

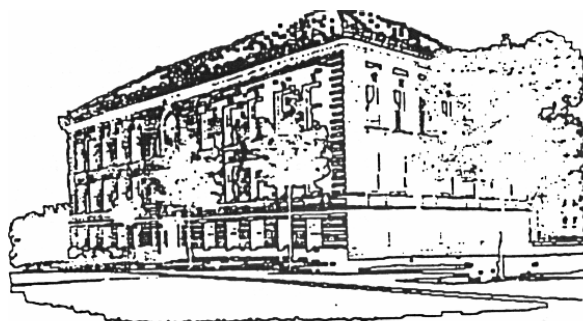
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Physics at a Research University

Case Western Reserve 1830 – 1990

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The author, the Case Physics Department, and the College of Arts and Sciences thank Dr. Sherwood L. Fawcett for his support in making the publication of this history possible. Dr. Fawcett, in 1950, was the third student to earn a physics doctorate at Case. Under the direction of Professor Eugene Crittenden, Sherwood Fawcett designed the electron beam extraction system for the Case Betatron accelerator. Upon graduation, Dr. Fawcett spent his entire career at Battelle Memorial Institute, the last seventeen years as President and Chief Executive Officer.

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2006

Library of Congress Cataloging in Publication Data
LCCN 2005933988

Fickinger, William J.
Physics at a research university: Case Western Reserve 1830-1990

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The sources of all illustrations are listed in Appendix H.

ISBN 0-9773386-0-6

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Introduction

This is about physics research at Case Western Reserve University. Teachers of “natural science”, later called “physics”, have long understood that science is an ongoing process and that the pursuit of research in the university helps to keep the teachers up to date and their teaching interesting.

There are currently about three dozen private, research-oriented, American universities which have physics faculties of twenty or more members. With the exception of the Ivy League schools, most of these began in the 19th century as either church-affiliated or technical schools. Typically, each began with one or two professors of natural science. In the 20th century, all these departments expanded rapidly, partly to teach growing numbers of engineers and scientists, and partly to participate in the exciting developments in experimental and theoretical physics.

Case Western Reserve University was formed in 1967 by the federation of Case Institute of Technology and Western Reserve University. It is probably unique in having its origins in both types of progenitor institution. Its physics department is similar in history, size, and research activities to the majority of the departments in the group of three dozen. It grew from one professor in 1830 to about 25 today. Its story describes the passage from research in meteorology, astronomy, optics and acoustics in the 19th century to experimental and theoretical atomic, nuclear, condensed matter, particle and astrophysics in the 21st.

I retired at the end of 1999, after thirty-two years on the CWRU physics faculty. Since then, I have become interested in tracing the lines of experimental and theoretical research done by my predecessors and colleagues. Much of this interest comes from working in the building which has been a home to the department for 100 years and the fact that I have recently taken responsibility for many of the artifacts and archival materials which have collected in it.

This project was begun with the intention of making a list of people and research areas for the history page of our departmental website. It soon went beyond that as I read through materials in the University Archives and other documents which have survived within the department. This book is more an informal story than a scholarly project. I concentrate on the physics, rather than on the physicists; on research, rather than on teaching. I describe work our faculty did while they were members of the department, with only the few necessary comments on what they did elsewhere, before and after. I include experimental details and actual data from the principal publications to help the reader understand the techniques used and appreciate the significance of the results. I include in the running text the titles and references of selected publications. Each title gives the author's best description of the work and the journal name gives a measure of the importance of the research. I frequently insert italicized “*asides*” which offer definitions of technical terms or explanations of the theory or experiment to help the non-physicist reader make sense of the story.

The first job is to find out who the players were and when they were part of the department. The following “*departmental tree*” shows roughly when each physicist was on the scene. I include only those who were assistant professor or higher, and who remained for three years or more. I apologize to the hundred-or-so hard-working instructors and to the score of folks who picked up stakes after a shorter stay. The list is still as long and as hard to remember as the cast of characters in a Russian novel. The reader might find it useful to come back to these pages from time to time, better to place a name or a date. The lines under the names mark the years spent on the faculty. The corresponding chapter numbers are to the right of each name. The three separate lists include, respectively, the people who started at Western Reserve, at Case, or at Case Western Reserve.

