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A

GUIDE TO

THE PAPERS OF

DR. O. R. SKINNER

MG 95

Prepared by Cheryl Avery, University of Saskatchewan Archives February 1992. Edited for
formatting, 2018.

MG 95 – Ray Skinner fonds

Dates: 1928-1990 (inclusive); 1970—1988 (predominant)

Extent: 5.2 m of textual records and sound recordings.

Biography: Orville Ray Skinner was born in Oshawa, Ontario, on 25 October 1927. He received a B.Sc. from the University of Toronto in 1950, and continued with postgraduate work at the Carnegie Institute of Technology, earning a M.Sc. in mathematics and Ph.D. in physics, in June and September of 1952 respectively. He taught briefly at the University of New York and worked at the National Research Council, Ottawa, prior to joining the faculty of the University of Saskatchewan in 1954 as a Postdoctoral Fellow. He was appointed Assistant Professor in 1956 and by 1968, had risen to the rank of Full Professor.

Dr Skinner was an extremely gifted teacher, able to explain abstractions of science simply and clearly. His teaching methods were innovative, combinations of the most effective methods used at other institutions; although he was not adverse to incorporating student suggestions and modifying his approach throughout his teaching career. He took considerable care with all his classes, developing methods of instruction and examination intended to foster real learning, and provided individual instruction or additional tutorials, as well as providing compassionate counselling, for both his undergraduate and graduate students. His teaching ability was recognised by the University in 1987, when it awarded him the Master Teacher Award.

As well as authoring two standard texts, Relativity and Mechanics, Skinner authored several papers and was frequently asked to review papers for scholarly journals. A physicist of international reputation, his research interests were varied, including early interest in the physics of ionospheric currents and collective motions in nuclei. He pioneered working on the combined space of position, velocity, and momentum, clarifying the relation of Hamiltonian and Lagrangian formulations of generalised mechanics, commonly known as the Dirac Constraint Theory. He had also begun work on a new approach to gauge field quantization, and shortly before his death, returned to research in the field of general relativity.

Although seriously ill with cancer, Dr. Skinner continued teaching until two weeks before his death. He died at his home in Saskatoon on 2 December 1988, at the age of 61.

Scope and Content: This fonds contains correspondence with colleagues, students and friends; subject files including information on the role of scientists in public affairs and education, nuclear energy, and labour relations; materials relating to various University of Saskatchewan committees and the Department of Physics; and work that was in progress at the time of Dr. Skinner's death.

Arrangement: This fonds has been organized into 6 series (series and subseries outlined in detail below):

I.	Correspondence	5
II.	Subject files	9
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Restrictions: Files marked as **RESTRICTED** require vetting by archivist prior to release. All restrictions are applied as per privacy legislation.

Donated by Edith Skinner, 1991.

No further accruals are expected.

Overview of fonds:

I. **Correspondence.** - 1963-1988. - 30.48 cm.

Series includes personal correspondence with colleagues within the international scientific community, friends, former students, and the general public.

II. **Subject Files.** — 1944—1988. — 71.12 cm.

Series consists of files on various topics of personal interest to Dr. Skinner, as well as material related to the University.

Organized into three subseries: General; University of Saskatchewan; and Physics Department.

a) **General.** - 40.64 cm.

Subseries contains material on various topics, including the role of scientists in public affairs and education, nuclear energy, labour relations, as well as files related to teaching physics, and national and international physics conferences, associations, etc.

b) **University of Saskatchewan.** - 1971-1980. - 10.16 cm.

Subseries contains files relating to the work of various university committees.

c) **Physics Department.** - 1959-1985. - 20.32 cm.

Subseries contains files relating to the Department of Physics, including its faculty, curriculum, and special lecture series.

III. **Teaching Material.** - 1.5 m

Series contains material used in teaching full and half classes in physics and astronomy at the University, including lecture notes, exams, and problems (with solutions), as well as notes, text, and transparencies for special lectures given at professional conferences, universities, and high schools.

Organized into two subseries: Classes, and Seminars and Lectures.

IV. **Research and Scholarly Work.** - 1969-1990. - 81.28 cm.

Series contains material related to Dr Skinner's research and publications, as well as material he was asked to review, etc.

Organized into four subseries: Papers Reviewed; Research Papers and Submissions; Research Notes; and Translations.

a) Papers Reviewed. - 1977-1985. - 5 folders.

Subseries consists of correspondence, review notes, and copies of articles written by others, and reviewed by Skinner for refereed journals.

b) Research Papers and Submissions. - 1969-1990. 30.48 cm.

Subseries consists of abstracts, articles, correspondence and some research notes relating to papers submitted for publication by Skinner.

c) Research Notes - [195?], 1977—1988. - 33 cm.

Subseries contains both published and unpublished research notes, including a "work in progress.

d) Translations – 4 folders

Subseries contains articles translated into English [by Dr Skinner.]

V. **Reference Material.** -1928-1988. - 2.1 m.

Series consists of lecture notes, reference articles and theses; some research notes and correspondence are included. Organized into six subseries: Lecture notes; Papers; Publications; Theses; University Teaching; Miscellaneous.

a) Lecture Notes. - ca. 1950-1959. - 20.32 cm.

Subseries contains lecture notes from classes attended by Dr Skinner at the Carnegie Institute, as well as printed notes from the Brandeis University summer institute in theoretical physics, National Research Council seminars, etc.

b) Papers. — 1928-1988. - 1 m.

Subseries contains hand-written and Xeroxed copies, as well as offprints, of research papers. Some files also contain correspondence, notes concerning alternate approaches to specific problems, and annotations.

