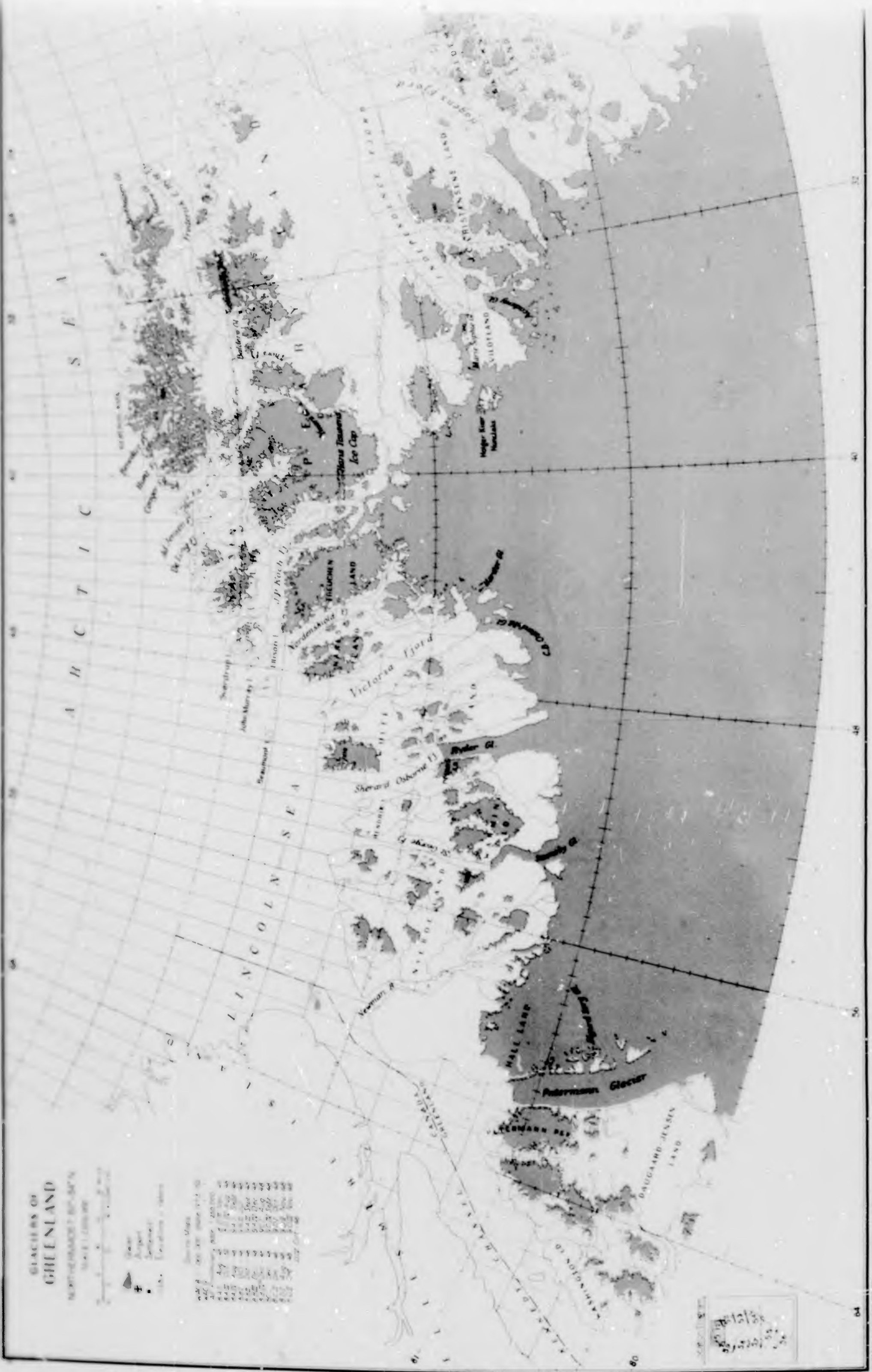
GLACIERS OF GREENLAND

NORTHING 78° 30' N
 MAP 1: 100,000



Source: Maps

Map No.	Scale	Year	Projection
1	1:100,000	1950	U.T.M.
2	1:100,000	1950	U.T.M.
3	1:100,000	1950	U.T.M.
4	1:100,000	1950	U.T.M.
5	1:100,000	1950	U.T.M.
6	1:100,000	1950	U.T.M.
7	1:100,000	1950	U.T.M.
8	1:100,000	1950	U.T.M.
9	1:100,000	1950	U.T.M.
10	1:100,000	1950	U.T.M.
11	1:100,000	1950	U.T.M.
12	1:100,000	1950	U.T.M.
13	1:100,000	1950	U.T.M.
14	1:100,000	1950	U.T.M.
15	1:100,000	1950	U.T.M.
16	1:100,000	1950	U.T.M.
17	1:100,000	1950	U.T.M.
18	1:100,000	1950	U.T.M.
19	1:100,000	1950	U.T.M.
20	1:100,000	1950	U.T.M.



