CHEMICAL HERITAGE FOUNDATION

DANIEL E. GOTTSCHLING

The Pew Scholars Program in the Biomedical Sciences

Transcript of an Interview
Conducted by

Andrea R. Maestrejuan
at

Fred Hutchinson Cancer Research Center
Seattle, Washington

on

8, 9, and 10 December 1997

From the Original Collection of the University of California, Los Angeles

ACKNOWLEDGEMENT

This oral history is part of a series supported by a grant from the Pew Charitable Trusts based on the Pew Scholars Program in the Biomedical Sciences. This collection is an important resource for the history of biomedicine, recording the life and careers of young, distinguished biomedical scientists and of Pew Biomedical Scholar Advisory Committee members.

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REFORMATTING:

Holly Polish, Program Intern, Oral History, Chemical Heritage Foundation. B.A. History, American University.

David J. Caruso, Program Manager, Oral History, Chemical Heritage Foundation. B.A., History of Science, Medicine, and Technology, Johns Hopkins University; PhD., Science and Technology Studies, Cornell University.

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This Interview Agreement is made and entered into this 20th day of May, 1998 by and between THE REGENTS OF THE UNIVERSITY OF CALIFORNIA, a California corporation, on behalf of the Oral History Program at the UCLA campus, hereinafter called "University," and DANIEL E. GOTTSCHLING, having an address at Fred Hutchinson Cancer Research Center, 1100 Fairview Avenue North, Mailstop A3-025, P.O. Box 19024, Seattle Washington 98109-1024, hereinafter called "Interviewee."

Interviewee agrees to participate in a series of University-conducted tape-recorded interviews, commencing on or about December 8, 1997, and tentatively entitled "Interview with Daniel E. Gottschling" This Agreement relates to any and all materials originating from the interviews, namely the tape recordings of the interviews and a written manuscript prepared from the tapes, hereinafter collectively called "the Work."

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Los Angeles, California 90095-1406

Attention: Ms. Carli V. Rogers
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If to Interviewee:

Daniel E. Gottschling
Fred Hutchinson Cancer Research Center
1100 Fairview Avenue North
Mailstop A3-025
P.O. Box 19024
Seattle, Washington 98109-1024

University and Interviewee have executed this Agreement on the date first written above.

INTERVIEWEE

Daniel E. Gottschling
(Signature)

Daniel E. Gottschling
(Typed Name)

Fred Hutchinson Cancer Research Center

1100 Fairview Avenue North
(Address)

Seattle, WA 98109-1024

Date Dec. 8 '97

THE REGENTS OF THE UNIVERSITY OF CALIFORNIA

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Date 5/26/98

Pew Scholars in the Biomedical Sciences

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Daniel E. Gottschling

Daniel E. Gottschling, Ph.D.

Jan 15, 2008

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DANIEL E. GOTTSCHLING

1955 Born in Gary, Indiana on 28 May.

Education

1977 B.A., Augustana College
1980 M.S., University of Colorado, Boulder
1984 Ph.D., University of Colorado, Boulder

Professional Experience

Fred Hutchinson Cancer Research Center, Seattle, Washington
1984-1988 Postdoctoral Fellow
1996-present Full Member

Western State College of Colorado, Gunnison, Colorado
1981-1982 Instructor, Department of Chemistry

University of Chicago, Department of Molecular Genetics and Cell Biology,
1989-1994 Assistant Professor
1994-1996 Associate Professor

Honors

1991-1995 Pew Scholars Program in the Biomedical Sciences Grant
1995 National Academy of Sciences Award in Molecular Biology
1995-1997 Fletcher Scholar of the Cancer Research Foundation

Selected Publications

Kruger, K. et al., 1982. Self-splicing RNA: Auto-excision and autocyclization of the ribosomal RNA intervening sequence of *Tetrahymena. Cell* 31:147-57.

Gottschling, D.E. et al., 1983. Different nucleosome spacing in transcribed and non-transcribed regions of the ribosomal RNA gene in *Tetrahymena thermophila. Nucleic Acids Research* 11:2093-109.

