

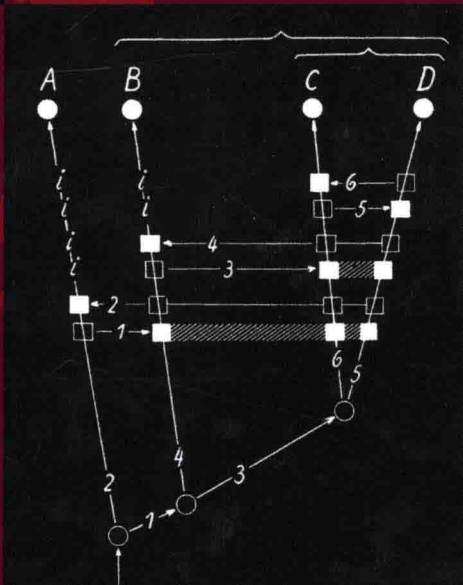


Michael Schmitt

# From Taxonomy to Phylogenetics

*– Life and Work of  
Willi Hennig*

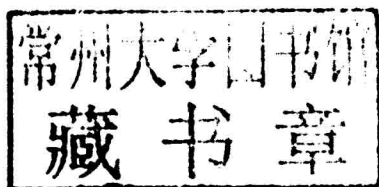
BRILL



# From Taxonomy to Phylogenetics—Life and Work of Willi Hennig

*By*

Michael Schmitt



BRILL

LEIDEN • BOSTON

2013

This publication has been typeset in the multilingual "Brill" typeface. With over 5,100 characters covering Latin, IPA, Greek, and Cyrillic, this typeface is especially suitable for use in the humanities. For more information, please see [www.brill.com/brill-typeface](http://www.brill.com/brill-typeface).

ISBN 978-90-04-21928-1 (hardback)

ISBN 978-90-04-21929-8 (e-book)

Copyright 2013 by Koninklijke Brill NV, Leiden, The Netherlands.

Koninklijke Brill NV incorporates the imprints Brill, Global Oriental, Hotei Publishing, IDC Publishers and Martinus Nijhoff Publishers.

All rights reserved. No part of this publication may be reproduced, translated, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, photocopying, recording or otherwise, without prior written permission from the publisher.

Authorization to photocopy items for internal or personal use is granted by Koninklijke Brill NV provided that the appropriate fees are paid directly to The Copyright Clearance Center, 222 Rosewood Drive, Suite 910, Danvers, MA 01923, USA.

Fees are subject to change.

This book is printed on acid-free paper.



Printed by Printforce, the Netherlands

From Taxonomy to Phylogenetics  
Life and Work of Willi Hennig

For Wolfgang, Bernd, and Gerd Hennig

## ACKNOWLEDGEMENTS

The roots of this book lay in 2008, when Michiel Thijssen from Brill Publishers and I met during the 23rd International Congress of Entomology in Durban (South Africa). While having a chat, I mentioned that Willi Hennig's centenary will be in 2013. Michiel spontaneously suggested that Brill should publish an "authoritative" book on Willi Hennig on that occasion, and invited me to author this book. I had already published some smaller papers on Hennig, and thought I could translate (as most are in German) and combine them, and agreed. For these smaller papers, I used information by many people whom I acknowledged in the respective publications. I want to mention them generally here to emphasise that the present book bases at a considerable degree on their earlier contributions.

Michiel Thijssen, Sabine Steenbeek, and Tessel Jonquière from Brill Publishers always encouraged me, always considered my suggestions, never raised any difficulties for me. I am grateful for this easy co-operation.

Many people and institutions helped me to collect the information, hidden either in public or private archives, or in their memories. Most of all I thank Willi Hennig's three sons, Prof.Dr. Wolfgang Hennig (Kranenburg), Dr. Bernd Hennig (Freiburg im Breisgau), and Gerd Hennig (Tübingen) for providing documents, photographs, verbal information, and critique. Through their help, I could read, copy, and cite piles of up to now unknown documents. They scanned diaries, photographs, notes and whatever they found in their fathers bequest for me. Most of the biographic details given in this book would remain unseen to the public without their support. Moreover, they read and commented on several stages of the manuscript of the present book up to the final.

