

This comprehensive biography traces the life and works of Robert Maillart, one of the most important engineers and designers of the twentieth century. His career developed around a central issue of modern technological society: the debate between two antithetical views of engineering opposing applied science, which relied on general mathematical theories for understanding structures, against design, which Maillart championed. Maillart considered structures not merely works of utility, but also as works of art. As utilitarian objects, he created a series of innovations of lasting significance, including the concrete hollow box, the concrete flat-slab floor, the concrete deck-stiffened arch, and the concept of the shear center. Aesthetically, Maillart shaped his three innovations in concrete to create surprising and often stunning new forms. Providing an analysis of these innovations, this biography also connects Maillart's aesthetic ideas with the private and professional context in which he worked.

Cambridge University Press
978-0-521-05742-4 - Robert Maillart: Builder, Designer, and Artist
David P. Billington
Frontmatter
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Marie-Claire and Robert Maillart in Orselino, 1912.

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Princeton University



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[More information](#)

CAMBRIDGE UNIVERSITY PRESS
 Cambridge, New York, Melbourne, Madrid, Cape Town, Singapore, São Paulo

Cambridge University Press
 The Edinburgh Building, Cambridge CB2 8RU, UK

Published in the United States of America by Cambridge University Press, New York

www.cambridge.org
 Information on this title: www.cambridge.org/9780521571326

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First published 1997
 This digitally printed version 2008

A catalogue record for this publication is available from the British Library

Library of Congress Cataloguing in Publication data

Billington, David P.
 Robert Maillart : builder, designer, and artist / David P. Billington.
 p. cm.

Includes bibliographical references (p.).

ISBN 0-521-57132-4 (hardback)

1. Maillart, Robert, 1872-1940. 2. Civil engineers - Switzerland -
 Biography. 3. Bridges, Concrete - Switzerland - Design and construc-
 tion. 4. Architecture - Switzerland - Aesthetics. 5. Structural design. I. Title.
 TG140.M3B57 1997
 624'.092 - dc20

[B]

96-23133
 CIP

ISBN 978-0-521-57132-6 hardback
 ISBN 978-0-521-05742-4 paperback

This book originated with the Architectural History Foundation.

Cambridge University Press
978-0-521-05742-4 - Robert Maillart: Builder, Designer, and Artist
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This book is dedicated to
Marie-Claire Blumer-Maillart

A Loyal Daughter
A Joyful Collaborator
A Gracious Friend

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Cambridge University Press
978-0-521-05742-4 - Robert Maillart: Builder, Designer, and Artist
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Preface

This biography represents a summary not just of Maillart's 46-year career, but also of my own exactly equal-length professional life. Discovering Maillart was fortuitous because research into his life and work seemed natural thanks to four stages in my own development beginning with undergraduate education at Princeton in the late 1940s. I followed a program invented by the Dean, Kenneth Condit, called ambiguously Basic Engineering, that brushed us through all fields of engineering but still allowed time to take more liberal arts electives than many liberal arts majors. My favorite courses were in music, literature, and art history, but I had enough engineering to win a Fulbright Fellowship for study of bridge reconstruction in Belgium. There I studied structural engineering at Louvain University, visited numerous new and partly built concrete bridges, and courted a talented and beautiful pianist. After marriage, we returned to Belgium where I studied the major new idea in structures, prestressed concrete, with one of its pioneers, Gustav Magne, at Ghent University.

After academic studies, I entered a second stage, returning to the United States and capitalizing on this new idea, to work for 8 years as a structural designer in New York City. There I met Otto Gruenwald, who taught me analysis, and Anton Tedesko, who inspired me to learn about another new idea, thin-shell concrete structures. Our firm did design of difficult structures, ones that most other engineers avoided. This type of design was an important part of Maillart's practice as well.

All the while my motivation to write and to speak in public began to overtake my urge to de-

sign, and thus when offered a position at Princeton, after some hesitation, I accepted and entered a third stage in preparation for Maillart. At Princeton, my mentor, Norman J. Sollenberger, gently eased me into the academic world and recommended that I work with Robert Mark, a civil engineer then running an experimental program in stress analysis at Princeton's Plasma Physics Laboratory. Mark and I wrote proposals to the National Science Foundation; but not having doctor's degrees and having no track record in such research, we were consistently unsuccessful until the program officer, Michael Gaus, recognizing our plight, simply overrode the mediocre peer reviews and awarded us a small grant. Thus began a fruitful collaboration during which Mark and I learned about the disciplines of academic research and the necessity for publication in refereed journals.