Gottschling, D.E. and T.R. Cech, 1984. Chromatin structure of the molecular ends of

Oxytricha macronuclear DNA: Phased nucleosomes and a telomeric complex. *Cell* 38:501-10.

Gottschling, D.E. and V.A. Zakian, 1986. Telomere proteins: Specific recognition and protection of the natural termini of *Oxytricha* macronuclear DNA. *Cell* 47:195-205.

Gottschling, D.E. and V.A. Zakian, 1988. DNA-protein interactions at telomeres in ciliated protozoans. In *Advances in Cell Biology,* Vol. 2, ed. K.R. Miller. Stamford, Connecticut: JAI Press, 291-307.

Gottschling, D.E. et al., 1990. Position effect at *S. cerevisiae* telomeres: Reversible repression of Pol II transcription. *Cell* 63:751-62.

Aparicio, O.M. et al., 1991. Modifiers of position effect are shared between telomeric and silent mating- type loci in *S. cerevisiae. Cell* 66:1279-87.

Gottschling, D.E., 1992. Telomere proximal DNA in *S. cerevisiae* is refractory to methyltransferase activity *in vivo. Proceedings of the National Academy of Sciences USA* 89:4062-65.

Wright, J.H. et al., 1992. *Saccharomyces* telomeres assume a non-nucleosomal chromatin structure. *Genes and Development* 6:197-210.

Renauld, H. et al, 1993. Silent domains are assembled continuously from the telomere and are defined by promoter distance and strength, and by *SIR3* dosage. *Genes and Development* 7:1133-45.

Aparicio, O.M. and D.E. Gottschling, 1994. Overcoming telomeric silencing: A transactivator competes to establish gene expression in a cell cycle dependent way. *Genes and Development* 8:1133-46.

Singer, M.S. and D.E. Gottschling, 1994. *TLC1:* Template RNA component of S*accharomyces cerevisiae* telomerase. *Science* 266:404-409.

Sandell, L.L. et al., 1994. Transcription of a yeast telomere alleviates telomere position effect without affecting chromosome stability. *Proceedings of the National Academy of Sciences USA* 91:12061-65.

Parthun, M.R. et al., 1996. The major cytoplasmic histone acetyltranferase in yeast: Links to chromatin replication and histone metabolism. *Cell* 87:85-94.

Huang, H. et al., 1997. The ubiquitin-conjugating Rad6 (Ubc2) is required for silencing *Saccharomyces cerevisiae. Molecular and Cell Biology* 17:6693-99.

ABSTRACT

Daniel E. Gottschling and his younger sister were born in Gary, Indiana. Their father was first an engineer and then in middle management at Bell Systems; their mother was an architect until she had children. Daniel attended a Lutheran school until the family moved when Daniel was in junior high school. Woods near his house provided free-time entertainment; there he began his interest in science by collecting spiders. Both sets of grandparents lived nearby, and the families were very close. Daniel spent a great deal of time with adults, listening to their stories and absorbing their experiences (and incidentally learning to shoot pool).

When Daniel was beginning junior high school the family moved to nearby Portage, Indiana, where Daniel began public school. Although he did not like school and was often sick, he did well, especially in science and mathematics. In eighth grade he had a wonderful biology teacher who knew about spiders, but otherwise Daniel was academically uninspired. He took up violin, began singing in a choir, and acted in all his high school plays. He and two friends formed a rock band that did very well, even playing at Earl of Old Town in Chicago, backup for Steve Goodman.

Not sure where to go to college, he visited a friend at Augustana College and decided to go there. He had to drop out of his rock band, but at college he immediately joined a choir, which practiced every day and travelled all over the world, and formed another rock band, all while studying and engaging in philosophical and historical discussions with faculty and fellow students. His chemistry and mathematics classes were excellent, and he chose chemistry as his major. He did not think much about where this was all leading until near the end of college, when he decided he did not want to be a doctor and might want to be a scientist. He was accepted into graduate school at the University of Colorado in Boulder. He helped new faculty member Thomas Cech set up his lab and set to work there. When Gottschling blew up the microwave in the lab and when his experiments were not working out well, he was discouraged and accepted a one-year job at Western State College of Colorado in Gunnison, Colorado, where he taught introductory chemistry. He liked teaching, but found that he liked the bench better and went back to Cech's lab to work on ciliate chromosomes, finally focusing on telomeres. When he saw Seattle he loved it and accepted a postdoc at the Fred Hutchinson Cancer Research Center, working on ciliate telomeres in Virginia Zakian's yeast genetics lab.