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ARLINGTON HALL STATION

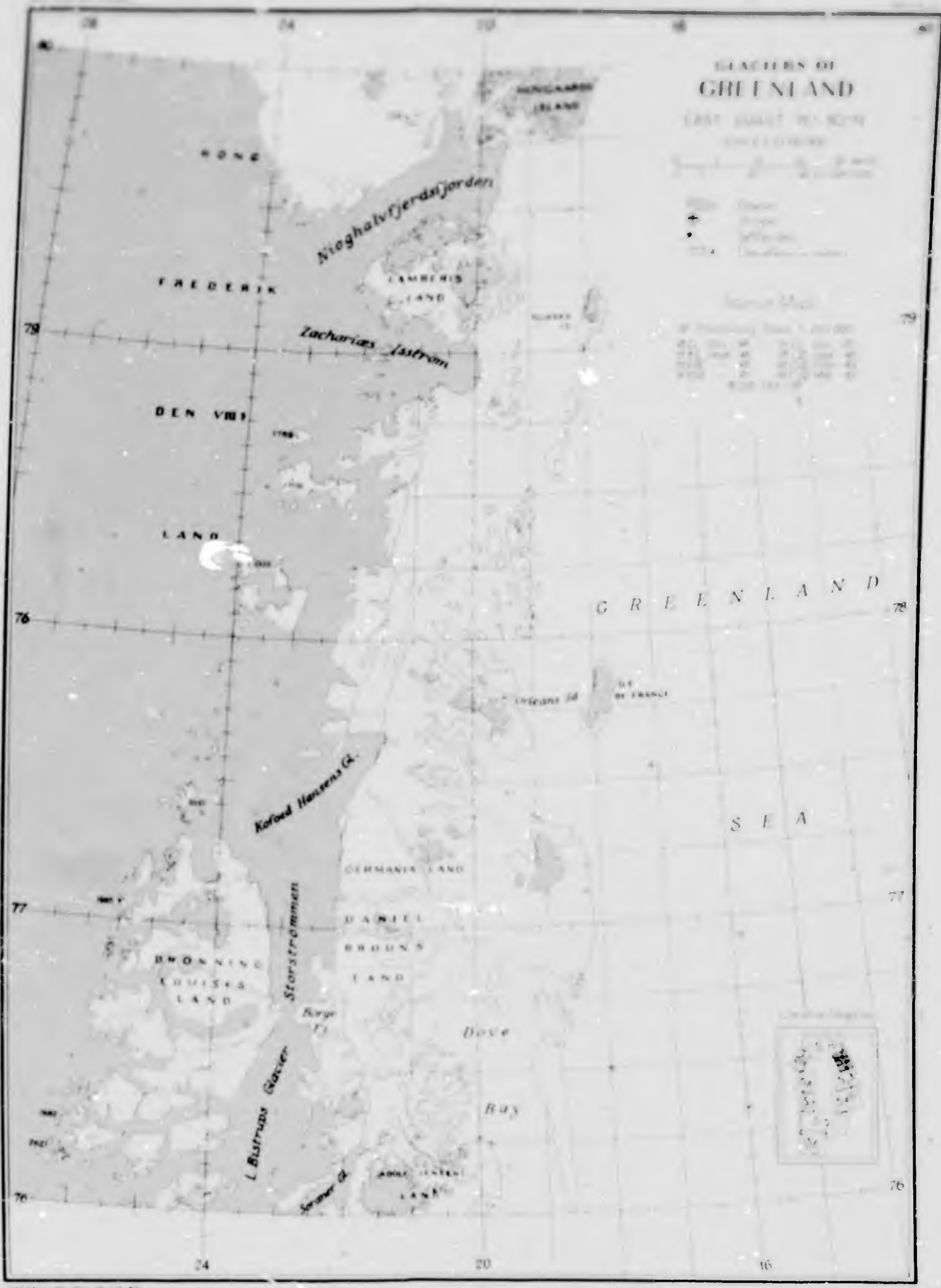
ARLINGTON 12 VIRGINIA

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GLACIERS OF GREENLAND

LAST COAST 72°-77°N

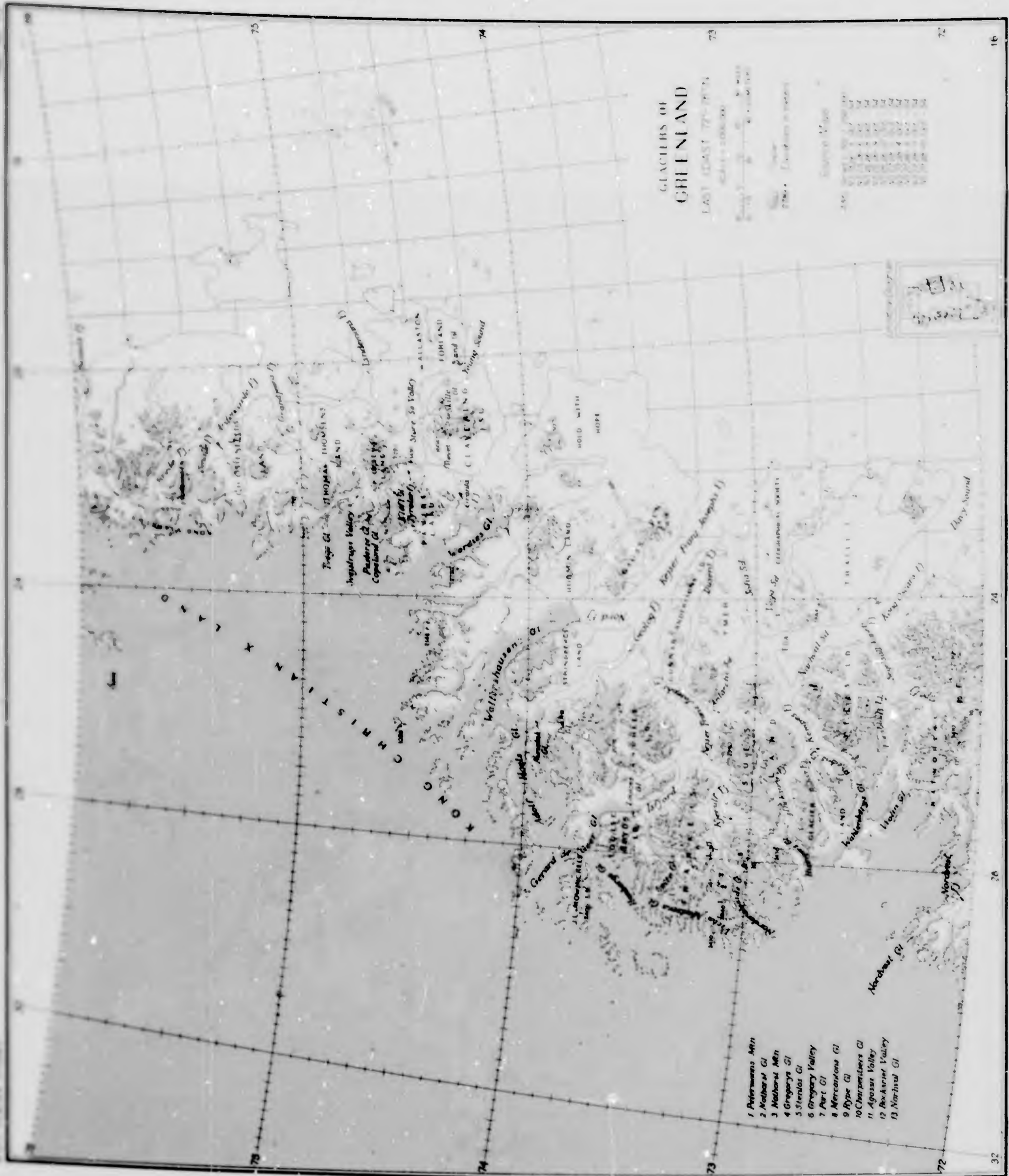
Scale 1:500,000

Scale 1:500,000

Scale 1:500,000

Source: Maps

1	2	3	4	5	6	7	8	9	10	11	12	13
1:500,000	1:500,000	1:500,000	1:500,000	1:500,000	1:500,000	1:500,000	1:500,000	1:500,000	1:500,000	1:500,000	1:500,000	1:500,000



- 1 Petermanns Arn
- 2 Nordhav Gl
- 3 Nordhav Arn
- 4 Gregory Gl
- 5 Stenslo Gl
- 6 Gregory Valley
- 7 Port Gl
- 8 Mercaisons Gl
- 9 Rype Gl
- 10 Charpentiers Gl
- 11 Agassiz Valley
- 12 Beckert Valley
- 13 Nordhav Gl



GLACIERS OF GREENLAND

EAST COAST 69°-71°N
24°-34°W



0 1 2 3 4 5 Miles
 0 1 2 3 4 5 Kilometers

0 1 2 3 4 5 Miles
 0 1 2 3 4 5 Kilometers

Glacier Name	Area (sq. miles)	Area (sq. kilometers)
Christian IV Gl.	1,200	3,100
Serpenti Glacier	1,100	2,800
Røstige Gl.	1,000	2,600
Other glaciers	1,000	2,600
Total	4,300	11,100



GREENLAND

SEA

Case Brewster

JAMESON LAND

SCORESBY SOUND

HALL GUFF

DENMARK

SEIFF

Røstige Gl.

