The Metabolic Ghetto

An Evolutionary Perspective on Nutrition, Power Relations and Chronic Disease

Chronic diseases have rapidly become the leading global cause of morbidity and mortality, yet there is poor understanding of this transition, or why particular social and ethnic groups are especially susceptible. In this book, Wells adopts a multidisciplinary approach to human nutrition, emphasizing how power relations shape the physiological pathways to obesity, diabetes, hypertension and cardiovascular disease. Part I reviews the physiological basis of chronic diseases, presenting a 'capacity–load' model that integrates the nutritional contributions of developmental experience and adult lifestyle. Part II presents an evolutionary perspective on the sensitivity of human metabolism to ecological stresses, highlighting how social hierarchy impacts metabolism on an intergenerational timescale. Part III reviews how nutrition has changed over time, as societies evolved and coalesced towards a single global economic system. Part IV integrates these physiological, evolutionary and politico-economic perspectives in a unifying framework, to deepen our understanding of the societal basis of metabolic ill-health.

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CAMBRIDGE
UNIVERSITY PRESS

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University Printing House, Cambridge CB2 8BS, United Kingdom

Cambridge University Press is part of the University of Cambridge.

It furthers the University's mission by disseminating knowledge in the pursuit of education, learning and research at the highest international levels of excellence.

www.cambridge.org
Information on this title: www.cambridge.org/9781107009479

First published 2016

Printed in the United Kingdom by TJ International Ltd. Padstow Cornwall

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

Library of Congress Cataloging-in-Publication data
Wells, Jonathan C. K., author.
The metabolic ghetto : an evolutionary perspective on nutrition, power relations, and chronic disease / Jonathan Wells.
Cambridge, United Kingdom ; New York : Cambridge University Press, 2016. | Includes index.
LCCN 2016015463 | ISBN 9781107009479
| MESH: Chronic Disease | Nutrition Disorders | Power (Psychology) | Socioeconomic Factors
LCC RC108 | NLM WT 500 | DDC 616/.044–dc23
LC record available at https://lccn.loc.gov/2016015463

ISBN 978-1-107-00947-9 Hardback

For Akanksha

Contents

Preface

> It is twenty five years ago this summer since I gave my word to the old lady Sarma. This has brought a twofold happiness: first, because of the fact that I actually kept my word, something which could easily be understood by anyone who had managed to do so for even half the time; and secondly, because I can at last tell the story which I have had to keep secret all this time.
>
> Leonid Borodin – *The Year of Miracle and Grief*

It is thirty years ago this summer since I climbed Mont Blanc, the highest mountain in Western Europe, though the route was not technically challenging. I remember an immense landscape emerging as the day began to dawn, the lights of a huge distant city still visible in the fading darkness to the north. Groups of head-torches winked on the snow slopes. The final path led up a knife-edge ridge, offering the undesirable choice of falling into France on one side or Italy on the other. From the summit, waves of mountain ridges rolled away in every direction, their crests picked out by the rising sun. It was cold but surprisingly gentle on the top of Europe that day.

I have often been reminded of that event while working on this book. There was the same sense of taking on something that might prove beyond me, but that was worth trying anyway. With hindsight, planning ten chapters and finishing with twenty indicates many false summits. There was the same lure that if one went further and higher than usual, one might be rewarded with a bigger view. And the same challenge of unpredictable terrain: piles of books and papers have regularly avalanched.

My aim is to offer a multidisciplinary account of how power relations impact health through the medium of nutrition. To this end, I have brought together physiological, evolutionary, anthropological, historical, political and economic perspectives. This allows me to develop a societal perspective on how chronic non-communicable diseases have become the leading global cause of illness and premature death even as undernutrition remains widespread, while both forms of ill-health are unevenly socially distributed. This approach is necessary because biomedical scientists pay inadequate attention to power relations when developing models of disease, while social scientists rarely extend their political analyses to the physiological traits that are fundamental to health. Furthermore, few have addressed the reasons why humans are prone to hierarchical societies, or how the nutrition–power relationship changes as societies themselves evolve.

Of course, the idea that a single book could do justice to such an enormous topic is ridiculous. I have known from the start that I cannot succeed, but only attempt to fail less badly. The reader must judge whether I fall into France or Italy.

Trying to address both detail and the big picture is daunting. In *Invisible Cities*, the novelist Italo Calvino depicted the Venetian explorer Marco Polo describing a bridge, 'stone by stone', to Kublai Khan, the blind ageing Emperor of the Tartars:

> 'But which is the stone that supports the bridge?' Kublai Khan asks.
> 'The bridge is not supported by one stone or another,' Marco answers, 'but by the line of the arch that they form.'
> Kublai Khan remains silent, reflecting. Then he adds: 'Why do you speak to me of the stones? It is only the arch that matters to me.'
> Polo answers: 'Without stones there is no arch.'[1]

This is my dilemma. Many of the best novels – including those of Calvino – are short, but scientific arguments must be backed with evidence. I need both stones and arch, and in particular I want to show how different perspectives – adjacent stones – can be linked together. This will not be a short book.

Scientific progress has been likened to the growth of a snowball rolling down a mountainside, with its ever-increasing surface area representing 'the unknown'.[2] To develop a genuinely multidisciplinary perspective, one must not only engage with multiple rapidly expanding literatures but also embrace differences in terminology, concepts and styles of enquiry, all the while keeping a unifying aim in mind. I learned early on that novelists have unique expertise in this area, for they often build astoundingly complex worlds while weaving a clear narrative through them. It is particularly helpful that biologists and novelists share interest in the way that environments shape experience through the course of life.