Organized into four sections: Hand-written Copies; Subject; Alphabetical; Chronological.

- c) Publications. - 15.24 cm.
Subseries contains Xeroxes of published works; unavailable at the University Library.
- d) Theses. — 1951—1952. — 2 folders.
Subseries contains two theses, written by Dr Skinner's colleagues.
- e) University Teaching. - 1954-1974. - 4 folders.
Subseries contains newsletters, articles, and reports concerning teaching physics in a University environment.
- f) Miscellaneous. — 1952-1985. - 8 folders.
Subseries contains articles and papers on various subjects, including research in physics and scientific freedom.

VI. Addendum

Donations to the University Archives by Dr. E. Kennedy, Professor Emeritus (Physics), February and March, 1992.

I. Correspondence

1. Anderson, Joan.
1967-1968. - 1 folder.

2. Ansaldo, E.J.
1975-1977. - 1 folder.
Memorandum concerning Dr. Ansaldo's appointment and tenure at the University, together with correspondence and a paper by Ansaldo, "Uses of Synchrotron Radiation" (1977).

3. B - Miscellaneous.
1966, 1975-1977, 1988. - 1 folder.
Correspondence with students and colleagues.

4. Bedford, Donald.
1964-1970, 1975. - 1 folder.
Correspondence concerning the Physics department, availability of teaching positions, and copies of some of Bedford's papers.

5. Bernard, Douglas.
1972-1976, 1981.
Correspondence concerning areas of specialisation, etc.

6. Borinski, A.S.W.
1976. - 1 folder.
Correspondence concerning two papers by Dr. Borinski, "The Structural Relations of Space—Time Matter" and "The Structural Relation of a Field of Pure Gravitation...", and a discussion concerning the dimensionality of matter.

7. Busch, Jerry.
1975-1976. - 1 folder.
Correspondence regarding a legal case, for which Dr. Skinner was asked to provide expert opinion. Includes photographs, memorabilia.

8. C - Miscellaneous.
1972, 1976. - 1 folder.

9. Carbno, Collin.
1974-1983. - 1 folder.
Correspondence concerning the graduate program at U of S, and a discussion of special relativistic thermodynamics.
10. Carlberg, Ray.
1972. - 1 folder.
Correspondence with a former student, concerning continued readings in relativity.
11. D - Miscellaneous.
1970-1981. - 1 folder.
Includes correspondence regarding Skinner's text on relativity, general enquiries on Einstein and natural units of time, availability of courses in the Physics department, etc.
12. Edwards, J.C.
1971-1978. - 1 folder.
Correspondence and copies of articles written by Edwards, as well as correspondence between Skinner and Robert Stebbins concerning amateur astronomers and avocational science.
13. G - Miscellaneous.
1974-1982. - 1 folder.
Correspondence with former students and colleagues, as well as questions from the general public concerning Einstein's theory of relativity, and measuring the speed of tachyons.
14. Gregorash, Darryl.
1973-1979. - 1 folder.
Correspondence concerning postgraduate studies at the U of S, responses to questions raised in a joint paper, and a copy of a paper, "Weyl—Dirac Theory with Torsion."
15. Gupta, V.J.
1963-1975. - 1 folder.
Correspondence concerning Ph.D. work at the U of S, the completion of a joint paper, teaching at a university and community college, and the use of audio—visual material for instruction.
16. H - Miscellaneous.
1966-1972. - 1 folder.
Includes correspondence with Jacques Hebert, and a note from Gerhard Herzberg regarding the Nobel Prize.

17. Hawking, Stephen.
1988. - 1 folder.
Letter and two papers.
18. Houston, Margaret.
1974-1983. - 1 folder.
Correspondence and memoranda concerning the College Scholar program and the College of Medicine Special elective.
19. J - Miscellaneous.
1967-1968, 1973, 1977. - 1 folder.
20. Jmaeff, Andrew.
1963-1974. - 1 folder.
Correspondence concerning course of study at graduate school, high school teachers' salaries, etc.
21. K - Miscellaneous.
1966-1983. - 1 folder.
22. Kopczynski, W.
1975-1976. - 1 folder.
Correspondence concerning current research, including approaches to the problem of Kerr disc of spinning dust, and juncture conditions in the Einstein-Cartan theory. Included are hand and typewritten corrections to Skinner's paper on Juncture conditions.
23. M - Miscellaneous.
1966-1983. - 1 folder.
General correspondence plus two reference articles, "The General Limits of Space Travel" and "Starships and their Detectability."
24. Msezane, Alfred.
1966-1976. -1 folder.
Includes comments on South African society, and a "survey" on 'African Educability,' as well as discussions concerning graduate research in physics.
25. N - Miscellaneous.
1966-1980. - 1 folder.
26. Nester, James.
1976-1984. - 1 folder.

27. P - Miscellaneous.
1968-1985. - 1 folder.

Box 2

28. Papini, Giorgio.
1971, 1976. - 1 folder.
Correspondence concerning detection of gravitational waves, as well as miscellaneous correspondence concerning graduate students and postdoctoral fellowships.

29. R - Miscellaneous.
1966-1976. - 1 folder.
A response to questions concerning friction and gravity, as well as comments, including a page of notations, regarding coriolis coupling and integrable transformation.

30. Rusk, Raymond.
1973-1974. - 1 folder.

31. S - Miscellaneous.
1973-1975. - 1 folder.

32. Schild, Alfred.
1974-1978. - 1 folder.
Personal correspondence, together with obituaries.

33. Shepherd, Marion.
1970-1976. - 1 folder.
Correspondence regarding Ph.D. research, teaching at a university, together with notes, corrections and correspondence regarding a joint publication.

