

Notes

Foreword by Doug Hill

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10. See the joint edition of his two-volume autobiography, *Norbert Wiener: A Life in Cybernetics* (Cambridge, MA: MIT Press, 2017), 55, 57. Ronald R. Kline's introduction to that edition mentions the original title of *Ex-Prodigy* on p. xii.
11. Conway and Siegelman, *Dark Hero*, p. 5.
12. Wiener, *A Life in Cybernetics*, 284.
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19. Conway and Siegelman, *Dark Hero*, 93–98, 217–230; Heims, *John von Neumann and Norbert Wiener*, 379–389.
20. Heims, 377.
21. Conway and Siegelman, *Dark Hero*, 16; Wiener, *A Life in Cybernetics*, 459–460; Heims, 155.
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Foreword by Sanjoy K. Mitter

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6. See, for example, Mark Davis and Alison Etheridge, *Louis Bachelier's Theory of Speculation: The Origins of Modern Finance* (Princeton, NJ: Princeton University Press, 2006).
7. See Norbert Wiener, *Extrapolation, Interpolation, and Smoothing of Time Series, with Engineering Applications* (Cambridge, MA: MIT Press, 1949).
8. Wiener, *Cybernetics*, 10, 11.
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17. Wiener, 112.
18. Wiener, 57, 58.

19. H. Sandberg, J.-C. Delvenne, N. J. Newton, and S. K. Mitter, "Maximum Work Extraction and Implementation Costs for Nonequilibrium Maxwell's Demon," *Physical Review E* 90 (2014): 042119, <https://doi.org/10.1103/PhysRevE.90.042119>.
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25. Wiener, 192.

Preface to the Second Edition

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2. Wiener, N., *Nonlinear Problems in Random Theory*, The Technology Press of M.I.T. and John Wiley & Sons, Inc., New York, 1958.
3. Here I am using the term "non-linear system" not to exclude linear systems but to include a larger category of systems. The analysis of non-linear systems by means of random noise is also applicable to linear systems and has been so used.
4. The terms "black box" and "white box" are convenient and figurative expressions of not very well-determined usage. I shall understand by a black box a piece of apparatus, such as four-terminal networks with two input and two output terminals, which performs a definite operation on the present and past of the input potential, but for which we do not necessarily have any information of the structure by which this operation is performed. On the other hand, a white box will be a

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8. This is a simplified picture of what happens, especially in the cortex, since the all-or-none operation of neurons depends on their being of a sufficient length so that the remaking of the form of the incoming impulses in the neuron itself approaches an asymptotic form. However, in the cortex for example, owing to the shortness of the neurons, the necessity of synchronization still exists, although the details of the process are much more complicated.
9. I must say that some evidence of the existence of narrow central rhythms has been obtained by Dr. W. Grey Walter of the Burden Neurological Institute in Bristol, England. I am not acquainted with the full details of his methodology; however, I understand that the phenomenon

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This is a portion of the eBook [doi:10.7551/mitpress/11810.001.0001](https://doi.org/10.7551/mitpress/11810.001.0001)
at

This is a section of [doi:10.7551/mitpress/11810.001.0001](https://doi.org/10.7551/mitpress/11810.001.0001)

Cybernetics or Control and Communication in the Animal and the Machine

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Citation:

Cybernetics or Control and Communication in the Animal and the Machine

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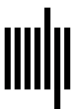
DOI: [10.7551/mitpress/11810.001.0001](https://doi.org/10.7551/mitpress/11810.001.0001)

ISBN (electronic): 9780262355902

Publisher: The MIT Press

Published: 2019

Funding for the open access edition was provided by the MIT Libraries Open Monograph Fund.



The MIT Press

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First MIT Press paperback edition, February 1965

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This book was set in ITC Stone Serif Std and ITC Stone Sans Std by Toppan Best-set Premedia Limited. Printed and bound in the United States of America.

Library of Congress Cataloging-in-Publication Data

Names: Wiener, Norbert, 1894-1964, author.

Title: Cybernetics ; or, Control and communication in the animal and the machine / Norbert Wiener ; forewords by Doug Hill and Sanjoy Mitter.

Other titles: Control and communication in the animal and the machine

Description: [Second edition, 2019 reissue]. | Cambridge, MA : The MIT Press, [2019] | "Reissue of the 1961 second edition." | Includes bibliographical references and index.

Identifiers: LCCN 2019005612 | ISBN 9780262537841 (pbk. : alk. paper)

Subjects: LCSH: Cybernetics. | Control theory. | System theory.

Classification: LCC Q310 .W47 2019 | DDC 003/.5--dc23 LC record available at <https://lccn.loc.gov/2019005612>

10 9 8 7 6 5 4 3 2 1