A novel such as Boris Pasternak's *Dr Zhivago* reminds us that while it is difficult to understand Zhivago's experiences outside their historical setting, it is also difficult to interpret broader events without seeing them through the experience of individuals. What is missing from our scientific understanding of malnutrition and its health penalties is this kind of dynamic perspective. A disease such as diabetes emerges through both societal transformation and the life-course experience of an individual. Unfortunately, the early-life 'secret' of undernutrition may eventually reveal itself in the form of adult ill-health. Conceptually, therefore, novelists have addressed many of the issues I have grappled with, and they have done so rather more elegantly. Above all, novelists surely have a deeper understanding of the meaning of food than scientists.

We can recast this book, therefore, as an effort to set the stories transcribed within our bodies in their broader societal context. As an undergraduate student in social anthropology at the University of Cambridge, I was encouraged by Keith Hart to read fiction as well as the conventional ethnographic literature. When I moved on to research in nutrition, I found that novels provided a unique unifying lens. Body composition, my specialist interest, may be likened to a physical 'memory' of past events. Our physical condition today reflects our cumulative nutritional experience.[3]

The fundamental relationship between society and metabolism transcends fiction. In Aldous Huxley's *Brave New World*, for example, mass-consumption was elevated to the raison d'être of society, with the drug *soma* used to reduce consciousness of the prevailing emptiness. 'Self-indulgence up to the very limits imposed by hygiene and

economics. Otherwise the wheels stop turning.'[4] In the modern era, what scientists have failed to understand is the deeper politico-economic basis of both extremes of malnutrition.

In *Nineteen Eighty-Four*, George Orwell offered a darker perspective: this time, that a perpetual state of war would justify extreme levels of control over individuals, a scenario achieved by the 'surveillance state'.[5] It is intriguing, first, that both of these societies were characterized by profound social hierarchy, and second, that life is steadily converging on fiction. Consumer society has indeed strengthened its metabolic grip in recent decades, while diverse forms of digital media subject us to covert observation and manipulation, concealed in the guise of endless consumer choice. And these traits are fundamentally connected, for processed foods and mobile phones are just two of many 'gifts' to society from the military–industrial complex. The role of nutrition in disciplining populations is no mere fictional scenario.

Of course, where there is power there is also resistance, and human biology shows many layers of resilience against nutritional stress. My previous book explored how our body fat provides an overarching 'energy insurance scheme' while also fuelling functions such as growth, reproduction and immune defence.[6] In the present book, I will pay particular attention to the role of the mother in buffering her offspring against ecological stress. In the thirteenth century, the Persian poet Jelaluddin Rumi described what the unborn baby might miss on account of such protection.[7]

> Suppose one said to the fetus:
> 'Outside is a beautiful world
> With mountains and oceans,
> Patchwork fields and fragrant orchards,
> A sky illuminated by the sun,
> Or the moon and countless stars.
> Bathed by breezes,
> Gardens host banquets and weddings.
> Why stay in your confining misery?'
>
> But the fetus would not listen:
> 'You are absurd and deceitful.
> I know only darkness.
> Outside the world has no scent or colour'.

If the fetus is oblivious of orchards and weddings, it is also substantially protected from the ravages of war and starvation. But such buffering is only partial, and if the mother herself is malnourished, then her 'protection' itself manifests as nutritional stress for the fetus. Historically, chronic undernutrition maintained control over those at the bottom of social hierarchies, and because it takes generations to resolve, it comes to represent a 'metabolic ghetto'. This phrase is intended to highlight the 'grip' that hierarchies exert over nutrition and metabolism.

Unfortunately, undernutrition is not the only such ghetto. Consumer society may seem the epitome of free choice, but it too has co-opted our metabolism for economic gain. In the modern era, entire populations are pushed to 'over-consume', generating another metabolically perturbed niche of obesity that may likewise take generations to resolve.

We have no hope of dealing with the global epidemics of diabetes and cardiovascular disease if we do not address the fundamental ways in which nutrition is used to discipline human behaviour.

Why do we submit to such coercion? Carlos Gamerro offered an answer in his novel, *An Open Secret*.[8] 'The perfect crime is precisely the one committed in the sight of everyone – because then there are no witnesses, only accomplices.' If malnutrition persists in 'liberal democratic' countries, it is because there is rather less liberty and democracy than we pretend. Nutrition is both a key locus of our collective disempowerment and a means for concealing its full magnitude. To participate in consumer society is to 'consent', and nicotine, sugar, caffeine and addictive digital technologies play a key role in manufacturing that consent.

This book owes much to my family, who have always encouraged me to explore the world and to follow my interests. My academic career has enabled me to read diverse literatures and to participate in research studies with many wonderful colleagues across Europe, South America, Africa and Asia, giving me empirical experience of what I am trying to make sense of. I am particularly grateful to Mario Cortina-Borja, Carlos Grijalva-Eternod, David Leon, Emma Pomeroy, David Osrin, Graham Rook, Aubrey Sheiham, Meghan Shirley, Mario Siervo, Jay Stock, Julie Wallace and Elizabeth Wells for discussions and critique of selected chapters. Despite their support, specialists will no doubt find many errors in this book, or point to literature of which I am ignorant. My hope is that, though the facts must inevitably become outdated, the broader concepts will remain valid. I am extremely grateful for the support and patience of my editor, Katrina Halliday, at Cambridge University Press, and for the meticulous work of Victoria Parrin, Velmurugan Inbasigamoni, Richard Hallas and colleagues on the manuscript.

Above all, my greatest support has come from Akanksha, who has read every chapter, made sure I kept women at the heart of the arguments, joined in the research efforts and periodically enticed me back to the mountains to regain the energy to write. May we always return to mountains and oceans, patchwork fields and fragrant orchards, and when day is done gaze up at countless stars. . .