34. T - Miscellaneous.
1970, 1975-1976, 1985. - 1 folder.

35. Tift, W.
1977-1979. - 1 folder.
Correspondence regarding possible sabbatical at U of S, and joint research on non—Doppler redshift. Includes 2 slides of line galaxies ordered on bands, showing outer and nuclear structure.

36. Tomusiak, Ed. - **RESTRICTED**
1973-1974. - 1 folder.
Correspondence during sabbatical leave, commenting on research, the physics department, etc.
*restricted.
37. Trofimenkoff, Nick.
1964-1972, 1976. - 1 folder.
38. Trofimenkoff, Peter.
1970-1971. - 1 folder.
39. Webb, Ian.
1974-1976. - 1 folder.
Includes correspondence regarding research for a joint paper.
40. Weil, J.
1974-1976. - 1 folder.
Correspondence and memoranda concerning the possibility of a joint appointment in Physics and Chemistry, together with notes regarding research on a joint paper.

II. Subject Files

a) General

1. Astrology.
1978-1980. - 1 folder.
Correspondence and memoranda concerning an adult education course offered through the Board of Education Regional Community College, and an "astrology festival" aired by CKOM radio, together with articles on astrology.
2. Arts and Science.
1971, 1973, 1980. - 1 folder.
Miscellaneous memoranda.
3. Audio-Visual Services. n.d., 1970-1974. - 1 folder.
Includes a script prepared for Skinner's video on the principles of the slide rule; memos concerning physics department videos, and lists of slides and films available at DAVS.
4. Books Ordered - Personal.
1981-1984. - 1 folder.

5. Book Review
1981. - 1 folder.
Review of The Search for Gravity Waves, for the Journal of the Royal Astronomical Society of Canada.
6. Canadian Association of Physicists - Banff Summer School.
1972. - 1 folder.
Information on, and application to attend, the course on relativity, astrophysics and cosmology, together with correspondence with Werner Israel (University of Alberta).
7. Canadian Association of Physicists - Congress.
1971, 1975—1977. — 1 folder.
Includes abstract, negatives for Skinner's presentation, "Juncture Conditions in the Einstein—Cartan Theory," memos and correspondence concerning the University acting as host for the conference and Skinner chairing the theoretical physics section, papers, etc.
8. Canadian Association of Physicists - Prize Exam.
1970, 1973, 1986. — 1 folder.
Includes newsletters, correspondence, and sample examinations.
9. Cancer Lifeline.
1978—1979. - 1 folder. Correspondence, clippings, and notes, concerning the Cancer Lifeline support group, and Dr. Skinner's involvement with trying to retain Dr. Christopher Franks as Head of the Saskatoon Cancer Clinic.
10. Cavendish Experiment.
1953, 1957. - 1 folder.
Copies of Leybold Physics leaflets.
11. Clippings.
n.d., 1968-1981.- 1 folder.
Various articles concerning the nature of universities, education, the environment, feminism, public spending, etc.
12. Conciliation Board.
1971-1975. - 1 folder.
Correspondence, memoranda, and notes concerning two labour arbitration cases, between the Retail, Wholesale, and Department store Union (RWDSU) and the Saskatoon Co-operative Association; and Construction and General Workers' Union local 890 and CEL Contracting Ltd.

13. Conferences - General Relativity.
1974-1976, 1985. - 1 folder.
Information concerning various conferences on relativity, together with abstracts of papers.
14. Conferences - Meeting on European Collaboration in Physics.
April 1966. - 1 folder.
Publication: invited and introductory speeches.
15. Conferences - Texas Symposium.
1974-1982. - 1 folder.
Information on the symposia, together with memoranda outlining their value to Skinner's research.
16. Courses - Miscellaneous.
1974-1976. - 1 folder.
Includes correspondence, memoranda and reference material concerning course evaluations, curriculum, and the 1974 strike by CUPE.

Box 3

17. Curriculum Vitae.
1980-1985. - 1 folder.
18. Dimensions in Science.
1978. - 1 folder.
Correspondence concerning television programmes on science.
18. Graduate Students.
1962, 1986. - 1 folder.
A list of thesis Skinner advised, plus a copy of a thesis he acted as external reviewer on.
20. High School Teaching.
1971, 1979-1984. - 1 folder.
Correspondence with the Saskatoon Board of Education and the Saskatoon Science Teachers Society; invitations to speak to students, and abstracts of presentations.
21. Invitations.
1968, 1975-1977. - 1 folder.
Invitations to give lectures.

22. Joint Institute for Nuclear Research.
1958. - 1 folder.
Publication concerning USSR Institute.
23. Journals.
1971-1983. - 1 folder.
Correspondence with publishers concerning journal orders and subscriptions.
24. Journals - Library.
n.d., 1984-1985. - 1 folder.
Lists of journals in print, those ordered on interlibrary loan, etc.
25. Letters of Recommendation — Colleagues.
1965-1985. - 1 folder.
26. Letters of Recommendation - Students.
1959-1982. - 1 folder.
27. Master Teacher Award.
1987-1988. - 1 folder.
Correspondence and memoranda concerning the award; congratulations from students and colleagues.
- Memberships.
1975-1978. - 1 folder.
 - Miscellaneous.
1969-1983. - 1 folder.
 - Newsletters.
1969-1976. - 1 folder.
Includes issues of Committee on the Undergraduate Program in Math (CUPM) Newsletter, and Newsletter of the Forum on Physics and Society.
31. Nobel Prize.
1978. - 1 folder.
Skinner's nominations for the 1978 award.