Prof. Dr. Willi Xylander (Senckenberg Museum für Naturkunde Görlitz) made available documents and photographs from the Willi Hennig-Archive, Görlitz, Ute Kaczinski (Archive of the Senckenberg Deutsches Entomologisches Institut—SDEI, Müncheberg) helped me with documents and photographs from the archive of the SDEI, Walter Pietrusziak (Deutsche Forschungsgemeinschaft—DFG, Bonn) and Undine Beier (Bundesarchiv, Berlin) assisted generously in accessing Willi Hennig's dossier at the DFG, Sabine Strickrodt (Institut für Arbeit und Gesundheit der Deutschen Gesetzlichen Unfallversicherung, Dresden) and Regina Malek (Sächsisches Staatsarchiv, Dresden) made possible to use Fig. 16, from

Prof. Dr. Rolf Kohring (Berlin) I received a photograph of and literature on and by W.G. Kühne. Professor Helmut van Emden (Reading, UK) provided many details of the biography of his father, Fritz van Emden, and checked parts of my manuscript, Prof.Dr. Götz Aly (Berlin) gave many valuable hints regarding my enquiries on information from Germany's NS-era. Maxene Graze (Portland, Oregon, USA) and Gabriele Uhl (Greifswald) critically read the manuscript and improved content and English.

I cordially thank all these and the countless others who helped me.

When I read in the "acknowledgments" sections of other books that the authors gave the names of their family members and thanked them, I often thought that there were an exhibitionistic moment in it. Now, after completing this manuscript, I understand the motives of those colleagues who thanked their family in detail. My wife and our two daughters tolerated my absence from family life the more the longer the writing took, and they not just tolerated it, they made it possible through their constant support and love. Gabriele, Veronika, and Helene—I owe you much more than some words in a book.

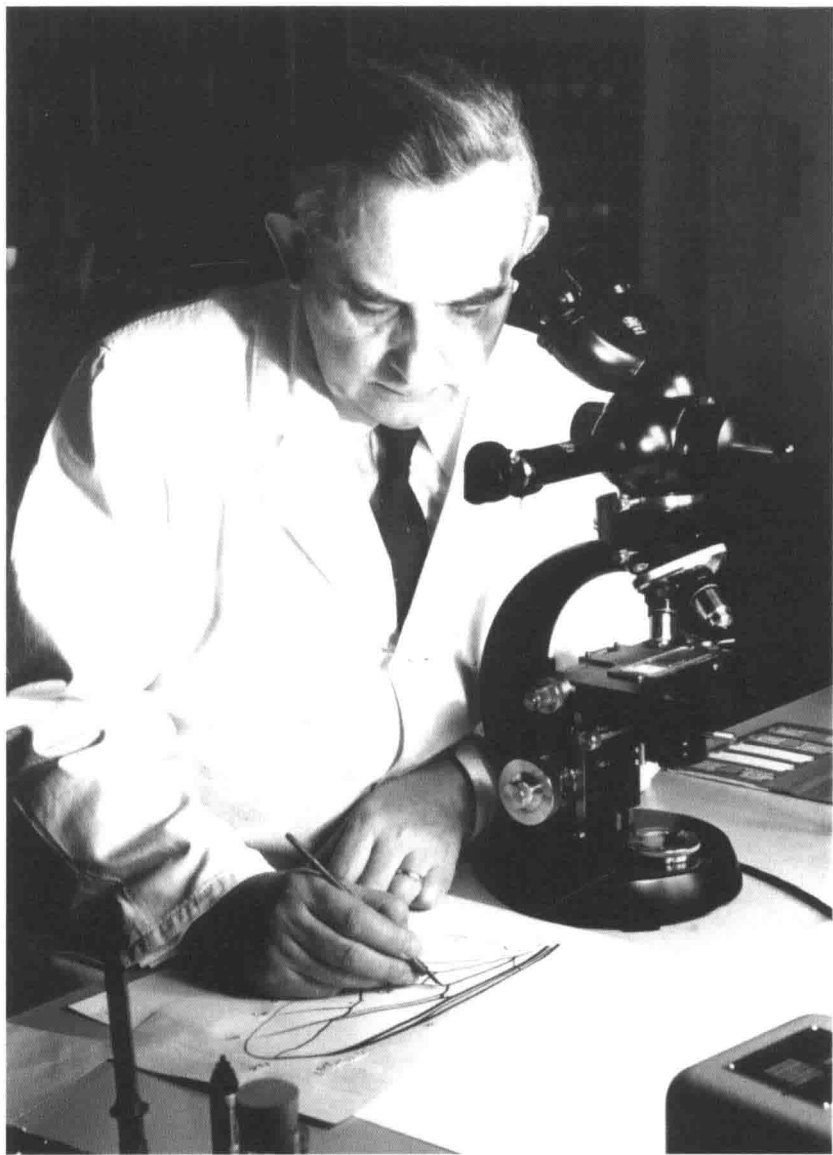


Fig. 1. Willi Hennig in February, 1968. Photo taken by "Photostudio Rössle, Ludwigsburg", the holder of the copyright could not be ascertained.



