SIMON FRASER UNIVERSITY S.83-85

MEMORANDUM

To: SENATE	From: SENATE COMMITTEE ON UNDERGRADUATE STUDIES
Subject: CHANGES - GEOGRAPHY	Date: NOVEMBER 14, 1983

Action undertaken by the Senate Committee on Undergraduate Studies at its meeting of November 1, 1983 gives rise to the following motion:-

MOTION:

"That Senate approve and recommend approval to the Board of Governors, as set forth in S.83-85 , the changes in Geography including:-

i) Change in major requirements, upper division
ii) Change in honors requirements, upper division
iii) New courses -
GEOG 412-5 - Quaternary Geology and Geomorphology
GEOG 453-5 - Remote Sensing"

FOR INFORMATION:

Acting under delegated authority at its meetings of November 1 and November 8, 1983 the Senate Committee on Undergraduate Studies approved changes as shown in the attached.

i) Change of title and description GEOG 319-3
ii) Change of title GEOG 346-3
iii) Change of prerequisite GEOG 411-5.

SIMON FRASER UNIVERSITY

MEMORANDUM

SCUS 83-42

To: Harry Evans
Secretary
S.C.U.S.

From: Sheila Roberts
Secretary, Faculty of Arts
Curriculum Committee

Subject: Curriculum Revisions -
Department of Geography

Date: October 21, 1983

The Faculty of Arts Curriculum Committee, at its meeting of September 29, 1983, approved the following revisions to the curriculum of the Department of Geography and the two new courses for permanent inclusion in the Calendar:

(a) Change of Upper-Division requirements for Majors and Honors.

(b) Change of Title: GEOG 346-3 Geography of Contemporary Societies.

(c) Change in Prerequisite: GEOG 411-5 Models in Hydrometeorology.

(d) New Course: GEOG 412-5 Quaternary Geology and Geomorphology.

(e) New Course: GEOG 453-5 Remote Sensing.

Would you please put these items on the agenda of the next S.C.U.S. meeting. Thank you.

Sheila Roberts

S. Roberts

SR/md

c.c. T. Hickin, Geography
G. Rheumer, Geography

SIMON FRASER UNIVERSITY

MEMORANDUM

SCUS 83-56

To: H. M. Evans
Secretary, S.C.U.S.

From: Sheila Roberts
Secretary, Faculty of Arts
Curriculum Committee

Subject: Changes in Title and Description:
GEOG 319-3

Date: October 27, 1983

The Faculty of Arts Curriculum Committee at its meeting of October 27, 1983, approved the change of title and description of GEOG 319-3. Would you please place this item on the agenda of the next meeting of S.C.U.S.

Thank you.

Sheila Roberts

S. Roberts

SIMON FRASER UNIVERSITY

FACC.

MEMORANDUM

To: Chairman
Faculty of Arts
Curriculum Committee

From: E.J. Hickin
Chairman
Dept. of Geography

Subject: New Courses & Calendar Changes

Date: September 21, 1983

Please find attached the proposed Calendar changes for the Department of Geography, and three proposals for new courses.

The Calendar changes represent housekeeping to accommodate recent additions to the curriculum (necessitated in part by the introduction of a compulsory course, Geog. 301). The title change for Geog. 346 has been requested by the instructor as a more appropriate guide to the course content. The change to Geog. 411 concerns an addition of Math prerequisites for this quantitative modelling course.

Geog. 412 is being introduced because of growing student demand and our desire to introduce more field oriented courses to the Physical Program.

The course proposal for Geog. 448 reflects a long standing interest of Professor Eliot Hurst's in this topic. The course has been mounted on several previous occasions under a special topics number, and this new course recognises this continuing interest.

The course proposal for Geog. 453 completes a sequence of two courses in Remote Sensing that have been phased into the curriculum following the appointment of Dr. Arthur Roberts to the faculty.

E.J. Hickin

EJH/mgb
Attch.

OFFICE OF THE DEAN

SEP 22 1983

FACULTY OF ARTS

CURRICULUM CHANGES

GEOGRAPHY UPPER DIVISION COURSE

CHANGE OF TITLE AND DESCRIPTION:

P. 160 Calendar

FROM:

GEOG 319-3 Physical Interactions in the Environment

The course will review and analyse those physical processes in the environment that can be used to predict the dispersion of toxic agents.