32. Nuclear Energy.
1976-1977.- 1 folder.
Notes, memoranda and correspondence regarding the City of Saskatoon Environmental Advisory Committee and the disposal of radioactive wastes. Includes an article by Jacques Cousteau, "Peaceful and Warlike Atoms - Living without both."
33. Nuclear Power in Perspective.
n.d. - 1 folder.
Copy of an article by Henry Caplan.
34. Personal.
1944-1989.- 1 folder. Includes early school records, degrees, clippings from university, obituary and eulogies. Includes photographs of Skinner and university class photos.
35. Political.
n.d., 1951-1981. - 1 folder.
The material in this file concerns various aspects of the role of scientists in the public affairs, nuclear research and weapons, public education and the need for broad dissemination of information. Included are Alfred Schild's article, "On the Matter of Freedom: The University and the Physical Sciences;" a copy of a speech given by Skinner, "Freedom in Science;" and "A Nation at Risk: The Imperative for Educational Reform." See also Nuclear Energy and University Teaching.
36. Research Grants.
1969-1988. - 1 folder.
37. Requests for Papers.
1974-1984.- 1 folder.
Correspondence with colleagues and institutions, requesting copies of research articles.
38. Royal Astronomical Society of Canada.
n.d., - 1 folder.
Notes, possibly for a lecture.
39. University Teaching.
n.d. - 1 folder. Various articles.

b) University of Saskatchewan

1. College Scholar and Special Studies.
1971-1976. - 1 folder.
Correspondence, minutes and memoranda, together with abstracts and proposals for study from students.
2. College Library Committee.
1980. - 1 folder.
Notes, reports, correspondence and memoranda concerning the work of the committee, chaired by Skinner.
3. College Library Committee - Student Survey. - 1 folder.
Results of a survey taken by the USSU concerning student attitudes to space allocation in the library.
4. Committee on Improvement in Teaching.
1974-1977. - 1 folder.
Notes, memoranda, correspondence and reports concerning the activities of this committee, and the events leading Skinner to resign as Chair.
5. Committee on Improvement in Teaching - Evaluation and Improvement of Instruction.
1973-1974. - 1 folder.
Correspondence, memoranda, surveys and reports concerning evaluation of teaching; including a report prepared on behalf of the USSU, "Course and Instructor Evaluation."
6. Committee on Improvement in Teaching - Notes and Draft Reports.
[1975-1976]. - 1 folder.
7. Committee on Improvement in Teaching - Reference Material.
[1971]-1975. - 1 folder.
Various articles and reports, including the Report of the Special Committee on Instruction at the University Level.

Box 4

c) Physics Department

1. Acting Head and Head.
1975, 1982, 1984. - 1 folder.
Correspondence and memoranda concerning the search for, and appointment of, a department Head; including recommendations by staff members on requirements for the Head, and on the Physics department generally.
2. Comprehensive Examinations.
1964-1974. - 1 folder.
Copies of M.Sc. and Ph.D. examinations.
3. Comprehensive Examinations — Memorandum.
1968, 1974-1978. - 1 folder.
Memorandum concerning the purpose of the comprehensive examinations, together with a copy of an exam used at Princeton.
4. Curriculum.
n.d. - 1 folder.
Brief from students in the Physics Club, proposing changes to the honours curriculum.
5. Curriculum - Committee.
1971-1982. - 1 folder.
Memorandum, correspondence, and reports concerning the Physics curriculum; included is an article by Jean Dieudonne, "Should we teach 'modern' mathematics?"
6. Meetings.
1971-1978 - 1 folder.
Minutes and memoranda.
7. Miscellaneous
n.d., 1959-1985. - 1 folder.
Correspondence and memoranda, as well as a copy of "A course on introductory nuclear physics," and Dr. Skinner's self-evaluative essay on teaching.
8. Physics Building - Space Allocations.
1975-1976. - 1 folder.
Correspondence, notes, reports and memoranda concerning proposed allocation of space to Computing services and Anthropology.

9. Positions.
1974-1977. - 1 folder.
Correspondence and applications concerning positions within the department.
10. Positions - Gowdy, Robert H.
1977-1978. - 1 folder.
Correspondence and memoranda regarding Skinner's attempt to create a special appointment for Gowdy.
11. Postdoctoral Fellowships.
n.d., 1972-1981. - 1 folder.
Correspondence and applications for postdoctoral fellowships with Skinner.
12. Seminar Series.
1974-1975. - 1 folder.
Correspondence and memoranda regarding special seminars presented by the Department.
13. Seminar Series - Fujiwara, I.
1975. - 1 folder.
Correspondence regarding an invitation to Dr. Izuru Fujiwara to give a seminar; includes card bibliography.
14. Seminar Series - Physics for Fun.
November 1973. - 1 folder.
Includes draft copy and abstract of Skinner's presentation, "Cosmology - the Story of the Universe."
15. Teaching Assignments.
n.d., 1971-1979. - 1 folder.
Memoranda and lists of teaching duties for the faculty of the department.