It was then in the mid-1960s that the architects began to exert their influence and I entered a fourth stage. In 1966, I received a National Science Foundation science faculty fellowship to study thin-shell theory with Warner Koiter, a world leader, at the Technical University in Delft, the Netherlands. Prior to leaving for Europe, Kenneth Frampton, a distinguished architectural historian then at Princeton, gave a series of lectures, two of which had a profound influence on me. One was on Gustav Eiffel and the cultural context for his bridges and tower; the second and of more immediate interest was on the Dutch modern movement in art, architecture, and engineering call *de Stijl*. Frampton opened my eyes to the connection among Dutch culture, modern art, and the engineering of an ar-

tificial landscape at just the time we were preparing to spend half a year in that waterlogged environment.

So it was that I returned to the lowlands to study not only an abstract mathematical theory, but also an abstract artistic culture in which the ideas of beauty and utility were intimately connected.

Without Frampton's stimulus I would never have seen the whole of the Netherlands and on returning, I was more than ever eager to find some way to express this wholeness in scholarship that would be somehow academically respectable in the fragmented, specialized universe of the research university. It was then that Maillart seemed to be a natural.

Having studied German and French in school, having lived in small European nations, having practiced design in concrete structures, and having found colleagues and students willing to collaborate and to learn, I was prepared to take on the complexity of a multilingual Swiss engineer whose structures had already been canonized by an exhibition at the Museum of Modern Art (1947), by a long chapter in Sigfried Giedion's hugely influential *Space, Time and Architecture* (1941), and whose works were elegantly detailed in a trilingual book by Max Bill (1949).

This biography culminates 28 years of studying the life of Robert Maillart, a name I had never heard of during my own college education and my 8 years in practice. Only when I began teaching did the architecture students bring me pictures of Maillart's bridges and buildings and ask me to teach them about such visually striking forms. At that time, in the early 1960s, there was no technical writing on Maillart in English and no writing of any type on him in the contemporary engineering literature.

Maillart's forms were so far out of the ordinary that I could find no way to incorporate them into a standard course on structural engineering either to architects or engineers. Here was a dilemma: the standard courses in structures were devoid of powerful visual images, whereas a small number of structural engineers following Maillart and others

were creating such images solely as engineers not architects. It was as if literature were being taught using texts taken from the front pages of newspapers while Hemingway, Fitzgerald, and Faulkner were creating their celebrated works.

This dilemma inspired me and my colleague Robert Mark, who faced a similar quandary, to talk to Whitney Oates, head of Princeton's Council of the Humanities, who told us to see Princeton's President Robert Goheen. Those two humanists sent us to Washington to visit the newly created National Endowment for the Humanities, an institution both men had helped to bring into being. There we met Herbert McArthur, a program officer, who was immediately sympathetic, and soon we had a small grant plus a larger amount that required matching funds. Oates and Goheen saw to it that we got those funds from the Ford and Rockefeller foundations.

Thanks to that beginning, I went with my son David to Zurich in the summer of 1970 where Marie-Claire Blumer-Maillart graciously received us and there began the most fruitful and unusual biographical collaboration that I know of. The following summer, with my daughter Elizabeth, I visited her again, this time at St. Jean Cap Ferrat where we discussed her father's centennial in 1972. Robert Mark and I organized a colloquium at Princeton in Maillart's honor and Madame Blumer-Maillart came with her husband Eduard Blumer. At that time, in October 1972, I began serious discussions with her about a biography and she responded warmly. The following year my wife Phyllis and I came to Switzerland and there I began to go through Maillart's papers and allied documents that had been collected and organized by Madame Blumer-Maillart and her husband.

In 1974, as a visitor to the Institute for Advanced Study, I began to write a biography. There was little material on Maillart's private life, so I focused on his works and was more than half way finished when Madame Blumer-Maillart and her daughter found in an attic trunk a mass of letters written by Maillart dating from his youth to his last months. Clearly, I needed to read these, but what to do with

the writing then nearly completed? Marshall Claggett, the historian at the Institute who sponsored my visit, gave me the needed advice – finish the book as an essay on Maillart’s major work and then write a proper biography. This sound advice led to *Robert Maillart’s Bridges: The Art of Engineering*, published by the Princeton University Press in 1979.