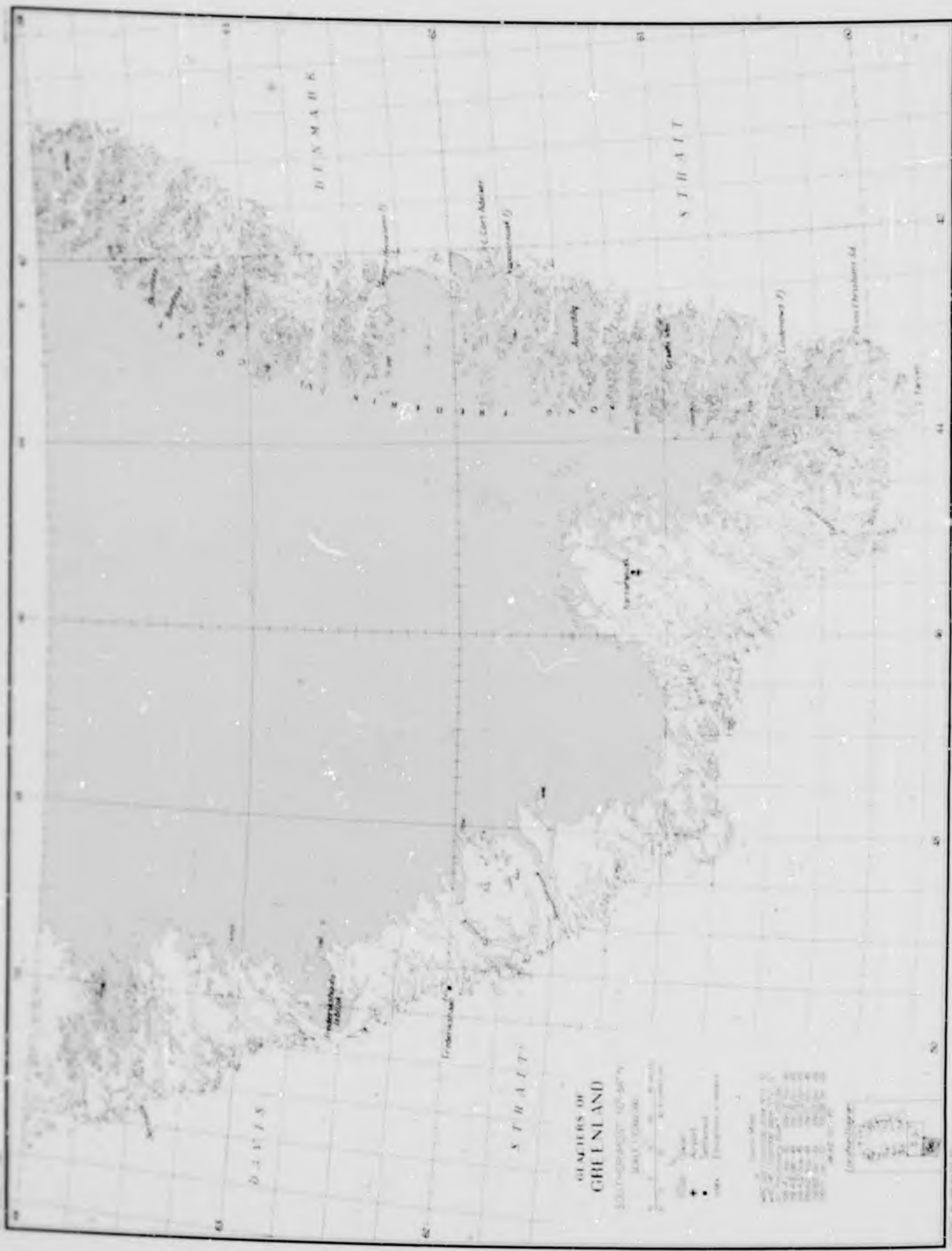
Christian IV Gl.

Serpenti Glacier

Kangerlussuaq Gl.

Halskovs Gl.





**MUNICIPALITIES OF
GREENLAND**

SOUTH-GREENLAND 10-10000
SCALE 1:100,000

- Coast
- Airport
- Settlement
- Station
-

Area	Population
1	100-200
2	200-500
3	500-1000
4	1000-2000
5	2000-5000
6	5000-10000
7	10000-20000
8	20000-50000
9	50000-100000
10	100000+



GLACIERS OF GREENLAND

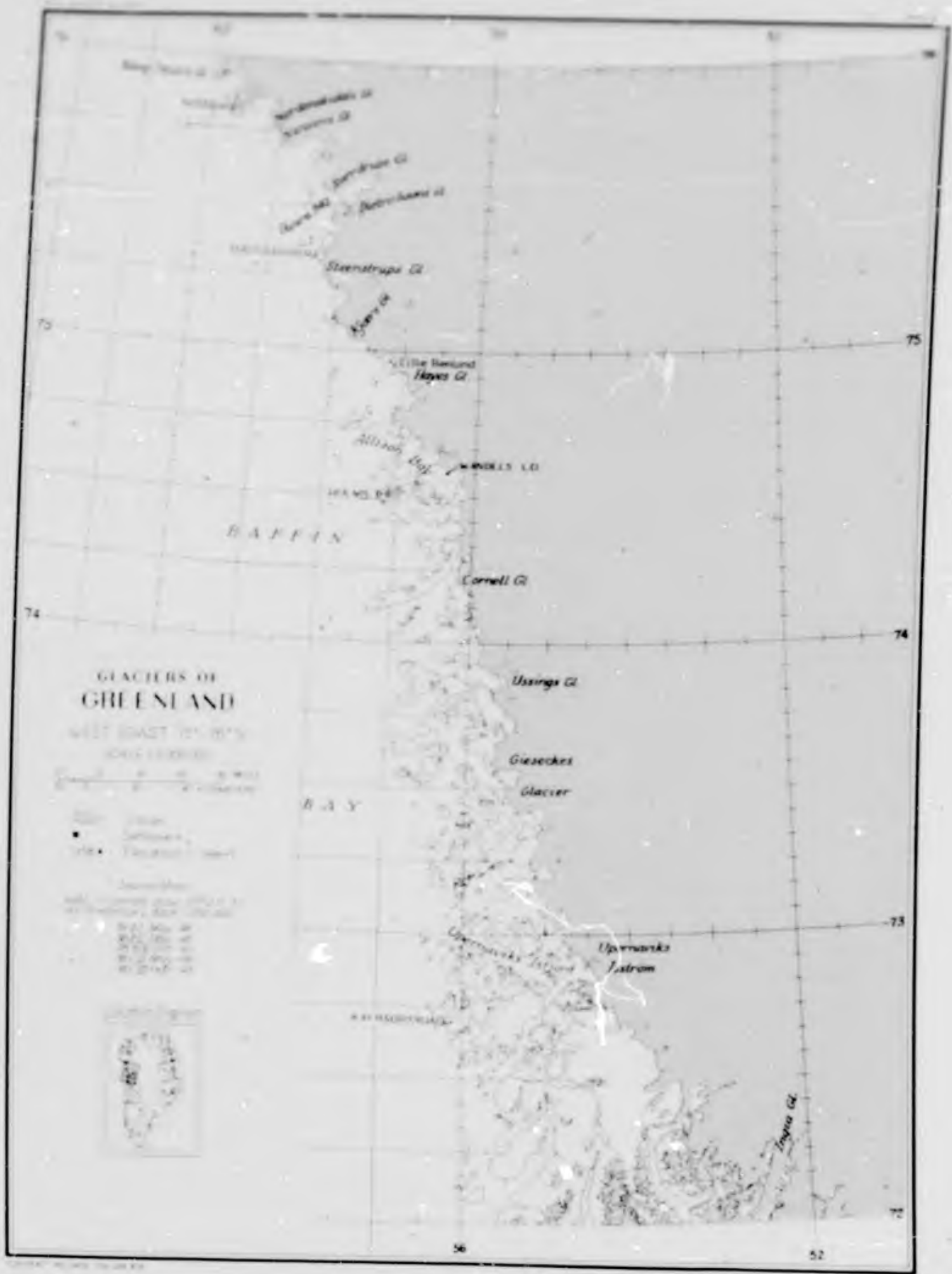
WEST COAST MAP 1914

SCALE 1:50,000



- Ocean
- Ice
- Snow
- Mountains
- Rivers
- Lakes
- Towns
- Roads
- Railroads
- Telegraph lines
- Boundaries