III. Teaching Material

a) Classes

1. Astronomy 110 - Exams.
2. Astronomy 110 - Handouts.
3. Astronomy 110 - Problems.

4. Astrophysics 212.
 5. Astrophysics 311 -Exams.
 6. Astrophysics 311 - Lecture notes.
 7. Astrophysics 311 - Notes.
 8. Astrophysics 311 - Problems.
 9. Astrophysics 311 - Reference Articles.
 10. Astrophysics 311 - Review Notes.
 11. Cosmology - Notes - Chapters 1,2,3. - 1 folder.
Notes on Sciama's Modern Cosmology, concerning dimensional analysis and cosmic rays. Includes reference material, "The Red-shift," "The Evolutionary Universe," "Will the Universe Expand forever?" and "Pulsating Stars and Cosmic Distances."
 12. Cosmology – Notes - Chapters 4-13. - 1 folder.
Includes "Radio Astronomy," "The Search for Black Holes," "The Evolution of Quasars," etc.
 13. Cosmology - Notes - Chapters 12-16. - 1 folder.
Includes a questionnaire on the course, and reference material: "The Search for Extraterrestrial Intelligence," "A Message from Earth," etc.
 14. Cosmology – Correspondence
 15. Cosmology - Reference Articles. - 1 folder.
"Cosmology and Elementary-particle physics," "Gearing up to answer questions posed by the sun," "Gravity and its Astronomical Implications" (Skinner, 1974).
- Box 6**
16. Course Material - Laboratory guides. - 1 folder.
Draft notes, annotated copies of Physics 102 and 111 laboratory guides, for revision of texts.
 17. Course Material - Miscellaneous. - 1 folder.

Includes handouts on Classical Mechanics, Lagrange's Equations, the Hamilton Equations of Motion, and the Hamilton and Lagrangian formalism for fields.

18. Course Material - Physics Notes - Chapters 1-5 (100A). - 1 folder.
Notes on kinematics, dynamics, the application of Newton's Laws, Relativity in Newtonian Mechanics, and energy.
19. Course Material - Physics Notes - Chapters 1-5 (281). - 1 folder.
20. Course Material - Physics Notes - Chapters 2-5 (102). - 1 folder.
Notes on dynamics, conservation laws, etc.
21. Course Material - Physics Notes - Chapters 6-7 (100A). - 1 folder.
Notes on statistical mechanics, thermodynamics, and collective motions in wave bulk matter.
22. Course Material - Physics Notes - Chapters 6-7 (281). - 1 folder.
23. Course Material - Physics Notes - Chapters 1-7 [Draft 2]. - 1 folder.
Used for both Physical Sciences 100A and Physics 281.
24. Course Material - Physics Notes - Chapter 8. - 1 folder.
Notes on collective motions and waves in bulk matter. Full text used for Physics 217; pages used for physics 102 and 281.
25. Course Material - Physics Notes - Chapter 9. - 1 folder.
Notes on relativistic kinematics.
26. Course Material - Physics Notes - Chapters 10-15. - 1 folder.
Notes on special relativity theory (kinematics and dynamics), development of quantum theory, and quantum mechanics.
27. Course Material - Upper Atmosphere. - 1 folder.
Mimeographed material on the permittivity of magnetoactive plasma, radio wave propagation in ionized media, atmospheric, etc.
28. Geology 408 - Lecture Notes.
29. Geology 408 - Reference Articles.
30. Geology 408 - Transparencies.

31. Physical Sciences 100
32. Physical Sciences 100 - Class Evaluations.
33. Physical Sciences 100 - Memorandum.
34. Physical Sciences 100 - Notes.
35. Physical Sciences 100 - Solutions.
36. Physics 102 - Class Evaluations
37. Physics 102 - Exams. - 4 folders.
38. Physics 102 - Exams - Tutorial Tests.
39. Physics 102 - Exams - Qualifying Exams. - 2 folders.
40. Physics 102 - Exams - Qualifying Exams - Trig. Tests.

Box 8

41. Physics 102 - Exercises.
42. Physics 102 - Handouts.
43. Physics 102 - Memorandum.
44. Physics 102 - Miscellaneous Notes.
45. Physics 102 - Preparatory Notes, Outline.
46. Physics 102 - Problems. - 5 folders.
47. Physics 102 - Optional Problems.
48. Physics 102 - Review Problems.
 - i. Physics 102 - Review Notes.
49. Physics 102 - Transparencies. - 1971-1972. - 1 folder.

Box 9

50. Physics 102 - Transparencies. - 1972-1976. - 6 folders.
 - i. Physics 102 - Transparencies - Annotated Xeroxes. - 6 folders.
51. Physics 102 - Transparencies - Quantum Mechanics.
52. Physics 102 - Videotape Scripts.
53. Physics 111
54. Physics 111 - Exams.
55. Physics 111 - Problems.
56. Physics 120 - Exams
57. Physics 120 - Handouts.
58. Physics 120 - Lecture Notes. - 2 folders. Box 10
59. Physics 120 - Miscellaneous Notes.
60. Physics 120 - Problems.
61. Physics 120 - Reference.
62. Physics 120 - Review Articles.
63. Physics 120 - Review Notes.
64. Physics 332 - Class Evaluations.
65. Physics 332 - Exams.
66. Physics 332 - Handouts.
67. Physics 332 - Lecture Notes.
68. Physics 332 - Problems.
69. Physics 332 - Review Notes.
70. Physics 402 - Problems. - 3 folders.
71. Physics 432 - Class Evaluations.

Box 11

72. Physics 432 - Exams.
73. Physics 432 - General Relativity - Draft 1. - 2 folders.
74. Physics 432 - General Relativity - Draft 2. - 1 folder.
75. Physics 432 - Handouts.
76. Physics 432 - Lecture Notes.
77. Physics 432 - Miscellaneous Notes.
78. Physics 432 - Problems. - 2 folders.
79. Physics 432 - Reference articles.
80. Physics 432 - Review Notes.
81. Physics 432 - Thirring-Lense papers.
82. Physics (800-level). - n.d., 1959-1982. - 1 folder.
83. Physics 899 - Lecture Notes. 1986. - 1 folder.

b) Seminars and Lectures

1. Classical mechanics. 1979. - 1 folder.
Hand-written notes for optional 4th-year course.
2. Cosmology Seminars. - 1 folder.
Outlines of lectures, notes on slides and transparencies used for talks on neutron stars, white dwarfs, and black holes, references from the Hubble Atlas of Galaxies, etc.