TO:

GEOG 319-3 Mass Transfer in the Biosphere

An introduction to the processes responsible for mass transfer in the biosphere. Emphasis will be given to the transfer of toxic agents in the environment.

RATIONALE:

The original title and description were prepared a number of years ago. As the course is required for BioSciences' Environmental Toxicology Minor Program, the changes reflect the needs of that program. Dr. F. Law, of Biological Sciences, has been consulted regarding the nature and content of the course.

DEPARTMENT OF GEOGRAPHY

Change of Requirements: pp. 41-42

FROM:

1. 1983/84 Calendar

jors:

(a) Six courses from Division A including at least one from each of Sections I, II, III, and IV. (18 Sem. Hrs.)

(b) One course from Division B.* (5 Sem. Hrs.)

(c) 7 semester hours of credit in any Geography courses numbered 300 and above. (7 Sem. Hrs.)

Total hours required: (30 Sem. Hrs.)

Honors:

(a) Six courses from Division A including at least one from each of Sections I, II, III and IV. (18 Sem. Hrs.)

(b) One course from Division B.* (5 Sem. Hrs.)

(c) GEOG 491-5. (5 Sem. Hrs.)

(d) 22 semester hours in any other courses numbered 300 and above, but not more than one course from Division C.* (22 Sem. Hrs.)

Total hours required: (50 Sem. Hrs.)

TO:

2. Proposal to revise 1984/85 Calendar

Majors:

(a) Five courses from Division A including at least one from each of Sections I, II, III and IV. (15 Sem. Hrs.)

(b) One course from Division B.* (5 Sem. Hrs.)

(c) One course from Division B or C.* (5 Sem. Hrs.)

(d) 5 semester hours of credit in any Geography courses numbered 300 and above. (5 Sem. Hrs.)

Total hours required: (30 Sem. Hrs.)

Honors:

(a) Five courses from Division A including at least one from each of Sections I, II, III and IV. (15 Sem. Hrs.)

(b) One course from Division B.* (5 Sem. Hrs.)

(c) One course from Division B or C.* (5 Sem. Hrs.)

(d) GEOG. 491-5 (5 Sem. Hrs.)

(e) 20 semester hours in any other courses numbered 300 & above, but not more than one course from Division C.* (20 Sem. Hrs.)

Total hours required: (50 Sem. Hrs.)

* Division B and/or C requirements for Majors & Honors maybe fulfilled by Geog. 498-5 and/or 499-15 depending upon course content.

RATIONALE:

When the Department added GEOG 301 as a required course, and changed its requirements, it did not realize that the changes would allow students to graduate with only one of the senior 400-Division courses. This change reverts to the previous requirements which ensure that students take at least two-400 Division courses.

CURRICULUM CHANGES

GEOGRAPHY UPPER DIVISION COURSES

CHANGE OF TITLE ONLY

P. 160 Calendar

FROM:

GEOG 346-3 Geography of Contemporary Industrial Societies

TO:

GEOG 346-3 Geography of Contemporary Societies

RATIONALE:

This title is a more appropriate guide to the course content.

CHANGE IN PREREQUISITE ONLY

P. 161--GEOG 411-5

FROM:

At least 60 credit hours including GEOG 313, GEOG 311, and MATH 151 and 152 or MATH 154 and 155.

TO:

GEOG 314, GEOG 311, and MATH 151 and 152 or MATH 154 and 155 or MATH 157 and 158.

RATIONALE:

GEOG 314 is a more appropriate course. The Department is listing the alternative calculus courses for Social Science students, MATH 157 & 158, to the calculus courses already required.

NEW COURSE

GEOG 412 Quaternary Geology and Geomorphology

RATIONALE:

GEOG 412 is being introduced because of growing student demand and our desire to introduce more field oriented courses to the Physical Program.

NEW COURSE

GEOG 453 Remote Sensing

RATIONALE:

The course proposal for GEOG 453 completes a sequence of two courses in Remote Sensing that have been phased into the curriculum following the appointment of Dr. Arthur Roberts to the faculty.