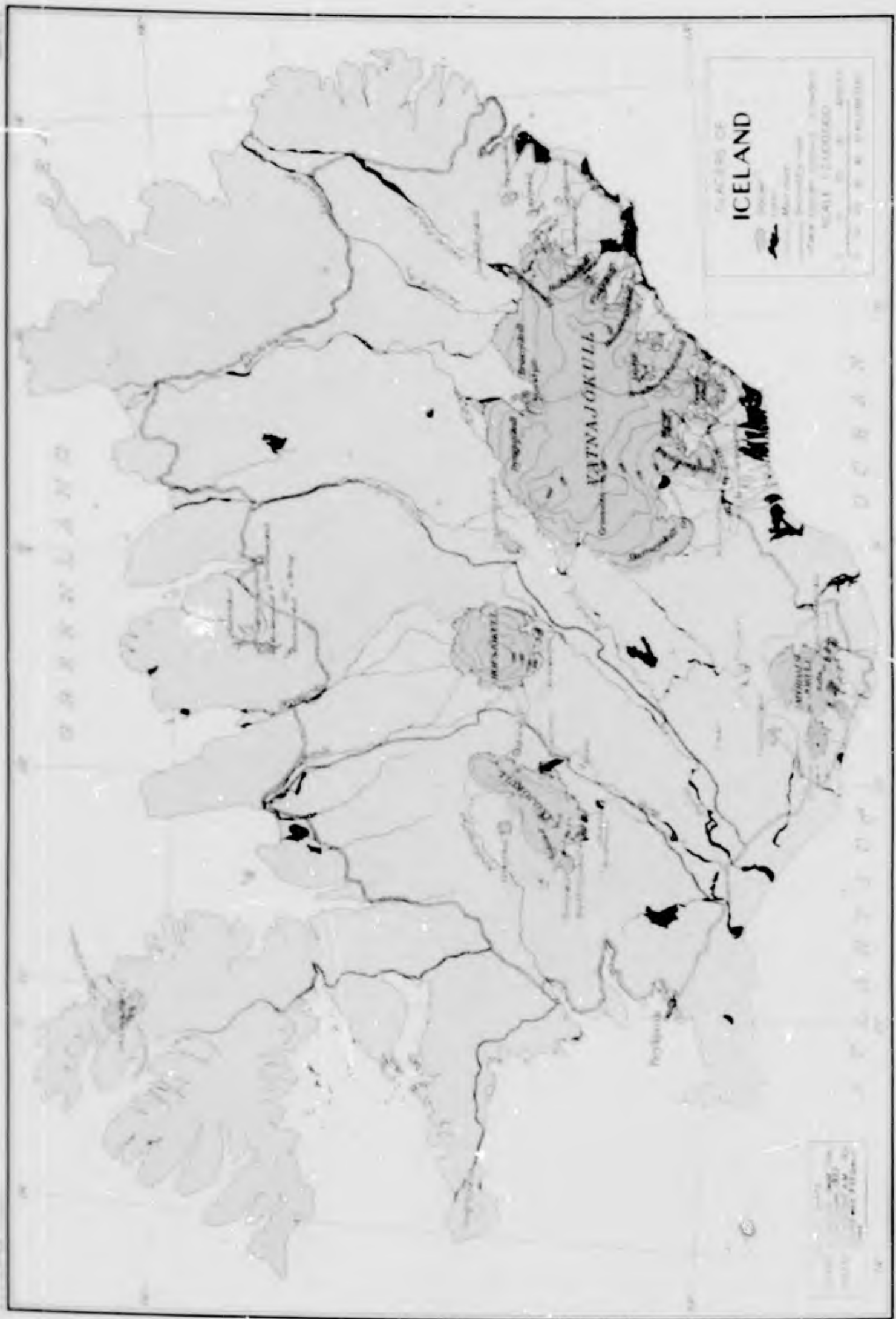




GLACIERS OF GREENLAND

WEST COAST OF NORTH GREENLAND





GLACIERS OF
ICELAND

Glacier
Main river
Secondary river
Lake
Scale 1:100,000
W. H. W. W. W.

BRUNLAND

DELAN

STRETTA

VATNAJÖKULL

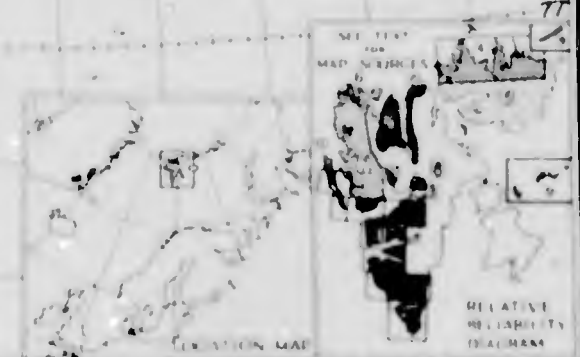
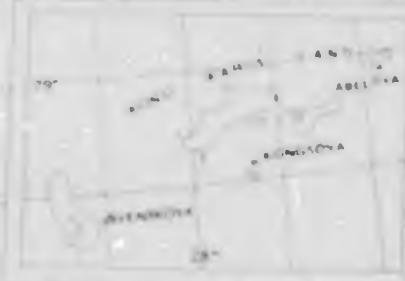
LANGJÖKULL