Box 12

3. Cosmology Seminars - Miscellaneous Draft Notes.
4. Cosmology Seminars - Fragments of Cosmology. - 1 folder.
Hand-written lecture notes, etc.

5. Cosmology Seminars - Fragments of Cosmology - Stellar Aging. - 1 folder.
Mimeograph and hand-written notes, etc.
6. Cosmology Seminars - Illustrations. - 1 folder.
Drawings on graph paper.
7. Cosmology Seminars - Lecture Notes. - 1 folder.
Hand-written notes, concerning cosmology and specifically, the age of the universe, gravity, stellar aging, relativistic gravitation, and Einstein's theories.
8. Cosmology Seminars - Transparencies. - 2 folders. - 1 Oversize.
9. Einstein Centennial Lecture.
10. Einstein Centennial Lecture - Drafts.
11. Einstein Centennial Lecture - Reference Articles.
12. Generalised Hamiltonian Dynamics.
13. Generalised Hamiltonian Dynamics - Transparencies. -1 folder. - Oversize.
14. Joint International Science Conference. 1982. - 1 folder.
Includes conference information, typewritten notes on talk, "In the ERA of equal opportunities, common sense need not apply," various hand-written notes on liberal and vocational education, and reference material, including "Education for the Future," and "Education, Science, and National Economic Competitiveness."
15. Joint International Science Conference - Transparencies. 1982. - 1 folder.
- Oversize.
16. Matter and Curvature, spin and torsion. n.d. - 1 folder.
Subtitled, "and what we are doing with general relativity at the U of S."
Includes typewritten notes, outline, and transparencies.
17. Miscellaneous Notes. n.d. - 1 folder.
Hand-written notes on various topics, including feynman diagrams, tensors, Moller scattering, quantum mechanics of the photon, Dirac Equation, and quantization of the electromagnetic field.
18. Miscellaneous Transparencies. - 1 folder. - Oversize.

19. Origin of the solar system. 1974. - 1 folder.
Includes hand-written notes and typewritten final draft, as well as reference article, "The evolution of the solar system."
20. Physics Club. 13 November 1973. - 1 folder.
Typewritten text of talk on R.B. Partridge'-s "Absorber Theory of Radiation and the Future of the Universe," with transparencies.
21. Quantization and Gauge Theories. n.d. - 1 folder.
Hand-written notes and transparencies.
22. Quantization of Gauge Fields.
23. Quantizing Gravity without Constraints. - 1 folder.
Text of lecture, subtitled, "a progress report on a formulation of generalised dynamics different from that of Dirac and Bergmann."
24. Quantizing Gravity without Constraints -Transparencies. - 1 folder.
- Oversize.
Includes some notes.
25. Radiation Reaction and the Cosmological Arrow of time. n.d. - 1 folder.
Includes hand-written bibliography, outline, transparencies, and notes.
26. Space Travel. n.d. - 1 folder.
Hand-written notes on the space program, in light of social and environmental programs.

Box 13

IV. Research and Scholarly Work

a) Papers Reviewed.

1. American Journal of Physics. 1983-1984. - 1 folder.
Correspondence concerning reviews of "Inadequacy of the Usual Newtonian formulation..." and "Effect of Wind and Altitude on Record Performance...", together with a revised copy of that article.
2. Canadian Journal of Physics. 1983-1984. - 1 folder.
Correspondence concerning reviews of "Faster-than-light relativistic physics" and "The process of observation in a Minkowski space with multi-dimensional time," together with reference articles.

3. Journal of Mathematical Physics. 1977, 1980. - 1 folder.
Review, revised and annotated copies of "Change conservation in Metric-Torsion Gravitational Theories."
4. Physical Review. 1985. - 1 folder.
Review of "Charged spin fluid in the Einstein-Cartan theory," together with a copy of the article, and reference material.
5. Physical Review Letters. 1982-1984. - 1 folder.
Review of "Anomalies in Gravity-Coupled $Su(n)$ Yang-Mills Theory," together with reference articles.

b) Research Papers and Submissions

1. General Correspondence. 1975, 1978, 1985. - 1 folder.
Correspondence with publishers.
2. Concept of Time in Special Relativity. 1974-1975. - 1 folder.
Correspondence, together with a copy of the paper.
3. Generalised Einstein-Cartan Field Equations. 1976. - 1 folder.
Notes, drafts, and correspondence.
4. Generalised Functions. 1988. - 1 folder.
Correspondence, together with a copy of paper, "Electromagnetic fields and Dipolar Hyperfine Interactions Treated as Generalised Functions."
5. [Gravitation]. n.d., - 1 folder.
6. Gravitational Time. 1977. - 1 folder.
Correspondence, together with a copy of the paper.
7. Gravity and its Astronomical Implications. 1974 -1976. - 1 folder.
Correspondence regarding the article, as well as notes for a talk on the same subject. Drafts of the article are included.
8. Introduction to Relativistic Gravitation in Astrophysics and Cosmology. 1975-1976. - 2 folders.
Correspondence, notes and drafts.
9. JHP Papers. n.d., 1983, 1986-1987. - 1 folder.
Miscellaneous notes, plus copies of six papers.