## CONTENTS

List of Illustrations .....	ix
Acknowledgements .....	xiii
 1 Introduction .....	 1
2 Willi Hennig's Biography .....	5
2.1. A Simple Life in Imperial Germany—Willi Hennig's Family Background and Childhood .....	5
2.2. A Gifted Young Man—Time in Dresden, at School and at the Museum .....	15
2.3. Studying Insects .....	23
2.4. Find a Job and Found a Family .....	36
2.5. An Entomologist at War .....	42
2.6. Willi Hennig's Time at the Deutsches Entomologisches Institut (DEI) after WWII .....	61
2.7. After the Wall—From Berlin to Ludwigsburg .....	75
2.8. Early Debates .....	81
2.9. Attempts to Improve a Situation .....	85
2.10. Zenith and Sudden End .....	93
 3 Willi Hennig's Personality—The Shy Revolutioniser .....	 101
4 The Taxonomist .....	109
4.1. Taxonomy of Extant Animals .....	109
4.2. Amber Fossils .....	114
5 The Systematist .....	119
5.1. The Era until 1960 .....	119
5.2. <i>Phylogenetic Systematics</i> (1966) .....	138
5.3. Mayr and the "Evolutionary Classification" .....	143
5.4. Later Works .....	150
5.5. Hennig and Cladistics .....	155
 6 The Philosopher .....	 163

7	The “Hennigian Revolution” .....	169
8	Willi Hennig—A Man of Order .....	177
	References .....	179
	Name Index .....	203
	Index of Subjects .....	206

## LIST OF ILLUSTRATIONS

### *Figures*

1. Willi Hennig in February, 1968 .....	xvi
2. Willi Hennig in his office at the Deutsches Entomologisches Institut, Berlin-Friedrichshagen, in 1960 .....	2
3. Willi Hennig's place of birth in Dürrhennersdorf .....	4
4. The Hennig family in 1916 .....	5
5. Emma and Willi Hennig .....	6
6. The three Hennig brothers: Herbert, Willi, and Rudolf, in 1919 .....	7
7. The Hennig family in 1923 .....	7
8. View from Willi Hennig's place of birth to the church of Dürrhennersdorf .....	9
9. Willi Hennig as a pupil in Taubenheim/Spree in 1920/21 .....	10
10. The house for signalmen in Taubenheim .....	11
11. The former station building in Oppach .....	12
12. Bill of one billion Mark, originally issued December 15, 1922, for 1000 Mark, overprinted ca. in March, 1923 .....	12
13. The elementary school of Oppach .....	14
14. The protestant church of Oppach, where Willi Hennig received confirmation in 1927 .....	14
15. Title page of issue no. 8 of the Mitteilungen aus der Landesschule Dresden, in which Willi Hennig's first publication appeared in June, 1931 .....	15
16. Aerial view of the Landesschule Dresden, taken in 1927 .....	16
17. Entry in Willi Hennig's diary for 08./12.05.1927 .....	18
18. Southeast ("Porcelain") pavillon of the Dresden Zwinger. In this building was the entomology collection housed in the 1930s .....	23
19. Photo of Willi Hennig, from his student ID card, issued 28.04.1932 .....	24
20. Portrait photo of Willi Hennig, from his Labour Service ID card, issued 23.10.1933 .....	30
21. The railway station building in Neusalza-Spremberg, where Willi Hennig's parents lived in the upper right part from the 1930s .....	37