CASE INSTITUTE OF TECHNOLOGY PHYSICS FACULTY

1865 70 75 80 85 90 95 1900

Michelson Reid Miller > Ch 3, 4

1900 05 10 15 20 25 30 35 40 45 50

< Miller Ch 4

Hodgman Ch 4

Albright Ch 4

Wallace Ch 4

Nusbaum Ch 4

Shankland >

Olsen Ch 7

Crittenden Ch 7

Shrader >

Smith >

50 55 60 65 70 75 80 85 90 95 00

< Shankland Ch 6

< Shrader Ch 7

< Smith Ch 7

Gregg Ch 7

< Hoffman Ch 12

Foldy Ch 9

< Klein Ch 9

< Crouch Ch 8

Milford Ch 9

Reitz Ch 9

Benade Ch 12

Gordon Ch 12

Eck Ch 12

Reines Ch 8

Frye Ch 8

Jenkins Ch 8

Thaler Ch 9

Tobocman Ch 9

Scharenberg Ch 7

PTaylor > Ch 17

Kowalski > Ch 13

Schuele > Ch 12

Nagarajan Ch 13

Coopersmith Ch 17

Leff Ch 17

50 55 60 65 70 75 80 85 90 95 00

CASE WESTERN RESERVE UNIVERSITY PHYSICS FACULTY

60	65	70	75	80	85	90	95	00	05
<u>Woods</u>									Ch 8
<u>Blanpied</u>									Ch 16
<u>Frisken</u>									Ch 16
<u>Huang</u>									Ch 14
<u>Jha</u>									Ch 14
<u>Pearle</u>									Ch 13
<u>Wang</u>									Ch 8
<u>Reichert</u>									Ch 14
<u>Silvert</u>									Ch 17
									<u>Fickinger</u> Ch 16
									<u>Willard</u> Ch 16
									<u>Kantor</u> Ch 12
									<u>Kikuchi</u> Ch 16
									<u>Rix</u> Ch 13
									<u>Dahm</u> Ch 15
									<u>Segall</u> Ch 17
									<u>Sullivan</u> Ch 16
									<u>Bevington</u> Ch 16
									<u>Brown</u> > Ch 13
									<u>Shakin</u> Ch 13
									<u>Albats</u> Ch 8
									<u>Baer</u> Ch 16
									<u>Eisner</u> Ch 16
									<u>Koga</u> Ch 8
									<u>Chottiner</u> > Ch 12
									<u>Petschek</u> > Ch 17
									<u>Rosenblatt</u> > Ch 18
									<u>CTaylor</u> > Ch 18
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									<u>Kash</u> > Ch 18
									<u>Mathur</u> > Ch 18
									<u>Starkman</u> > Ch 18
									<u>Akerib</u> > Ch 18
									<u>Lambrecht</u> > Ch 17
									<u>Vachaspati</u> > Ch 18
									<u>Covault</u> > Ch 18
									<u>Ruhl</u> > Ch 18
									<u>Shan</u> > Ch 18
									<u>Shutt</u> > Ch 18

Acknowledgements

Members of the staff of the Case Western Reserve University archives have been especially helpful in finding information on the pre-1950 departments. I much appreciate the cooperation of the former archivist Dennis Harrison and of current staff members, Thomas Steman and Helen Conger.

Portions of the text have been read by many of my colleagues, some emeritus and some still teaching. Let me list here the faculty members who, by email or in person, were kind enough to read selections of my text and to make valuable suggestions. I especially appreciated the “first-person” stories and anecdotes which have added to the narrative. Among the original Western Reserve faculty, I have been able to contact Leonard Kisslinger in Pittsburgh, Berol Robinson in Paris, and Chandrasekhar in Munich. Stefan Machlup and David Farrell suggested many improvements. Emeriti readers from the Case side included particle experimentalists Marshall Crouch, Glenn Frye, and Tom Jenkins. From the “middle generation” Case condensed matter folks were Bill Gordon, Tom Eck, and later Arnie Dahm, Gary Chottiner and Jie Shan. I appreciate the guidance of theorists Bill Tobocman, Ken Kowalski, Phil Taylor, Bob Brown, Rolfe Petschek, Ben Segall, and Walter Lambrecht.

I thank the family of Les Foldy for permission to include among the appendices two documents which he made available to the department: his essay on the Foldy-Wouthuysen transformation (Appendix G) and his list of CWRU connections to the 1993 APS centennial list of “most cited papers” (Appendix E). I thank Lawrence Krauss, Cyrus Taylor and the other members of the physics faculty for their support.

Finally, I thank Dr. Sherwood L. Fawcett (PhD Case Institute of Technology – 1950) for making it possible for the physics department to send a gift copy of the book to each of our physics alumni.

William Fickinger, Cleveland 2006