Box 14

10. Junction Conditions. 1976-1977. - 1 folder.
Correspondence, research notes, and drafts of the paper.
11. A New Path-integral solution to the Schwinger model. 1990. - 1 folder.
12. On the Special Theory of Relativity. 1974-1975. - 1 folder.
Notes, correspondence, and a copy of the paper.
13. Referential. 1984-1985. - 2 folders.
Correspondence, research notes, reviews, together with copies of papers.
14. Relativity - Correspondence. 1969-1983. - 1 folder.
Correspondence with the publisher.
15. Relativity - Errata. n.d. - 1 folder.
List of corrections to text.
16. Relativity - Problems. - 1 folder.
Hand-written solutions to problems in the text.
17. Spin-Hamiltonian Energies. 1976. - 1 folder.
Correspondence, annotated copy of paper.
18. Stellar Aging. 1971-1974. - 1 folder.
Correspondence.
19. Weil Papers. - 1 folder.
Includes several papers co-authored by John Weil: "An Introduction to Generalised Functions...", "The Calculation of Magnetic Resonance Intensities with Diagram Techniques" (I and II), and "Spin-Hamiltonian Energies and State Vectors."
20. Weil Papers - Drafts and Notes. - 1 folder.
21. Weil Papers - Reference Material. - 1 folder.

Box 15

c) Research Notes

1. Weinberg. - 1 folder.
2. Notes to Paper I. 11 October - 29 December 1987. - 1 folder.

3. Integration over e.m. field with source term. 28 January - 5 March 1988. - 1 folder.
4. Calculations - Chiral, S.M. 4-d Fermions. 27 March - 24 May 1988. - 1 folder.
5. Form of Path Integral. 2 - 26 June 1988. - 1 folder.
6. Uncoupled 1st order Equations of Motion. 28 June - 13 August 1988. - 1 folder.
7. $S^{(0)}$ term in SE (solution from integration over fermion fields). 14 July - 3 August 1988. - 1 folder.
8. Correction to solution for Free Fermion fields. 20 - 22 August 1988. - 1 folder.
9. Annihilation and Creation Ops. 8 August - 1 September 1988. - 1 folder.
10. Interaction - Integration over e.m. fields. 2 September - 18 October 1988. - 1 folder.
11. $S^{(0)}$ term in SE (Solution from integration over e.m. fields). 23 October - 8 November 1988. - 1 folder.
12. Notes on Paper (Original). - 1 folder.
13. Widom [A.] - 1 folder.
Copy of "A simple physical view of the quantum electrodynamic Chiral anomaly," together with notes.
14. Notes on Papers. September 1988. - 1 folder.
15. Notes to Dittrich and Reuter...
16. Lin Gravity.
17. Notes on Johnson Paper.
18. Nash and Sen - Topology and Geometry for physicists.
19. Jackiw - Topological investigations of quantized gauge theories.
20. Jackiw - field theoretic investigations in current algebra.

21. Hydrodynamical Problem. [ca. 195?]. - 1 folder.

Box 16

22. Work in Progress - Chapter 1. - 1 folder.

Material for book on [magnetic resonance, possibly in co-operation with J. Weil.]

23. Work in Progress - Chapter 2. - 1 folder.

24. Work in Progress - Chapter 3. - 1 folder.

25. Work in Progress - Chapter 4. - 1 folder.

26. [J. Nester] Old Calculations. February - April 1977. - 1 folder.

[Material gathered for paper co-authored by Jim Nester.]

27. [J. Nester - Miscellaneous]. 1976-1980. - 2 folders.

28. [J. Weil - Miscellaneous]. - 1 folder.

[Material gathered for paper co-authored by J. Weil.]

29. [R. Rusk - Generalised Hamiltonian Dynamics.] - 1 folder.

[Material gathered for work done by R. Rusk.]

d) Translations

1. Differential Geometry and Analytic Mechanics.
2. Half Lives of Isomeric Nuclei.
3. Nuclear Fission in the Collective Model.
4. Relative Theory of Fluids and spin.

V. **Reference Material**

a) Lecture Notes

1. Advanced Quantum Mechanics - F.J. Dyson. 1951. - 1 folder.
Hand-written notes of lecture, given at Cornell University.

2. Collective Motion - Lipkin; Elliot. 1958,1959. - 1 folder.
Typewritten lecture notes, "Collective Motion in Many-Particle Systems," given by Harry Lipkin at Brandeis University, together with hand-written notes, "Collective Motions (Selon Elliott)."
3. Field Theoretic Methods - Julian Schwinger. 1959. - 1 folder.
Typewritten lecture notes, based on course given at Brandeis University.
4. Hard-Sphere Bose Gas and Liquid Helium - Kerson Huang. 1959. - 1 folder.
Typewritten lecture notes, MIT.
5. Introduction to Field Theory - Victor Weisskopf. 15 Sep 1958. - 1 folder.
Typewritten notes of series of lectures given to experimental physicists at CERN: European Organization for Nuclear Research.
6. Isotopic Spin. [195?]. - 1 folder.
Typewritten notes.
7. Lecture Notes for a Second Course in the Calculus - Carman Miller. n.d.- 1 folder. Typewritten notes.
8. Magnetohydrodynamics for Cosmic Fluids. [195?]. - 1 folder.
Hand-written notes.
9. Mechanics of Deformable Systems. [195?]. - 1 folder.
Hand-written notes; with annotations.
10. The Physical Interpretation of Quantum Mechanics and Bohm's Theory - T.Y. Wu. July 1951. - 1 folder. Copies of hand-written notes, from Theoretical Physics Seminar, National Research Council, Ottawa.
11. Quantized Fields I. [ca. 195?]. - 1 folder.
Hand-written and mimeographed notes on various topics, including "Quantum Field Theory," "Photons," "Interactions," "S—Matrix Expansion," "Compton Scattering," "Soluble Interactions," "Energy of the Coupled System," "Pair Theory, Classical," and "Behaviour of the Wave Matrix."
12. Quantum Theory of Angular Momentum - (Rose). [ca. 195?]. - 1 folder.
Hand-written notes, annotated and cross—referenced.
13. Scattering Theory Seminars - F. Low and G.F. Chew. 1953. - 1 folder.