SENATE COMMITTEE ON UNDERGRADUATE STUDIES

NEW COURSE PROPOSAL FORM

1. **Calendar Information** **Department** Geography

Abbreviation Code: GEOG **Course Number:** 412 **Credit Hours:** 5 **Vector:** 2-0-4

Title of Course: Quaternary Geology and Geomorphology

Calendar Description of Course: Stratigraphy of the Quaternary Period; geomorphic and sedimentary evidence of glaciation; models of glacial and periglacial environments. Laboratory and field study of glacial deposits.

Nature of Course Lecture/ laboratory/ field work

Prerequisites (or special instructions):

GEOG 313-3

What course (courses), if any, is being dropped from the calendar if this course is approved: None

2. **Scheduling**

How frequently will the course be offered? At least every 5 semesters.

Semester in which the course will first be offered? 1984-3

Which of your present faculty would be available to make the proposed offering possible?

M.C. Roberts; E.J. Hickin

3. **Objectives of the Course**

To provide a more earth science oriented approach to the Quaternary than is possible in Geog. 416. Students will have a thorough grounding in the procedures of identifying and mapping Quaternary deposits.

4. **Budgetary and Space Requirements (for information only)**

What additional resources will be required in the following areas:

Faculty None

Staff None

Library One new journal: Boreas (Dept. will purchase back issues)

Audio Visual None

Space None

Equipment None

5. **Approval**

Date: 1983:09:21	1983:10:21	
E.J. Hickin	R.C. Brown	
Department Chairman	**Dean**	**Chairman, SCUS**

SCUS 73-34b:- (When completing this form, for instructions see Memorandum SCUS 73-34a. Attach course outline).

Arts 78-3

ADDITIONAL COMMENTS REGARDING GEOG 412

Library

The Library subscribes to, with a minor exception, the major journals in the field of Quaternary research (Journal of Geology, Quaternary Research, Arctic and Alpine Research, Canadian Journal of Earth Sciences, Earth Surface Processes, Geografiska Annaler, Journal of Glaciology, Bulletin of the Geological Society of America).

The holdings of monographs in the area is extensive. This is a reflection of the interest of Professors F.F. Cunningham, Hickin, Roberts and Sagar in ordering books dealing with the Quaternary. It must also be pointed out that colleagues in Archaeology and Biological Sciences have active research interests in the Quaternary and they have influenced the collection's growth.

The Library collection in the classification areas of QE and GB (relating to the Pleistocene/Quaternary) is particularly good after 1965.

Simon Fraser University
Department of Geography

Geography 412
M.C. Roberts

Course Outline

Quaternary Geology and Geomorphology

This course will examine the stratigraphy, geomorphology, and glacial depositional models associated with the Quaternary Period. The regional emphasis will be on Western Canada and adjacent areas in the U.S.

Course Organization: There will be two one-hour lectures per week throughout the semester, and a three-hour laboratory session. The laboratory session will be replaced by field trips on at least three afternoons (see schedule). There will be one weekend field-trip: budget $50 to cover the costs.

Required Text: D.Q. Bowen, 1978, Quaternary Geology; Pergamon.

Course Syllabus:

1. The Quaternary Period - an overview.

2. A review of glacial and periglacial geomorphology.

3. Stratigraphic concepts: stratigraphic procedures for outcrops and subsurface; concepts unique to the Quaternary; terminology; the application of the stratigraphic code; correlation; type sections.

4. Geochronological techniques applicable to the Quaternary.

5. Quaternary stratigraphy: the evolution of the stratigraphic divisions; the classical regions-Alps and the Midwest; the impact of marine evidence.

6. The Quaternary of B.C. emphasing the record of southwestern British Columbia.

7. Models of glacial depositional environments.

8. Soils in the Quaternary record.

9. Palynology, tephras, climatic change.

10. Sea-level changes

Grades: will be determined as follows:

Laboratory and field reports	40%
Mid-term examination	30%
Final examination	30%

Simon Fraser University
Department of Geography

Geography 412
M.C. Roberts

Quaternary Geology and Geomorphology

READING LIST

Monographs

Armstrong, J.E., 1981, Post-Vashon Wisconsin glaciation, Fraser Lowland, B.C., Geol. Surv. Canada, Bulletin 322.