Meanwhile I read through the letters with Madame Blumer-Maillart. Together we relived much of Maillart’s life, primarily from the construction of his first major work, the 1901 Zuz Bridge, to the destruction in 1940 of his last great design, the Zurich Cement Hall. She would interpret words, names, places, and events that I could never have gotten on my own. It was an indispensable experience, especially reading those letters written while the Blumers were in Indonesia from 1929 to 1940. We read letters in Zurich, we read letters during another stay at the Institute for Advanced Study, and we read more in the Princeton Maillart Archive, founded in 1974 and installed permanently at the Engineering School in 1980, thanks to the support of our departmental chairman, Ahmet Cakmak.

I began writing the biography in 1978, once the first book was in press, but it proved more difficult than I had anticipated. As I struggled with the large mass of documentation, Martin Kessler, President of Basic Books, showed up one day in my office and stimulated me to write a book for him on the idea of art in modern structures. My brother, James H. Billington, had urged Kessler to see me and the result was *The Tower and the Bridge: The New Art of Structural Engineering*, published in 1983 with Maillart as the central figure in a story that began with Thomas Telford, Gustav Eiffel, and John Roebling, and ended with the legacy of Maillart as seen in the late twentieth-century structural artists Felix Candela, Heinz Isler, Christian Menn, and Fazlur Khan.

That book grew out of a course that I had begun teaching at Princeton in 1974 entitled “Structures and the Urban Environment,” which in turn had come from my studies on Maillart. I wanted to

show that Maillart was part of a modern tradition begun with the Industrial Revolution and flourishing today. Following the publication of *The Tower and the Bridge* I returned to the biography, rewriting and extending the story. By 1988, I was once again nearly finished when I got a call from Edgar Kaufman stating that he wanted me to write a heavily illustrated book on Maillart.

This call was not my first contact with Kaufman. Four years earlier he had called after receiving a letter from George Collins, Professor of Art History at Columbia University and a good friend of mine since 1969. Collins had suggested that the Architectural History Foundation publish a book of color photos as a sort of companion to *The Tower and the Bridge*. Collins believed that the theme of structural art needed a book with elegant pictures much as is frequently done for architects. That project appeared too daunting in 1984, but Kaufman’s more focused idea of 1988 became a reality with the 1990 bilingual book, *Robert Maillart and the Art of Reinforced Concrete*, published by the Architectural History Foundation in New York and the Verlag für Architektur Artemis in Zurich and Munich.

I told Mr. Kaufman about the biography, which he asked to see and then enthusiastically recommended to the Architectural History Foundation. The foundation’s president, Victoria Newhouse, accepted it and following publication of the 1990 book, she began to work closely with me in revising what had become an unwieldy manuscript. Thanks to her fine editorial eye, the work began to take shape but only after she had helped me reorganize it rather drastically. We spent many hours together reading over sections, reworking parts, and discussing content. When she decided in 1994 to close down the foundation, she sent the manuscript to Beatrice Rehl of Cambridge University Press through whose encouragement and help the manuscript went through one more revision before it was finally accepted in August 1995.

This long journey from the 1960s to the 1990s, therefore, has been completed thanks to the sustaining help of many people. But there is another

story that has evolved through this 28 years of writing. At the outset, I was intrigued by the works and, as a structural engineer, I wanted to study them technically. Did their aesthetic power derive from a pure engineering design or did they acquire elegance by means other than engineering, that is, decoration or nonstructural form? Put the other way, was Maillart a technically inferior engineer by stressing appearance over cost and performance?

My first studies revealed that Maillart was far ahead of his profession technically, so I needed to tell that story to a nonengineering audience; but then came the next question: To what extent could his superior engineering and his fine aesthetic talent be connected to his private life? This is an old question in biography, especially for biographies of artists. The more I learned about Maillart as a person, as a family man, and as a colleague, the more difficult it became to answer that question. It was only after I had amassed the documentation and written a long manuscript that I could begin with the help of reviewers and editors to see where the private life would illuminate the professional life and where it would not.

The private story began during the Victorian certainty of a stable Europe in the comfortable bourgeois world of little Switzerland. It then met the convulsion of World War I, which led into a wildly swinging interwar Europe and culminated in the outbreak of the second half of the Great War. In a curious and unusual way Maillart lived through this tumult. Outwardly a Victorian with conventional attitudes and a routine life, he adjusted to a partly monastic existence after losing his wife and his wealth during the war. He never lost his settled attitudes and his love of routine, but his motivation did change from that of large-scale builder to small-scale designer. It was a change enforced by penury, but it was one that fit his personality.