Typewritten, mimeographed lecture notes, together with Skinner's hand-written notes on the seminars.

14. Theory of Superconductivity - L.N. Cooper. 1959. - 1 folder. Typewritten notes of lecture, together with hand-written notes, "Bosons and Fermions [Dirac]," "Introduction to Bogdiulov canonical transformation method [Belyaev]" and "Application of Canonical Transformation Method to Nuclei [Belyaev]."
15. Weak Interactions - E.C.G. Sudarshan. 1959 - 1 folder Typewritten notes based on series of lectures given at the summer Institute in Theoretical Physics, Brandeis University.

b) Papers

i) Hand-written

1. n.d.,1928-1941. - 1 folder.

Box 18

ii) Hand-written

2. 1942-1985. - 3 folders.
3. 1942-1985. - 3 folders.
4. 1942-1985. - 3 folders.
5. Boundary Value problems (George Habetter). [ca. 1950]. - 1 folder.

iii) Subject

1. Anomaly 1955-1969, 1983-1986. - 1 folder.
1986-1988. -1 folder.
2. Bob [?] 1985. - 1 folder
includes correspondence, research notes, commentary on other current research, and reference articles.
3. BRS [Becchi-Rouet-Stora Symmetry]. 1977-1985. - 1 folder.
4. Case. 1975-1984. - 1 folder.
5. Commutators. 1973-1975. - 1 folder.
6. Costa et al. [M.E.V. Costa, Brazil]. 1985. - 1 folder.
Includes brief notes on Costa's findings, as well as correspondence.
7. Dirac-B. 1982-1984. - 1 folder.

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8. Fujikawa. 1979-1988. - 1 folder.
9. Gauss' Law. 1985-1987. - 1 folder.
10. General [Relativity].
1960-1983. - 1 folder.
1984-1986. - 1 folder.
1987. - 1 folder.
1988. - 1 folder.
11. Hyperfire Structure. 1929, 1936, 1955. - 1 folder.
12. Jackiw. 1986-1988. - 1 folder.
13. Lattice.
1974-1982. - 1 folder.
1983-1988. - 1 folder.
14. Linearized. 1947-1984. -1 folder.
Includes research notes.

Box 20

15. $M > 0$. 1960-1983.- 1 folder.
16. Path Integral. 1960-1988. - 1 folder.
Includes research notes.
17. Propagator. 1978-1988. - 1 folder.
18. Quantization.
n.d., 1967-1982. - 1 folder.
1984-1986. - 1 folder.
1987. - 1 folder.
1988. - 1 folder.
19. Review.
n.d. - 1 folder.
n.d., 1974 - 1 folder.

Box 21

- 20. Review. 1978-1986. - 1 folder.
- 21. Spin. 1977-1984. - 1 folder.
- 22. Strings [String Theory]. 1985-1987. - 2 folders.
- 23. Strong-Coupling. 1979-1985. – 1 folder.
- 24. To Read. n.d., 1972, 1980-1986. - 1 folder.
Includes papers on Linear Symplectic relations, quantum field theory, cosmology and particle practice, and black holes, etc.

iii. Alphabetically (by author)

n.d., 1930-1984. - 22 folders; 25 cm.

c) A - F.

Box 22

d) G-Z.

iv. Chronologically

nd., 1930-1986. - 24 folders; 40.64 cm.

n.d. - 1969.

Box 23

1970 - 1982.

Box 24

1983 - 1985.

c) Publications

1. Applications of Global Analysis in mathematical physics.
2. Constrained Hamiltonian System.
3. Differential Invariants of Generalised Spaces.
4. Geometrie des Groupes des Transformations.

Box 25

5. Non-Riemannian Geometry.
6. Relativity, gravitation and world structure.
7. Riemannian Geometry.
8. Schouten, J.A.
9. Schwerkraft und weltall.
10. Structure des systems dynamiques.

d) Theses

1. The Dispersion Relation for Light and Its Application to Problems Involving Electron Pairs. 1952. - 233 pages. John Sampson Toll's doctoral thesis from Princeton University.
2. On the Quantization of the Gravitational Field of General Relativity. 31 May 1951. - 91 pages. Felix A.E. Pirani's doctoral thesis from the Carnegie Institute of Technology.

Box 26

e) University Teaching

1. General. 1954-1974
2. Commission on College Physics - Newsletter. 1962-1971. - 1 folder.
3. Commission on College Physics - Reports. 1962-1972. - 1 folder.

f) Miscellaneous

1. General. 1952-1985.
2. Angular Momentum and Its Conservation.
3. Investment in Man (Ashby, Eric). 1963. - 1 folder.
4. Practical Astronomy with your Calculator.

5. The Relativistic Spherical Top. (Hanson, A.J.). 1974. - 1 folder.
6. Scientific Freedom and Responsibility.
7. The Sin-Gordon Equation. (Rubinstein, J.).\
8. Singularities and the Geometry of Space-Time (Hawking, Stephen). 1966.

Box 27

Addendum

- Relativity and Mechanics, donated by Dr. E. Kennedy, Professor Emeritus (Physics), February 1992.
- Astronomy and Creationism. 1 December 1982. - 1 folder.
- Memo, plus copy of article by David Morrison, University of Hawaii.