MÝRÐALSJÖKULL

ÞORVAÐUR

W. H. W. W. W.

SPITSBERGEN



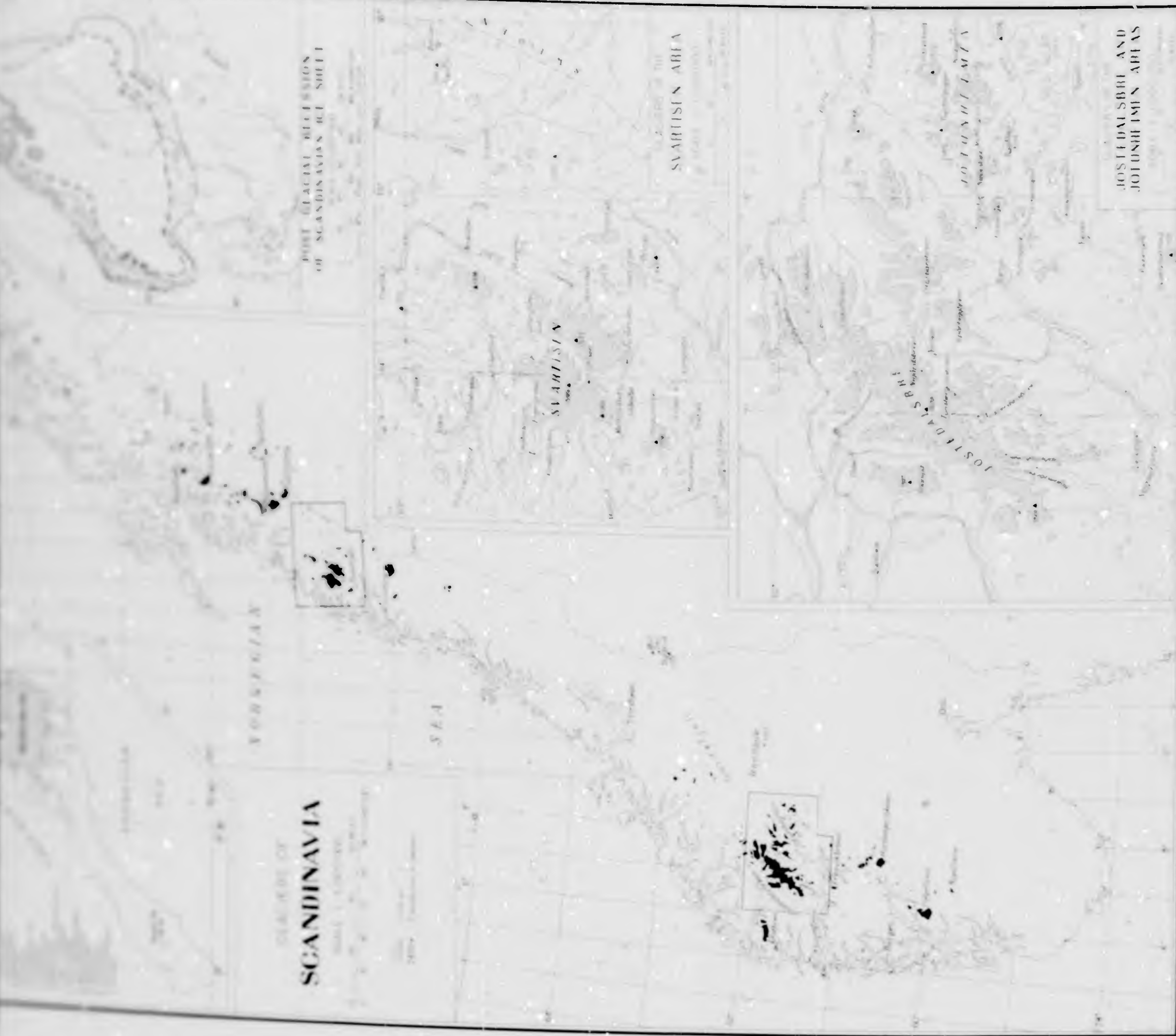
12°

16°

20°

1956

PART III. GLACIERS OF EUROPE



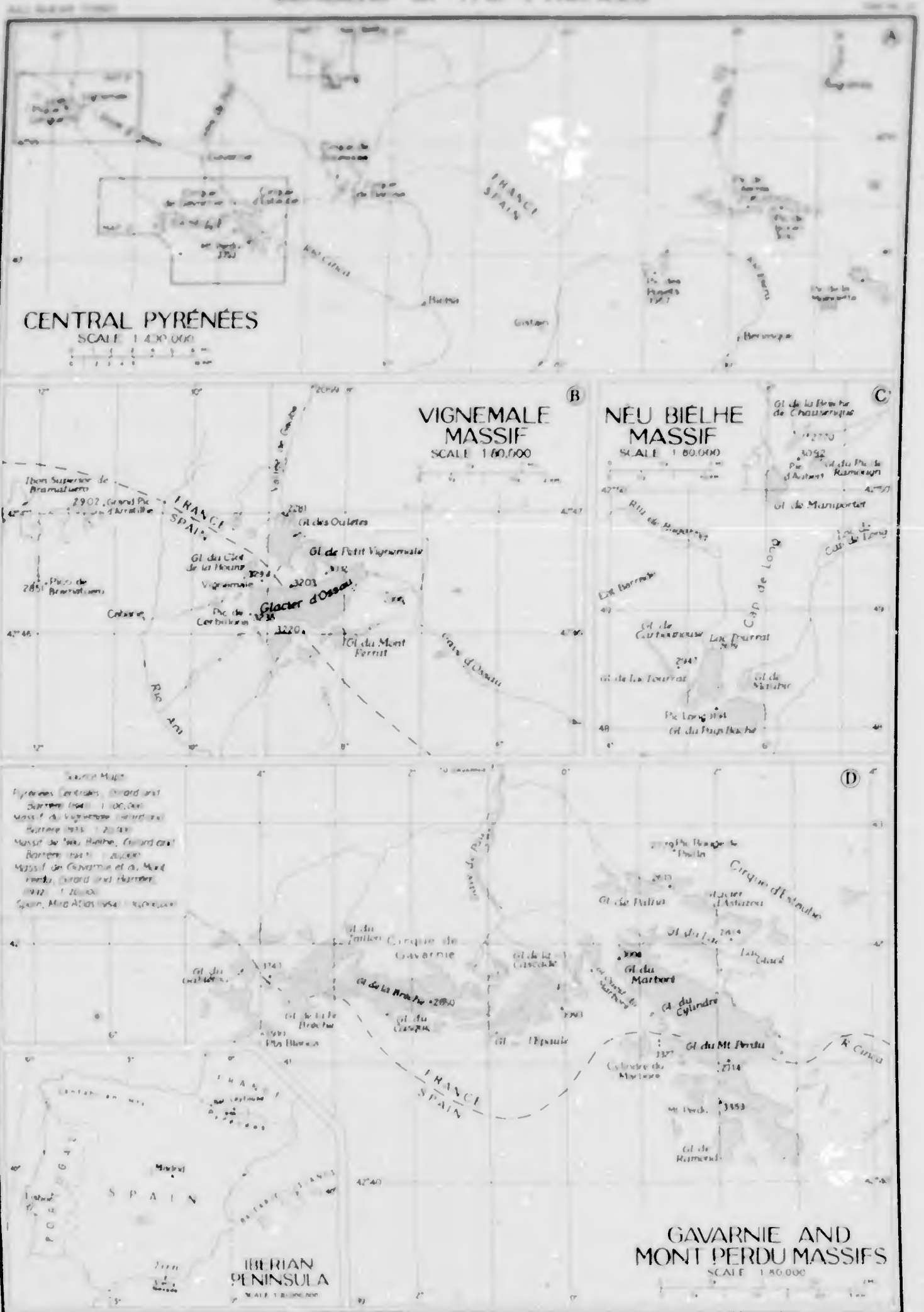
PORT OF SCANDINAVIAN ICE SHEET

SWEDISH AREA

JOSTEDALSBREI AND JOSTUNHEIMEN AREAS

SCANDINAVIA

GLACIERS OF THE PYRÉNÉES



CENTRAL PYRÉNÉES
SCALE 1:400,000

VIGNEMALE MASSIF
SCALE 1:80,000

NEU BIELHE MASSIF
SCALE 1:80,000

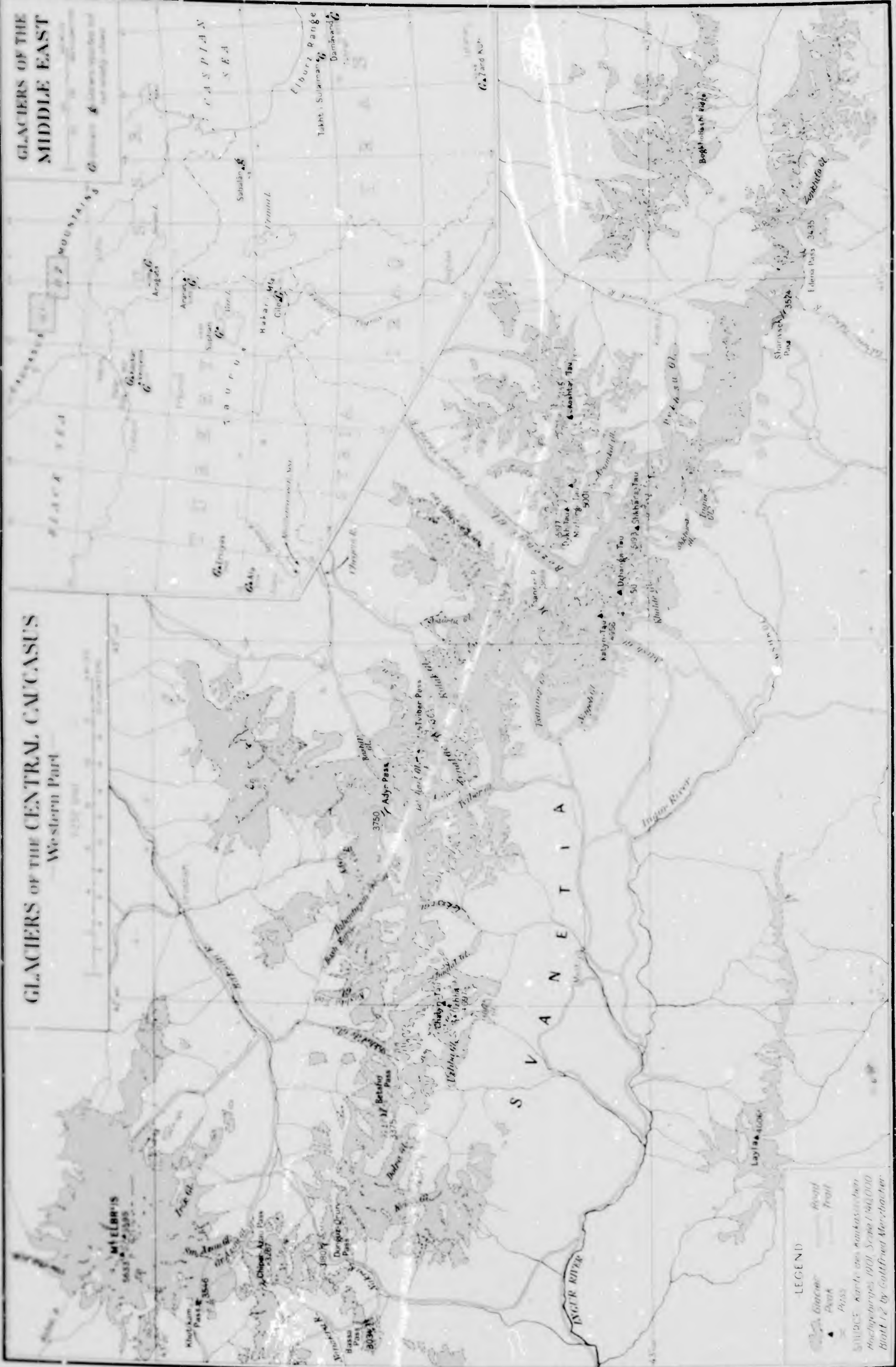
GAVARNIE AND MONT PERDU MASSIFS
SCALE 1:80,000