Eventually Gottschling accepted an assistant and then an associate professorship at the University of Chicago, leaving behind his ciliates and moving into yeast and epigenetics. After seven years he opted for less teaching and more bench work at the Fred Hutchinson Cancer Research Center, where he continues his research on yeast, believing that if one starts at one end and burrows through to the other end of something he can learn how that something works. Gottschling has won the Pew Scholars in the Biomedical Sciences Award and the National Academy of Sciences Award in Molecular Biology. He still loves music, though he has less time for it than he would like. He teaches in the Science-Education-Partnership (SEP), run by Barbara Berg. And, of course, he continues his beloved benchwork.

UCLA INTERVIEW HISTORY

INTERVIEWER:

Andrea R. Maestrejuan, Interviewer, UCLA Oral History Program; B.S., Biological Sciences, University of California, Irvine, 1986; M.A., History, University of California, Riverside, 1991; C.Phil., History, University of California, Riverside.

TIME AND SETTING OF INTERVIEW:

Place: Gottschling's office, Fred Hutchinson Cancer Research Center.

Dates, length of sessions: December 8, 1997 (147 minutes); December 9, 1997 (84) ; December 10, 1997 (117).

Total number of recorded hours: 5.8

Persons present during interview: Gottschling and Maestrejuan.

CONDUCT OF INTERVIEW:

This interview is one in a series with Pew Scholars in the Biomedical Sciences conducted by the UCLA Oral History Program in conjunction with the Pew Charitable Trusts's Pew Scholars in the Biomedical Sciences Oral History and Archives Project. The project has been designed to document the backgrounds, education, and research of biomedical scientists awarded four-year Pew scholarships since 1988.

To provide an overall framework for project interviews, the director of the UCLA Oral History Program and three UCLA faculty project consultants developed a topic outline. In preparing for this interview, Maestrejuan held a telephone preinterview conversation with Gottschling to obtain written background information (curriculum vitae, copies of published articles, etc.) and agree on an interviewing schedule. She also reviewed prior Pew scholars' interviews and the documentation in Gottschling's file at the Pew Scholars Program office in San Francisco, including his proposal application, letters of recommendation, and reviews by Pew Scholars Program national advisory committee members. For technical background, Maestrejuan consulted J.D. Watson et al., *Molecular Biology of the Gene.* 4th ed. Menlo Park, CA: Benjamin/Cummings, 1987, Bruce Alberts et al., *Molecular Biology of the Cell.* 3d ed. New York: Garland, 1994, and Horace F. Judson, *The Eighth Day of Creation.* New York: Simon and Schuster, 1979.

The interview is organized chronologically, beginning with Gottschling's childhood in Gary, Indiana, and continuing through his graduate work at University of Colorado, Boulder, his postdoc at the Fred Hutchinson Cancer Research Center, and the establishment of his own labs at the University of Chicago and then at the Fred Hutchinson Center. Major topics discussed include Gottschling's association with Thomas R. Cech, his deciphering of the chromosome structure in *Tetrahymena,* his work on the telomere position effect, and his interest in educating

the public on scientific matters.

ORIGINAL EDITING:

Gail Ostergren, editorial assistant, edited the interview. She checked the verbatim transcript of the interview against the original tape recordings, edited for punctuation, paragraphing, and spelling, and verified proper names. Words and phrases inserted by the editor have been bracketed.

Gottschling reviewed the transcript. He verified proper names and made minor corrections and additions.

William Van Benschoten, editor, prepared the table of contents, biographical summary, and interview history. Ödül Bozkurt, editorial assistant, compiled the index.

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