During his 15-year marriage, he strove to create a thriving business as his family grew, but following the war, he had no home and reverted to the 7-year bachelor life he had had before marriage. The last quarter century of his life, living mostly alone, he

created the structures on which his fame rests. His sometimes weekly letters give the sense of a routine life and rarely do they digress into the professional controversies so characteristic of his work. Exceptions occur in letters to his daughter in Indonesia from 1929 to 1940. These documents themselves have a remarkable history. Sent to the Dutch colony, they were saved by Marie-Claire Blumer-Maillart; and then during her desperate escape from the invading Japanese and her incredible 4-year survival in the jungles of Java, she kept them in a small briefcase so that finally after circling the globe they returned to Switzerland intact at the war's end.

In these letters, written rapidly and unselfconsciously, we get a glimpse of Maillart's reflections and responses to weekly trials. His sense of humor never left him, his optimism remained in the face of depression, and his loneliness became more apparent as the 1930s came to a close. He even reveals at times his delight in a new little bridge that he was given because of its difficulty. These factors of personality do illuminate the works or at least they seem consistent with them. Yet the direct connection between works and events or public designs and private thoughts remains elusive. Perhaps that is always so when utilitarian objects rise to the level of great art whether portraits painted for prephotographic records or architecture created out of cost-constricted programs.

To take the example that keeps recurring in these studies, the Salginatobel Bridge, I find its design to be some kind of a mystery. I can explain it structurally and yet its visual impression is always more complex without ever leaving the realm of pure structure. In his simplicity, Maillart reminds me of two contemporaneous painters, the Dutchman Piet Mondrian and German Swiss Paul Klee. Both artists created many works of deceptive simplicity and both lived lives often apart from mainstream society. Maillart himself was half Dutch and Belgian as well as half German Swiss. The simplicity of his lines and even of his patterns of steel reinforcement within concrete reminded Max Bill of Mondrian; and Maillart's playfulness with form is reminiscent of some Klee paintings. If one could explain once

and for all the meaning of Mondrian's *New York Boogie Woogie*, Klee's *Doulezelt*, and Maillart's *Salginatobel*, then they would cease to be art.



The theme of structure as art first became public with the 1947 Museum of Modern Art exhibition. Following that event, Professor Mark and I proposed a Maillart exhibition in the Princeton University Art Museum to go together with the Centennial Symposium in October 1972. David Steadman, acting director of the museum, organized the exhibition and J. Wayman Williams put it together out of original Maillart documents, recent photographs, and models. Four years later, in honor of Madame Blumer-Maillart's visit, we put together a new photographic exhibition again with the help of Mr. Williams and the director of the art museum, Peter Bunnell. In 1978, with director Fred Licht and Wayman Williams, we mounted an exhibition entitled "The Bridges of Christian Menn," and in 1980, with the new director Alan Rosenbaum and again Wayman Williams one on "Heinz Isler, Structural Artist," both showing the legacy of Maillart on present-day Swiss engineering designers of bridges and buildings.

All the while I was bringing copies of Maillart documents to the Princeton Maillart Archive, Madame Blumer-Maillart was establishing in Zurich a

Maillart Archive at the Federal Institute of Technology. Most of the original drawings and calculations from Maillart's post-1920 offices in Geneva and Bern are now in the Zurich Archive, assembled and catalogued by Dr. Beat Glaus and Mr. Clemente Regassi. Then in 1990, the Museum für Gestaltung in Zurich held a large exhibition on Maillart that thereafter traveled throughout Europe.

One climax of these Maillart events came on August 21, 1991, when James E. Sawyer, President of the American Society of Civil Engineers, and Madame Blumer-Maillart unveiled a plaque designating the Salginatobel Bridge an International Historic Civil Engineering Landmark. Part of the Swiss celebration for the 700th anniversary of the founding of their confederation, this Maillart Day event placed his wilderness work alongside only twelve other such landmarks, which include the Eiffel Tower, the Firth of Forth Bridge in Scotland, and the Panama Canal. We made a pilgrimage that day up from the Landquart River Valley along the single-lane roadway far into the Alps; it is a pilgrimage that should be made by anyone who wishes to contemplate the theme of Maillart's life and work: Design, in this fragmented world, when carried out by a highly rational, deeply educated engineer, can integrate utility and beauty within the constraints of responsible economy with public funds.