Legend Map
 Pyrénées Centrales, Grand and
 Barrière 1941 1:100,000
 Massif du Vignemale, Grand and
 Barrière 1941 1:20,000
 Massif de Neu Bielhe, Grand and
 Barrière 1941 1:20,000
 Massif de Gavarnie et du Mont
 Perdu, Grand and Barrière
 1942 1:20,000
 Spain, Mid Atlas 1954 1:50,000

PART IV. GLACIERS OF ASIA AND ADJACENT PARTS OF THE USSR

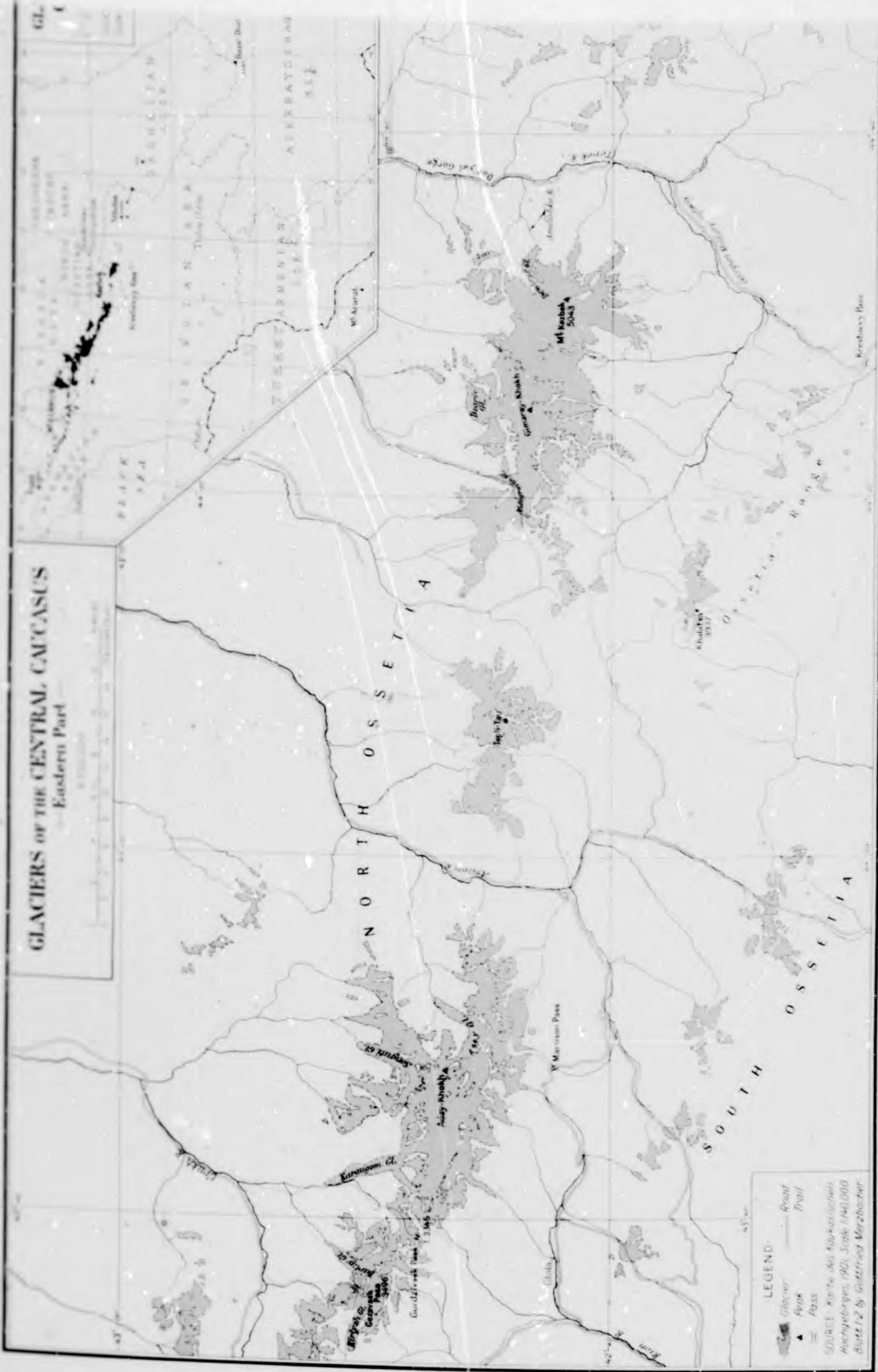
GLACIERS OF THE CENTRAL CAUCASUS — Western Part —

GLACIERS OF THE MIDDLE EAST



LEGEND
 Glacier
 Pass
 Trail
 5000 ft. marks
 Hochgebirgs (H.G.) Scale 1:60,000
 Blatt 12 by Gottfried Mercator.