Birkeland, P.W., 1974, Pedology, weathering and geomorphological research. Oxford Univ. Press.

Butzer, K.W., & Isaac, G.L., (eds.), 1975, After the Australopithecines.

Cullingford, R.A., Davidson, D.A., & Lewin, J. (eds.), 1980, Timescales in Geomorphology. J. Wiley and Sons.

Embleton, C., & King, C.A.M., 1975, Glacial geomorphology. (2nd edit.), Arnold, London.

Flint, R.F., 1971, Glacial and Quaternary Geology, J. Wiley, N.Y.

French, H.M., 1976, The Periglacial Environment. Longman, London.

Goldthwait, R.P., et al (eds), 1971, Till, a symposium. Ohio State Univ. Press.

Hedberg, H.D. (ed), 1976, International Stratigraphic Guide: a guide to stratigraphic classification, terminology and procedure. Wiley-Interscience, New York.

Jopling, A.V. & McDonald, B.C. (eds), 1975, Glaciofluvial and glaciolacustrine sedimentation. Special Publication No. 26, S.E.P.M.

Price, R.J., 1973, Glacial and fluvioglacial landforms. Hafner, N.Y.

Smalley, I.J. (ed.), 1975, Loess: lithology and genesis. Benchmark Papers in Geology No. 26, Dowden, Hutchinson & Ross Inc.

Sugden, D.E. & B.S. John, 1976, Glaciers and landscape. London: Edward Arnold.

Turekian, K.K., (ed), 1971, The late Cenozoic glacial ages.

Washburn, A.L., 1973, Periglacial Processes and Environments. Arnold, London.

West, R.G., 1975, Pleistocene geology and biology. Longmen, London.

Articles

Alley, N.F., 1979, Middle Wisconsin stratigraphy and climatic reconstruction, southern Vancouver Island, B.C., Quat. Research, 11, pp. 213-237.

Alley, N.F., & Chatwin, S.C., 1979, Late Pleistocene history and geomorphology, S.W. Vancouver Island, B.C., C.J.E.S., 16, pp. 1645-1657.

Andrews, J.T. & Mahaffy, M.A.W., 1976, Growth rate of the Laurentide Ice Sheet and sea level lowering. Quat. Research, 6, pp. 167-184.

Armstrong, J.E. & Clague, J.J., 1977, Two major lithostratigraphic units in S.W., B.C., C.J.E.S., 14, pp. 1471-1480.

Baker, V.R., 1974, Paleohydraulic interpretation of Quaternary alluvium near Golden, Colorado. Quat. Research, 4, pp. 94-112.

Boulton, G.S., 1972, Modern Arctic glaciers as depositional models for former ice sheets, Jour. Geol. Soc. London, 128, pp. 361-393.

Chamberlain, T.C., 1895, The classification of American glacial deposits, Jour. Geology, 3, pp. 270-277.

Church, M. & Ryder, J., 1972, Paraglacial sedimentation: a consideration of fluvial processes controlled by glaciation, Bull. Geol. Soc. Amer., 83, pp. 3059-3072.

Clague, J.J., 1976, Quadra Sand and its relation to the late Wisconsin glaciation of SW, B.C., C.J.E.S., 13, pp. 803-815.

Clague, J.J., Armstrong, J.E., & Mathews, W.H., 1980, Advance of the late Wisconsin Cordilleran Ice Sheet in southern B.C. since 22,000 yr BP, Quat. Research, 13, pp. 322-326.

Davis, M.B., 1976, Pleistocene biogeography of temperate deciduous forests. Geoscience and Man, 13, pp. 13-26.

Davis, N.F.G., & Mathews, W.H., 1944, Four phases of glaciation with illustrations from S.W. B.C., Jour. Geology, 52, pp. 403- 413.

Easterbrook, D.J., 1969, Pleistocene chronology of the Puget Lowland and San Juan Islands, Bull. Geol. Soc. Amer., 80, pp. 2273-2286.

Fairbridge, R.W., 1972, Climatology of a glacial cycle. Quat. Research, 2, pp. 283-302.

Frye, J.C., 1973, Pleistocene succession of the central interior United States, Quat. Research, 3, pp. 275-283.