Acknowledgments

As the preface makes clear, Marie-Claire Blumer-Maillart has been central to this biography, and her husband Eduard Blumer played a major role in collecting documents, in organizing records, and in escorting me to archives. His enthusiasm for Maillart, his unfailing sense of humor, and his ability to make friends quickly in almost any European language made him a joy to be with and an invaluable colleague. Their daughter Marie-Claire and her husband John Cuniberti have also been of considerable help especially in hosting us in Geneva and putting me in contact with Maillart works and documents there.

In 1974, while searching for more Maillart works with my daughter Jane, I had the good fortune to visit René Maillart in Marseilles; he graciously agreed to the construction of his recollections of his father. René's grandson Laurent Maillart spent 3 months in Princeton in 1993 and did a study of the Salginatobel Bridge, which added new insight into his great grandfather's most famous design. I am also much indebted to the son of Maillart's eldest child, Robert Maillart, for documents concerning his grandfather. In all, the family has been open, unfailingly helpful, and a great pleasure to know.

Along with the family, the support of Christian Menn has been crucial to this research. Switzerland's foremost living bridge designer and after Maillart the greatest master in concrete bridges of this century, Menn has opened doors to the offices of bridge engineers and cantonal archives all over his small but decentralized country. But of far greater importance is my coming to know him, his

work, and his ideas that get me closer to the ideals of Maillart. Professor Menn also secured substantial financial support for me in Switzerland to cover expenses and to allow me to be a visiting professor at the ETH (Federal Technical Institute in Zurich).

Heinz Isler, the other major Swiss structural artist practicing today, was a direct help with people and documents in the Canton of Bern and an indirect help by explaining his own works, which are exemplars of the same intrinsic interest as those of Maillart and Menn. His wife Maria Isler was a gracious host and another colleague in my Swiss adventures.

Four other Swiss engineers, all with connections to Maillart, gave me invaluable insights into his works and professional life. The late Ernst Stettler was Maillart's chief engineer in Bern from the late 1920s until his death when the younger man took over the practice. Stettler's published reflection provides a firsthand account of Maillart's design activity and of his life in Bern during the 1930s. Likewise, Marcel Fornerod's reflections give a picture of Maillart's Zurich activities during the early 1930s. I had known Fornerod long before I knew about Maillart; already a highly respected engineer in the United States, Fornerod wrote me after our 1972 symposium to tell me of his work in Switzerland with Maillart 40 years earlier. Pierre Tremblet, heading the successor office in Geneva, gave me access to his archive and kindly had copies of it all sent to the Princeton Maillart Archive. The originals have since been deposited in the ETH Archive in Zurich. Finally, Hanspeter Bernet sent me copies of his Bern Archive and hosted us elegantly in his

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city. He had taken over the Maillart office when Stettler retired. Dr. Hans Eichenberger, executive officer of the Swiss Society of Cement, Chalk and Gypsum Manufacturers provided financial support for expenses and with his assistant, Kurt Müller, was an invaluable guide to Swiss concrete structures.

In the middle 1970s, I sent letters to all the other former employees of Maillart's that I could identify and to my surprise Karl Lehr, the only one alive who had worked with him in Russia, responded from the New Jersey shore only an hour's drive from Princeton. I immediately went to see him, conducted a long and friendly interview with an old and feeble man, and thus secured an invaluable recollection of a relatively early period in Maillart's life. Also I had the good fortune to find Hans Kruck, the only architect to work for Maillart, still living in the late 1970s in Zurich where we had several lengthy meetings. Thanks to his daughter, I secured another significant recollection. Similarly, Professor Fritz Stüssi, an adversary of Maillart's during the 1920s, received us warmly at his home in Bäch and provided me with a different perspective on Maillart as well as sending me a full set of lecture notes taken by an ETH student, Hans Misbach, from Maillart's lectures there before World War I.

The noted Swiss architect, Alfred Roth, generously shared his recollections of Maillart with me, and Vinzenz Losinger sent me many photos and materials from his firm's archives. I am deeply indebted also to the late Max Bill, for his pioneering writing of Maillart and for his inspiring keynote addresses both at our 1972 symposium in Princeton and at the opening of the 1990 Maillart exhibit in Zurich. Anyone writing about Maillart also must be grateful to Sigfried Giedion, whose early recognition of Maillart as an artist showed great insight. He also helped organize the 1947 exhibition on Maillart at the Museum of Modern Art.