GLACIERS OF THE CENTRAL CAUCASUS — Eastern Part —

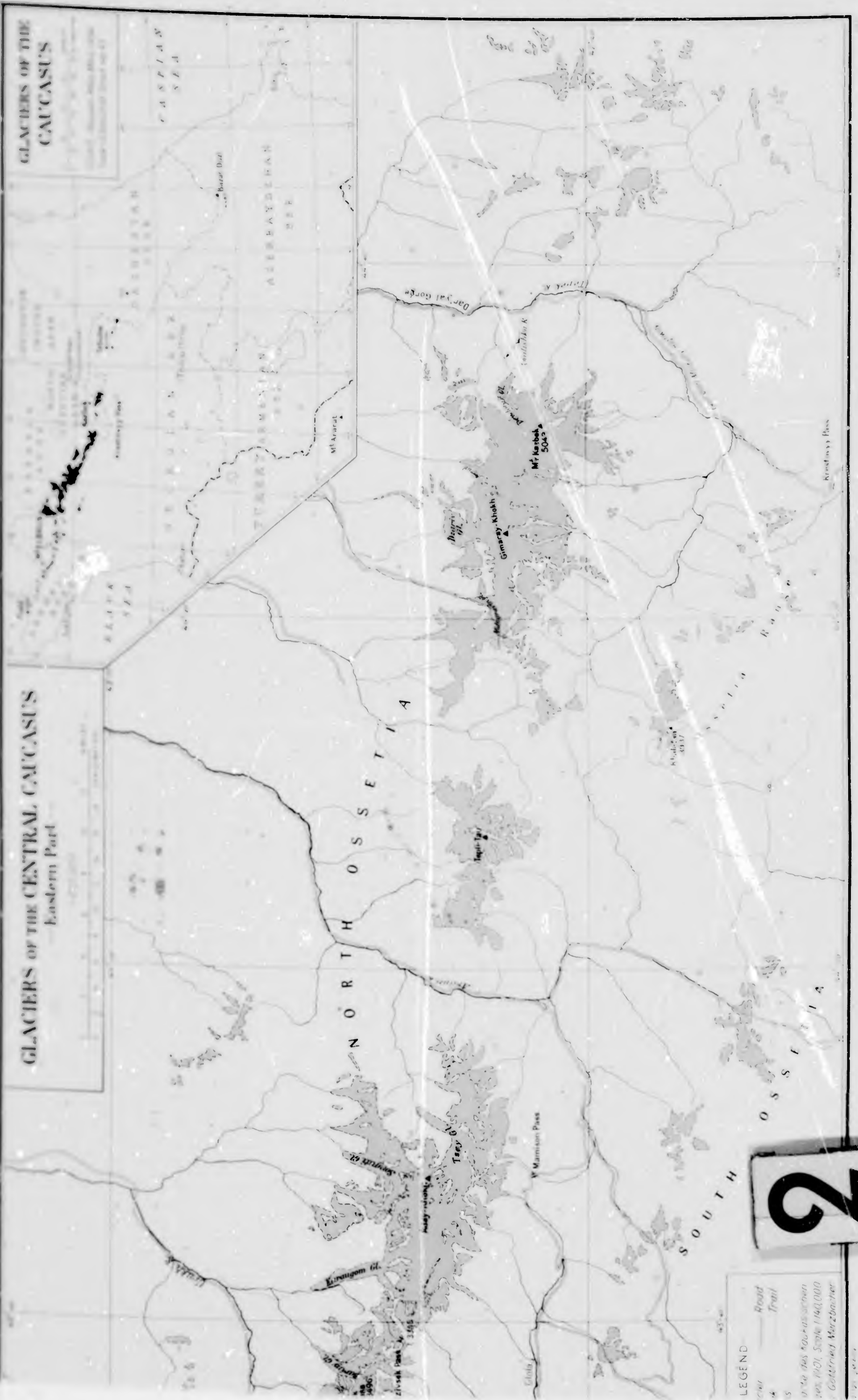


LEGEND:
 Glacier ———
 Peak ▲
 Pass =

SOURCE: Karte des kaukasischen Hochgebirges, 1905, Scale 1:100,000
 Blatt 1-2 by Gottfried Mezger