22. Gosslerstr. 20 in Berlin-Dahlem, institute building of the DEI from 1912 until 1943 .....	40
23. Hans Sachtleben on an insitute's excursion ("Betriebsausflug") to the Woltersdorfer Mühle near Berlin in 1955 .....	42
24. Willi Hennig as a recruit in 1939 at Zossen .....	43
25. Willi Hennig as a soldier in September, 1939 .....	43
26. Willi Hennig sitting on a bunk bed in German barracks in November, 1939, studying his stellar map .....	45
27. Willi Hennig in Poland, guarding the unit's vehicles, 21.01.1940 .....	46
28. Willi Hennig as a soldier in Poland, Bakowice 27.-30.03.1940 ....	46
29. Willi Hennig sitting at the entrance of a slit trench, Doná di Piave (Italy), 29.08.1944 .....	53
30. Sketch of a cladogram in Willi Hennig's notebook, 1944 .....	54
31. First page of the table of content in the manuscript of the <i>Grundzüge</i> .....	57
32. Manuscript of the <i>Grundzüge</i> : First page of the introduction	58
33. Manuscript of the <i>Grundzüge</i> : Page corresponding to p. 18 of the book .....	59
34. Willi Hennig in the photograph of his provisional passport, issued 01.12.1945 .....	60
35. Irma and Willi Hennig in their flat in Berlin-Steglitz, 1950s ....	62
36. Deutsches Entomologisches Institut, Berlin-Friedrichshagen, seen from the South, 1960 .....	62
37. Blücherhof manor, where collections and library of the DEI were housed from 1943 until 1950 .....	63
38. The former "Biologische Reichsanstalt", now "Julius-Kühn- Institut", Berlin-Dahlem, Königin-Luise-Str. 19 .....	64
39. Willi Hennig in 1950 .....	67
40. Bernd, Gerd, and Willi Hennig in the Grunewald forest of Berlin in the 1950s, taken by Wolfgang Hennig .....	70
41. Willi Hennig at his microscope in the museum of Ludwigsburg, 1966 .....	76
42. Ludwigsburg, Arsenalplatz 3, the former SMNS .....	78
43. Curtis Saborsky, (Robert L. Usinger, hidden), Boris Rohdendorf, Willi Hennig, and Norman Denbigh Riley during the 12th International Congress of Entomology, London 1964 .....	80
44. Willi Hennig and Klaus Günther in the library of the Museum Georg Frey, Tutzing, June, 1963 .....	81

45. Fig. 2 from <i>Phylogenetic Systematics</i> (1966) .....	82
46. Klaus Günther handing over the diploma of the honorary doctorate to Willi Hennig on 21.02.1969 in Stuttgart .....	86
47. Willi Hennig on August 12, 1976 (possibly the last portrait photo) .....	94
48. Ludwigsburg-Pflugfelden, Denkendorfer Strasse 16 .....	97
49. Willi and Irma Hennig in their flat in Ludwigsburg- Pflugfelden, 1971 .....	98
50. Tombstone of Willi and Irma Hennig on the "Bergfriedhof", Tübingen .....	99
51. Willi Hennig on July 30, 1965, sitting on the balcony of his home in Ludwigsburg-Pflugfelden .....	100
52. Willi Hennig in the 1950s .....	102
53. Willi and Irma Hennig, Hildegard and Klaus Günther, in Hennig's flat in Berlin-Steglitz, in a merry circle. October, 1955 .....	104
54. Willi Hennig and Hans Sachtleben in the library of the DEI, 1960 .....	108
55. Fabricius medal, awarded to Willi Hennig in 1953 by the German Entomological Society .....	110
56. The copulatory apparatus of <i>Glossina brevipalpis</i> .....	112
57. Holotype of <i>Archiphora robusta</i> , a fly of the family Sciadoceridae, embedded in amber, drawing by Hennig .....	115
58. Phylogenetic tree of the insects .....	118
59. Cover of the <i>Grundzüge</i> .....	120
60. Sketch of a cladogram in Hennig's notebook of 1944 .....	126
61. Sketch of a cladogram in Hennig's notebook of 1944 (hypotheses on the phylogeny of Diptera) .....	127
62. Sketch of a cladogram in Hennig's notebook of 1944 (Hennig's calculations in chapter IIIB of the <i>Grundzüge</i> ) .....	128
63. Scheme illustrating the "deviation rule" .....	128
64. Two possibilities of a numerical increase of number of species over time .....	134
65. Diagram illustrating the meaning of the terms "apomorph" and "plesiomorph", from Hennig et al. (1953, no. 80) .....	136
66. The "argumentation scheme in <i>Phylogenetic Systematics</i> " .....	138
67. The different forms of "hologenetic" relationships within and between organisms .....	139
68. Ernst Mayr at the Weismann-Symposium in Freiburg im Breisgau, 29.05.1984 .....	144

69. Possible evolutionary pathway of orthognathy and prognathy in holometabolous insects, with special emphasis on the Diptera .....	151
70. Concrete example of an argumentation scheme .....	156
71. Willi Hennig on vacations in Northern Italy, 1965 .....	162
72. Certificate of the American Museum of Natural History, accompanying the award of its gold medal to Willi Hennig on January 23, 1975 .....	168
73. Passage of the manuscript of the <i>Grundzüge</i> .....	170
74. Illustration of the crucial difference between similarity and (genealogical) relationship) .....	171
75. Part of Willi Hennig's office at the SMNS in Ludwigsburg, mid-1960s .....	176
76. Wilhelm Meise ca. 1935 .....	21
77. Wilhelm Meise on 17.02.2000 .....	21
78. Fritz Isidor van Emden ca. 1958 .....	25
79. Paul Buchner ca. 1926 .....	33
80. Klaus Günther ca. 1965 .....	36
81. Walter Georg Kühne in 1987, during his journey in New Zealand .....	88