A large number of Swiss have aided my research beginning with Alvin E. Jaeggli, archivist at the ETH in Zurich. His successor Dr. Beat Glaus has been indispensable and has gone out of his way to

provide me with documents and advice as well as friendship. His assistant, Clemente Rigassi, produced a masterful catalogue for the Zurich Maillart Archive and was unfailingly helpful to me. A number of engineers throughout Switzerland opened their archives and provided me with valuable documents: Engineers Letta and Bosch of St. Gallen, Engineers Stampf and Tschudin of Chur, Engineer Schlumpf of the Rhätische Bahn, Engineer Hirt and Mr. Stalden of Zurich, and Engineer E. Woywod of the Aargau who escorted me to archive sites at Aarburg, at Rheinfelden, at Laufenburg, and at Aarau. I benefited from Professor R. Favre's discussions about the Aarburg and Zuoz bridges for which he did the rehabilitation design. Others who helped me were B. Jotteraud of the Bière-Apple-Morges Railway, M. Masshardt of the Losinger Company, E. Gruner who wrote me a recollection of the Laufenburg Bridge, and Margaret Siegrist of the ETH alumni association. Also of help were Walter Meierhans of the Zurich Warehouse Company, Ulrich Bähler of the St. Gallen City Public Works Department, and Andreas von Waldkirch of the Bern Meliorationsamt.

Of special assistance was Prof. Hans Hauri, formerly Rector of the ETH, who in addition to general advice, set up and taped an interview that I carried out with Prof. Karl Hofacker, formerly an assistant of Prof. Max Ritter, Maillart's bitterest detractor at the ETH. Prof. Hofacker gave me another perspective on Maillart. Tom Peters, formerly at the ETH and now a professor at Lehigh University, has been a helpful colleague in my Maillart work. With Madame Blumer-Maillart, I met Miss Oechslin (Mucci) who had known Maillart well in the 1930s.

The principal financial support for this book has come from the Division of Research Programs of the National Endowment for the Humanities headed by Harold Cannon and from the Program for the History and Philosophy of Science of the National Science Foundation headed by Ronald Overmann. Robert Mark and I have had grants from the National Endowment for the Humanities, from the Ford and Rockefeller Foundations, as well as from the Andrew W. Mellon and Alfred P. Sloan

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Foundations, all of which have helped the studies leading to this book. Of particular benefit to this book were two grants from the National Endowment of the Arts, and especially the encouragement of Thomas Cain. Of great help also were a series of grants from the Alfred P. Sloan Foundation in its program, The New Liberal Arts, aimed at bringing engineering to liberal arts students. I am especially grateful to its former president, the late Albert Rees, and to its program officer, Samuel Goldberg.

At Princeton, a number of colleagues contributed to this research, especially my academic mentor Norman J. Sollenberger and my close colleague Robert Mark. John Abel, now at Cornell, played a major role during the first years of this project especially for the Maillart symposium and its publications for which he served as editor and coeditor. Ahmet Cakmak, who succeeded Sollenberger as chairman of Civil Engineering, strongly supported this effort, encouraged me to publish the early research results, and urged me to give a course to include this material. The late Donald Egbert, professor of Architectural History, served as an advisor to me during a leave in 1969 and taught me about writing history. Also of help in that endeavor were François Bucher, who first collected Swiss documents for us in 1968, and Kenneth Frampton, who showed me how connections could be made among art, architecture, and engineering. The late William Shellman was a continual help in acquainting me with the relationship among art, architecture and engineering; he also made elegant drawings of Maillart's bridges for our art museum exhibitions.

The late George Collins, professor at Columbia University, wrote an article at our suggestion on Maillart and Modern Art, which I believe to be the most perceptive such writing ever done. He was always a guide and friend. Carl Condit, the pioneering historian of civil engineering in the United States, was an inspiration for our work, and Edwin Layton, another distinguished historian of technology, now at the University of Minnesota, has been a longtime teacher to us engineers. A third major American historian of technology, Merritt Roe Smith of MIT, read an early version of this biog-

raphy and gave cogent advice and continual encouragement.

The late Myron Goldsmith, both an architect and an engineer, has never ceased to stimulate me; his immense enthusiasm for Maillart helped keep me at work. His colleague at Skidmore, Owings and Merrill, the late Fazlur Khan, was a Maillart enthusiast, as well and Khan's own work, like Goldsmith's, served to give me a sense of Maillart's legacy. Like Khan and Menn, Felix Candela, the gifted structural artist from Mexico, wrote a moving essay on Maillart's influence and helped me formulate ideas on structure through his lively discussions.