Fulton, R.J., 1965, Silt deposition in late-glacial lakes of southern B.C., Amer. Jour. Science, 263, pp. 553-570.

Articles cont'd.

Fulton, R.J. & Smith, G.W., 1978, Late Pleistocene stratigraphy of south-central B.C., C.J.E.S., 15, pp. 971-980.

Heusser, C.J., 1973, Environmental sequence following the Fraser advance of the Juan de Fuca lake, Washington, Quat. Research, 3, pp. 284-306.

Ives, J.D., Andrews, J.T., & Barry, R.G., 1975, Growth and decay of the Laurentide Ice Sheet and comparisons with Fenno-Scandinavia. Die Naturwissenschaften, 62, pp. 118-125.

Holtedahl, M., 1967. Notes on the formation of fjonds and fjond-valleys. Geografiska Annaler 49A: 188-203.

Luckman, B.H., & Osborn, G.D., 1979, Holocene glacier fluctuations in the Middle Canadian Rocky Mountains, Quat. Research, 11, pp. 52-77.

Mathewes, R.W., 1973, A palynological study of postglacial vegetation changes in the University Research Forest, S.W. B.C., Can. Jour. Botany, 51, pp. 2085-2103.

Moore, D.P., & Mathews, W.H., 1978, The Rubble Creek Landslide, S.W. B.C., C.J.E.S., 15, pp. 1039-1052.

Morrison, R.B., 1969, The Pleistocene-Holocene boundary. Geologie en Mijnbouw, 48, pp. 363-372.

Peacock, M.A. 1935, Fiord-land of British Columbia. Bulletin of the Geological Society of America 46: 636-696.

Porter, S.C., 1976, Pleistocene glaciation in the southern part of the North Cascade Range. Bull. Geol. Soc. Amer., 87, pp. 61-75.

Porter, S.C., & Denton, G.H., 1967, Chronology of Neoglaciation in the North American Cordillera, Amer. Jour. Science, 265, pp. 177-210.

Roberts, M.C. & Mark, D.M., 1970, The use of trend surfaces in till fabric analysis, C.J.E.S., 7, pp. 1179-1184.

Roberts, M.C. 1978, Drainage density variations on the morainic landscapes of northeastern Indiana. Zeit. Geomorph. 22, pp. 462-471.

Ruhe, R.V., 1954, Relations of the properties of Wisconsin labs to topography in western Iowa. Amer. Jour. Science, 252, pp. 663-672.

Simonson, R.W., 1954, Identification and interpretation of buried soils. Amer. Jour. Science, 252, pp. 705-732.

Suggate, R.P., 1965, The definition of "Interglacial". J. Geol., 73, pp. 619-626.

Tipper, H.W., 1971, Multiple glaciation in central B.C., C.J.E.S., 8, pp. 743-752.

Articles cont'd.

Whright, H.E., 1976, The dynamic nature of Holocene vegetation. Quat. Research, 6, pp. 581-596.

SENATE COMMITTEE ON UNDERGRADUATE STUDIES

NEW COURSE PROPOSAL FORM

1. **Calendar Information**

Department GEOGRAPHY

Abbreviation Code: GEOG **Course Number:** 453 **Credit Hours:** 5 **Vector:** 2-0-4

Title of Course: Remote Sensing

Calendar Description of Course:

Applied remote sensing and image analysis. Topics include air photo interpretation, multispectral and colour photography, thermal imagery, multispectral scanners, microwave applications and satellite imagery.

Nature of Course Lecture/laboratory/field work

Prerequisites (or special instructions): GEOG 353

What course (courses), if any, is being dropped from the calendar if this course is approved: None

2. **Scheduling**

How frequently will the course be offered? Annually

Semester in which the course will first be offered? 01/84

Which of your present faculty would be available to make the proposed offering possible? A.C.B. Roberts / T.K. Poiker

3. **Objectives of the Course**

To provide a comprehensive survey of applied remote sensing in Geography and Resource Management.

4. **Budgetary and Space Requirements (for information only)**

What additional resources will be required in the following areas:

Faculty	None
Staff	None
Library	Some new material: Can Journal of Remote Sensing back issues of Photogrammetria
Audio Visual None	
Space	None
Equipment	More intensive use of existing equipment

5. **Approval**

Date: 1983:09:21	1983:10:21	
Department Chairman	**Dean**	**Chairman, SCUS**

SCUS 73-34b:- (When completing this form, for instructions see Memorandum SCUS 73-34a. Attach course outline).