GLACIERS OF THE CENTRAL CAUCASUS
— Eastern Part —

GLACIERS OF THE CAUCASUS



LEGEND

- Road
- - - Trail

Scale 1:140,000
Scale 1:140,000

© G. Merzbacher

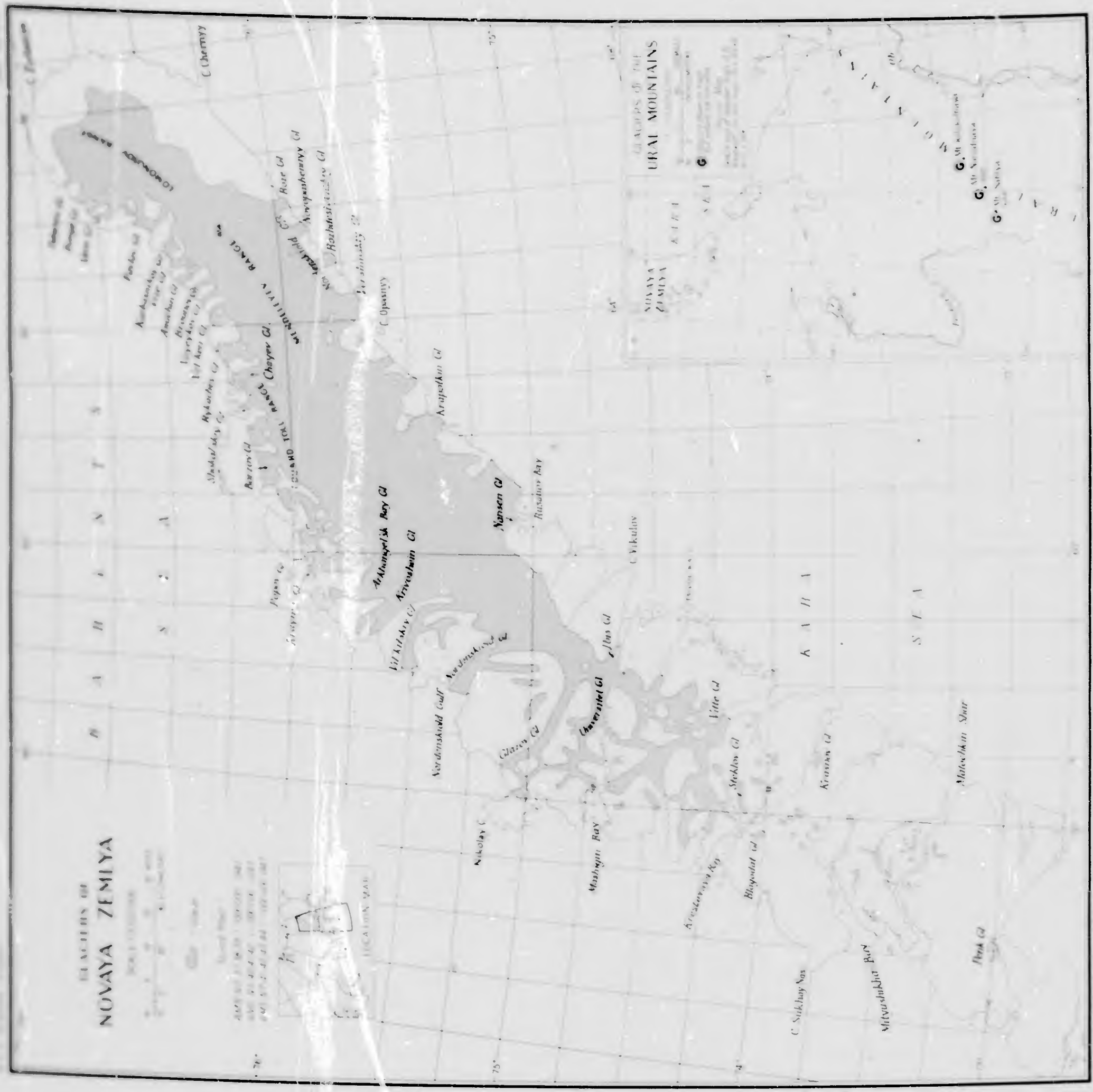
2

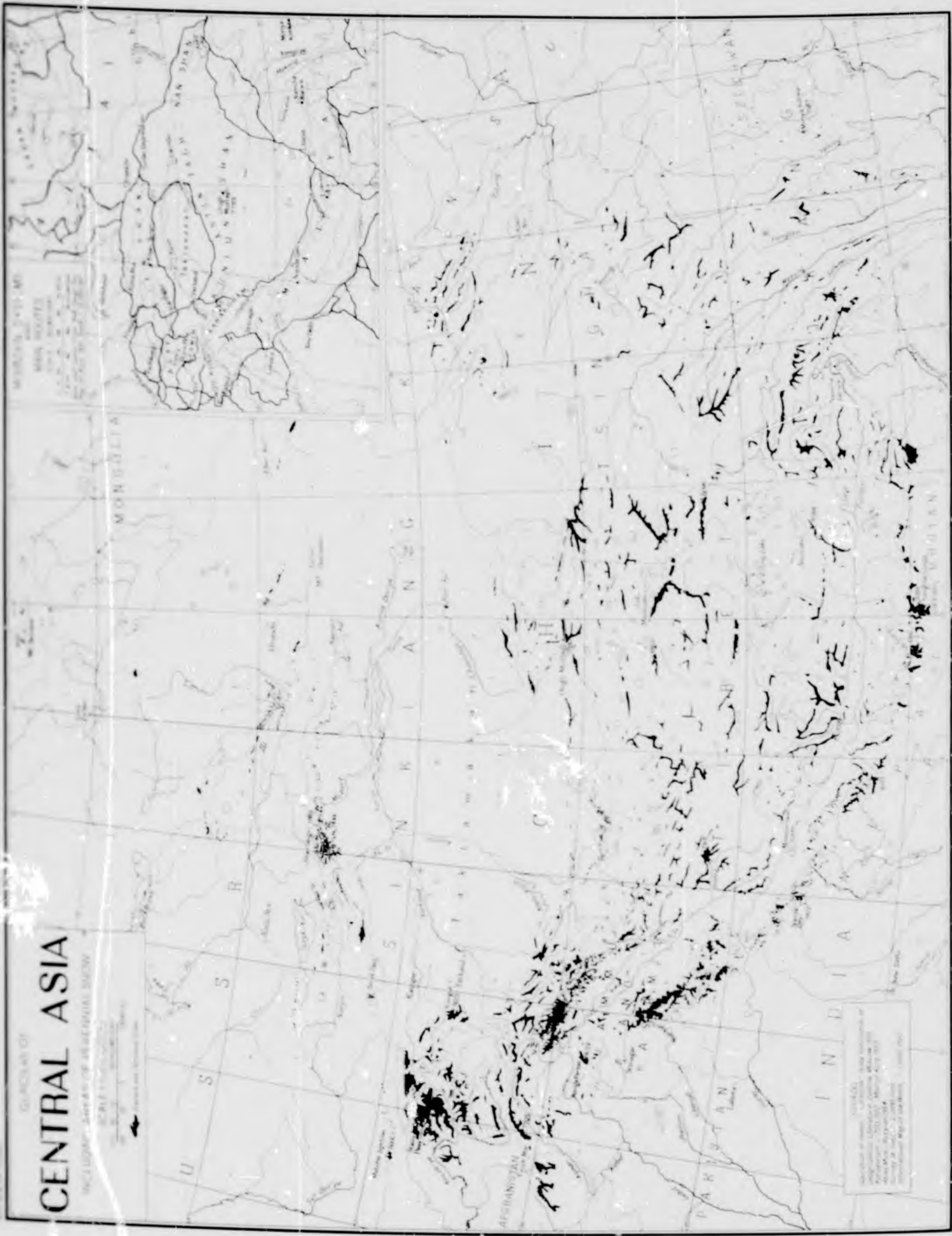
LOCATIONS OF NOVAYA ZEMEL'YA

Scale 1:500,000
1:1,000,000
1:2,000,000
1:3,000,000
1:4,000,000
1:5,000,000
1:6,000,000
1:7,000,000
1:8,000,000
1:9,000,000
1:10,000,000



LOCATION MAP





CENTRAL ASIA

BOUNDARIES OF
 INCLUDING AREAS OF ORIGINAL SOVEREIGNTY

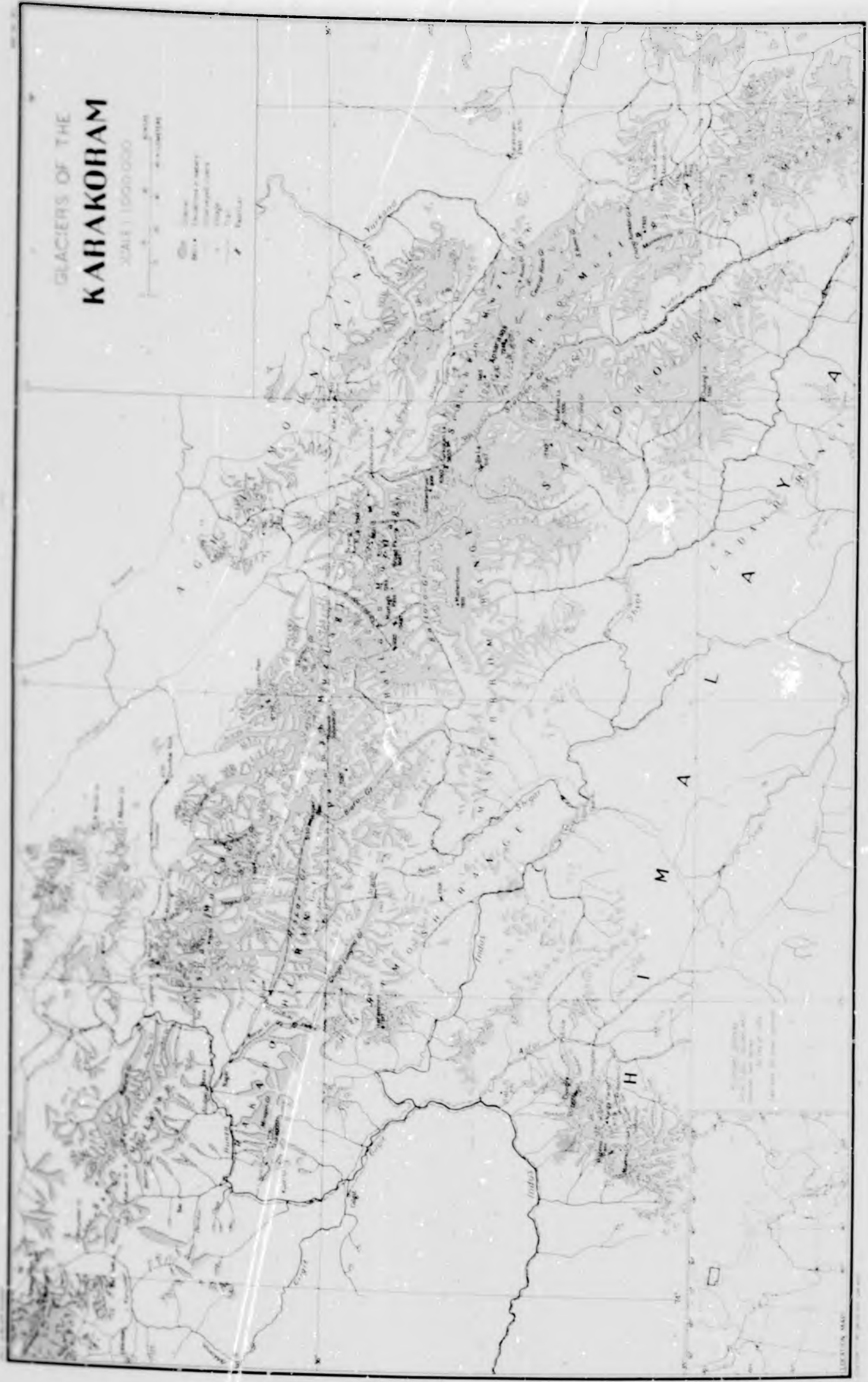
SCALE 1:500,000
 1:500,000
 1:500,000

1:500,000
 1:500,000
 1:500,000

GLACIERS OF THE KARAKORAM

SCALE 1:500,000

- Glacier
- Mountain
- Pass
- City
- Fort
- Station
- Peak
- Pass
- Pass



PART V. GLACIERS OF AFRICA

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APPENDIX

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Glaciers
- 2 - The Study of Glaciers
- 3 - Classification of Glaciers
- 4 - Terminology and Usage

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- 2 - St. Elias Mountains
- 3 - Chugach Mountains
- 4 - Kenai Mountains
- 5 - Talkeetna Mountains
- 6 - Wrangell Mountains
- 7 - Alaska Range
- 8a - Aleutian Range
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- 10 - Kilbuck and Other Mountains

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- 1b - Interior Ranges of British Columbia
- 2 - Canadian Rocky Mountains
- 3 - Northern Labrador
- 4 - Baffin and Bylot Islands
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- 6 - Queen Elizabeth Islands

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- 1b - Sierra Nevada
- 2a - American Rocky Mountains
- 2b - Other Glaciers of the United States
- 3 - Mexico
- 4 - Northern Andes

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- 2 - Jan Mayen
- 3 - Iceland
- 4 - Spitsbergen

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- 2 - Alps
- 3 - Pyrenées
- 4 - Central Africa

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- 2 - Caucasus
- 3 - Ural Mountains
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- 3 - Himalaya
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- 7 - Altay-Sayan Mountains
- 8 - Kun Lun - Nan Shan (Mountains)
- 9 - Tibetan Highlands

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- 2 - Cartography in the Service of Glaciology

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- Chapter 1 - Glaciers and Human Activities
- 2 - Some Aspects of Glacier Travel
- 3 - Avalanches

PART 10 Atlas of Mountain Glaciers in the Northern Hemisphere

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