No one has sustained my efforts professionally more than J. Wayman Williams, whose critical judgment and engineering good sense go together with a talent for organizing all our exhibitions, for making many of the slides for my teaching, and for putting together publications of all sorts. His wife Patti typed one version of this book as well. Jean Carlucci, Thelma Keith, Susan Cleary-Diaz, and Lilya Lorrin also typed sections. Kathy Posnett, my present secretary, typed the final version and serves in many other ways to keep things organized and running smoothly. The former engineering librarian at Princeton, Dee Hoelle, was a continual help.

During this entire Maillart project I have been fortunate to have a series of excellent students serve as research assistants, starting with Peter Cole who helped greatly with the 1972 symposium, David Lamb, Ellen Lieng, Mark Herron, Kent Smith, Robert Shulock, Michael Hein, Neil Hauck, Paul Gauvreau, Scott Hunter, Ronald Wakefield, Christopher Peck, Rosemary Secoda, John Matteo, Karen Mielich, Roger Haight, Nicholas Edwards, Susan Lyons and Eric Hines who also checked the notes, especially for correct German. Byron Pipes first called my attention to Maillart's shear center discovery. Mark Reed made many of the fine drawings for this book as did Clark Fernon and Colin Ripley. Of central importance was James Chiu, who volunteered to organize the copies of the Maillart Geneva Archive and was thereby responsible for the founding of the Princeton Maillart Archive.

Edward Tenner, editor for *Robert Maillart's*

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Bridges, helped me during the early stages of this work. My sister-in-law, Lynn Billington provided me with fine editing and careful retyping at a crucial stage in this biography. Then from 1990 to 1994, Victoria Newhouse became my editor and gave the essential reworking that finally put the book in its present shape. When some issues still remained unresolved, she urged me to contact Stanford Anderson, professor of Architectural History at MIT, who gave me significant assistance in late 1994. Since then Beatrice Rehl at Cambridge University Press has taken over as editor and provided the necessary advice and actions to put the book in production. Ernie Haim has designed and organized the final form of this book with great skill. I am also grateful for the splendid photos taken by Bruno Mancina and Franziska Bodmer Mancina.

Finally, and of the greatest importance, my family has not just been supportive, but also actively engaged in this research and writing. My brother Jim has long served as a model both of academic integrity and of historical scholarship. He read numerous versions and drafts and always had incisive suggestions often of major themes. Each of my children has traveled with me to visit Maillart sites, often to locate documents, and always to provide critical reactions and collegial companionship. Sarah, the youngest, has become herself a fine structural engineer and has already collaborated on two writing projects with me. She studied at the ETH with Christian Menn and developed a close relationship also with Madame Blumer-Maillart. My two sons, Stephen and Philip, traveled through Switzerland with my wife and me in 1987; they are both artists though not engineers and thus provided

sharp reactions to the works and an often comic sense of the wilderness Swiss context replete with cows and multilingual little valleys. My daughter Jane, a teacher now, ferreted out many little bridges in 1974, and my eldest daughter, Elizabeth, also an artist along with my eldest son David, an historian, searched archives in 1975 with Eduard Blumer. Both Jane and Elizabeth have always exacted a steadying influence on me during the stress of foreign travels especially in rural settings.

At the very end of this project when acceptance was still in doubt, David read the entire manuscript and saw a central theme that had eluded me. He then drafted an introduction, which is largely the present version, and then I was able to make the final revisions that led to the book as it now stands. His clear insight and his historical imagination have been my greatest support. David has also done the index with great skill.

This biography is properly dedicated to Marie-Claire Blumer-Maillart. Without her collaboration, I would not have attempted this kind of scholarship. Although in the end, the judgments are mine with all their limitations, her dedication to her father and to my efforts has sustained this research and writing for over a quarter of a century.

In a deep and general sense, all my work is dedicated to my wife, Phyllis. Her piano playing fills the house as I write and her management of a large and complex family not excluding a disorganized professor has kept that operation together with a model of beauty and utility.

David P. Billington
 Princeton, N.J.
 September 12, 1996

Cambridge University Press
978-0-521-05742-4 - Robert Maillart: Builder, Designer, and Artist
David P. Billington
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