### Table

1. List of courses and lectures Willi Hennig attended at Leipzig University .....	26
---	----

### Boxes

1. Wilhelm Meise .....	20
2. Fritz van Emden .....	24
3. Paul Buchner .....	33
4. Klaus Günther .....	34
5. Walter Georg Kühne .....	86
6. Did Hennig steal from Daniele Rosa? .....	121
7. Was Willi Hennig a Nazi? .....	173

## CHAPTER ONE

### INTRODUCTION

Every day is the centenary of millions of people, but only few of these are celebrated by more than some family members. Willi Hennig was born in 1913, and this book is published in 2013 in his memory, to dignify his contributions to science. Clearly, any layperson singled out at random from an average gathering of people on any market square on this planet will hardly know Willi Hennig's name, let aside his scientific merits, other than, e.g., Charles Darwin's. The picture will, however, be completely different if students of the biological discipline of systematics are asked. Of these, hardly any will *not* know at least Hennig's name and one or two terms he coined.

Willi Hennig has dramatically changed the scientific framework of biological systematics. The change was so fundamental, at least it has been perceived as such by quite a number of scientists, that it has been regarded a "scientific revolution". Certainly, appearance and reputation of biological systematics have improved over the past fifty years. The question if *Archaeopteryx* was a member of the stem-group of the modern birds or indeed one of their ancestors, is a serious topic in scientific discourse. Modern authors can treat birds as "Reptilia" without becoming ridiculed. Phrases like "the insects are probably sister-group of a certain subgroup of Crustacea", "the myriapods are probably paraphyletic", or "the complex eye is an apomorph groundplan character of the arthropods" are not taken from an argot of a small circle of adepts. That this is so, is a consequence of the work of Willi Hennig. He introduced a new method of phylogenetic research, which he called 'Phylogenetic Systematics', and which is now in widespread use under the label 'Cladistics'.

Willi Hennig was an unpretentious museum entomologist (Fig. 2) who anyway has shaped the way of reasoning far beyond the limits of insect systematics. The dipterists' community would definitely regard him a luminary even if he had not initiated the development of biological systematics from an art or a handicraft towards a science in the modern sense. In comparison to his unquestioned merits as a scientific innovator, the public picture of his person is remarkably vague. He was shy and cautious, so he is generally recognised, but rather little is known beyond that about his personality.



Fig. 2. Willi Hennig in his office at the Deutsches Entomologisches Institut, Berlin-Friedrichshagen, in 1960. Courtesy of SDEI, Müncheberg.

The student volunteers assisting at the 26th meeting of the Willi Hennig Society at New Orleans, LA, USA in 2007 wore a badge showing “Willi Hennig Superstar”. Likewise, James S. Farris wore a t-shirt showing “Willi Hennig Superstar”, when James M. Carpenter took a photo of him in February, 1988 (Hull 1988: 153). What makes a person a “superstar”? How “superstar-like” was Willi Hennig? It is my aim in the present book to trace Willi Hennig’s life, his professional career, his scientific work, as detailed as possible. I tried to describe his *curriculum vitae* as exact as possible, but also to understand his feelings and to comprehend his decisions in the light of the contemporary living conditions and his biographical background. He made his way from a small Saxon village to the capital of the German empire, and from there to head of a scientific department, and posthumously to the pedestal of a “superstar”.

The present book cannot replace a textbook of Phylogenetic Systematics—for those I refer to Ax (1984) and Wägele (2000), of which English translations exist; shorter and more recent German introductions are Wiesemüller et al. (2003), or Schmitt & Misof (2009). Recommended English readings may be Kitching et al. (1998) or Wiley & Lieberman (2011)—



the list could certainly be longer. Also, I do not claim to present a “history of systematics” or even a “history of cladistics”. I refer the reader to Hull’s chapters on that topic (1988, 1989), to James S. Farris’ special papers (e.g. 1985, 2012), and to the recent treatise by Engel & Kristensen (2013). I focus on Willi Hennig as a person and scientist.

Willi Hennig was no hero, he was a simple man—possibly a “nerd” (Yoon 2009: 240). The more I came to know about his personality, the more likeable I found him. And the more I learned about his scientific work, the more I admired him. I would regret if these attitudes had blurred my scientific sight. Should, however, the readers of this book finally share my view on Willi Hennig’s personality and work, I would feel rewarded.

Greifswald, December 15, 2012

Michael Schmitt