Arts 78-3

Rationale Geography 453

As aerial photography did in the past remote sensing now is becoming an important technique and research area in geography. In conjunction with the Natural Resource Management programme the Department of Geography has developed a small but comprehensive remote sensing facility. A number of geography students have expressed a strong interest in more advanced training in remote sensing after completion of GEOG. 353 (Air Photo Interpretation).

This new course will provide a systematic and detailed introduction to advanced remote sensing with practical experience in photogrammetric plotting, colour densitometry, colour and multispectral reconnaissance photography, thermal imagery, multispectral scanners, microwave remote sensing and computer assisted image interpretation. The course will be oriented towards applications in geography and resource management.

Students from other departments (i.e. Biology, Archaeology, Computing Science) have also expressed an interest in the course. Geography 453 will complete the teaching stream for a new faculty appointment made in 1981 and the anticipated enrolment will permit the Department of Geography to make full use of the existing remote sensing equipment acquired over the past year.

The first half of the course covers remote sensing principles, instrumentation and analysis. The second half deals with remote sensing applications in resource management and will involve student presentations. A seminar/laboratory format will be used with lectures and discussions on outlined topics. Readings will be assigned in advance of the topics and applications will be oriented towards specific resource interests of the students. Six practical laboratory assignments are included to familiarize students with important basic aspects of applied remote sensing.

Grading will be based upon a term paper, related seminar presentation and laboratory assignments.

Geography 353-3 or an equivalent air photo interpretation course is a prerequisite.

ESSAY: (50%) Topics to be related to remote sensing applications in resource management. Involves planning of a remote sensing mission including problem definition, rationale, literature review, mission logistics and interpretational requirements.

SEMINAR PRESENTATION (20%) Presentation of a defined problem and related literature from a selected essay topic.

LABORATORY ASSIGNMENTS (30%)

TOPICS

I Principles, Instrumentation and Analysis

(a) Introduction to Remote Sensing:

- principles, concepts and problems
- scope and importance
- electromagnetic spectrum
- atmospheric effects
- panchromatic aerial photography
- air photo interpretation

Laboratory 1: Air Photo Interpretation and Terrain Analysis

- characteristics of the stereo model drainage, landform and landuse analysis

(b) Photogrammetry:

- properties of the single aerial photograph
- parallax and height measurement

Laboratory 2: Photogrammetry:

- height measurement and contour mapping

(c) Visible Spectrum and Photography:

- colour photography
- film filter combinations
- Retinex theory

Laboratory 3: Densitometry:

- densitometric interpretation of colour photography

(d) Reconnaissance Aerial Photography:

- flight planning
- image acquisition
- image analysis
- ground truth

Laboratory 4: Planning reconnaissance aerial photography:

- interpretational and logistical requirements; justification

(e) Nonphotographic Optical Sensors:

- measurement and design considerations
- radiometers, thermal scanners and multispectral scanners

Laboratory 5: Interpretation of thermal imagery:

- urban thermography; heat loss assessment; use of the Zoom Transfer Scope

(f) Microwave Systems:

- theory and applications
- imaging radars — side looking airborne
  synthetic aperature
  multi-channel

(g) Satellites and Sensors I:

- Meteorlogical satellites
- Seasat
- Space Shuttle

(h) Satellites and Sensors II:

- Landsat
- MSS
- RBV
- Thematic Mapper

(i) Data Analysis:

- radiometric transformations
- spatial transformations
- spectral analysis
- comparison of qualitative and quantative techniques
- ground truth for remote sensing

Laboratory 6: Computer Analysis of Landsat imagery:

- image characteristics
- radiometric and spatial transformations
- enhancement and classification

II Remote Sensing Applications and Resource Management

(j) Remote Sensing in Agriculture and Forestry

- radiation and plant canopies
- vegetation stress
- crop management
- forest resource management

(k) Hydrological Resource Management

- hydrological parameters
- water penetration
- contaminent detection
- ground water, sediments and snow melt

(l) Geological Applications:

- photo-geology
- surficial mapping
- radar imagery
- multi-spectral techniques

(m) Terrain Analysis and Cultural Applications

- multispectral techniques
- photo interpretation
- spatial analysis and classification
- site mapping

TEXT: Lillesand, T.M. and R.W. Kiefer, Remote Sensing and Image Interpretation, John Wiley & Sons, Toronto, 1979

GENERAL SOURCES

Aird, W.J. and S.P. Pierce, 1976 Remote Sensing Data Summary, Ottawa, Environmental Conservation Directorate, Environmental Protection Service, Environment Canada, 5v.

Canadian Advisory Committee Reports on Remote Sensing, Energy, Mines and Resources, Ottawa, 1978 -

Canadian Journal of Remote Sensing, Ottawa, Canadian Aeronautics and Space Institute, 1975 -

Cihlar, J. CCRS Airborne Program Assessment: 2v. Analysis and User Reports Energy Mines and Resources, Ottawa, 1978.

Glen, J.W., R.J. Adie and D.M. Johnson (eds.) 1975 "Symposium on remote sensing in glaciology", Journal of Glaciology, Vol. 15, no. 73, pp. 1-482.

IEEE Transactions on Geoscience and Remote Sensing, New York, Institute of Electrical and Electronic Engineers

Kogan, R.M., I.M. Nazarov and S.D. Fridman, 1971 Gamma Spectrometry of Natural Environments and Formations: Theory of the Method Applications to Geology and Geophysics, Available from the U.S. Dept. of Commerce, National Technical Information Service, Springfield

Lintz, J. and D.S. Simonett, 1976 Remote Sensing of Environment, Addison-Wesley Publishing Company, Don Mills, Ontario

Lauder, D.R., 1959 Aerial Photographic Interpretation: Principles and Application, McGraw-Hill, New York

Meier, M.F.,,1979 "Remote Sensing of Snow and Ice" Technical Papers In Hydrology, No. 19, UNESCO

Photogrammetria, Elsevier, Amsterdam

Photogrammetric Engineering and Remote Sensing American Society of Photogrammetry, Falls Church

Proceedings of the First to Fourteenth International Symposia on Remote Sensing of Environment, Environmental Research Institute of Michigan, Ann Arbor

Reeves, R.G., A. Anson and D. Landen (eds.), 1975 Manual of Remote Sensing American Society of Photogrammetry, Falls Church

Remote Sensing in Canada C.C.R.S., Energy Mines and Resources, Ottawa V. 1 - V. 8

Science, American Association for the Advancement of Science, Washington, D.C.

Slama, C.C., C. Theurer and S.W. Henriksen, 1980 Manual of Photogrammetry, Fourth Edition, American Society of Photogrammetry, Falls Church

Smith, J.T. Sr. (ed.), 1968 Manual of Color Aerial Photography, American Society of Photogrammetry, Falls Church

Thompson, G.E. (ed.) 1974 "The Applications of Remote Sensing and Benefits to Canada" Proceedings of the Second Canadian Symposium on Remote Sensing, Energy, Mines and Resources, Ottawa

Thompson, G.E. (ed.) 1975 Third Canadian Symposium on Remote Sensing, Canadian Aeronautics and Space Institute, Ottawa

Thomson, K.P.B. (ed.) 1977 4th Canadian Symposium on Remote Sensing, Canadian Aeronautics and Space Institue, Ottawa

Veziroglu, T.N. (ed.) 1975 Remote Sensing: Energy Related Studies, John Wiley & Sons, Toronto

Wa, , D.S., 1973 Terrain Analysis: A Guide to Site Selection Using Aerial Photographic Interpretation, Dowden, Hutchinson and Rose Inc., Stroudsburg, Pennsylvania

Wenderoth, S. and E. Yost, 1975 Multispectral Photography Science Engineering Research Group, C.W. Post Center, Long Island University, New York

White, D. (ed.), 1972 "Resource Satellites and Remote Airborne Sensing For Canada", Proceedings of the First Canadian Symposium on Remote Sensing, Energy Mines and Resources, Ottawa

Zsilinszky, V.G., 1966 Photographic Interpretation of Tree Species in Ontario, Ontario, Department of Lands and Forests, Queen's Park, Toronto