

Abstract

Society's Laboratories:
Biomedical Nutrition and the Modern Chinese Body, 1910-50

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2009

The central topic animating my dissertation concerns the practice and proliferation of biomedical nutritional research in China from 1910-1950. I focus on the connection between the field of nutrition (*yingyangxue*) and the social production of knowledge—namely, how biomedical nutrition contributed to, as well as helped construct, specific kinds of lived bodily experiences demonstrative of Chinese modernity.

In the early twentieth century, biomedical nutrition emerged as an important branch of scientific inquiry in urban China. Although most commonly associated with food research, the field of Chinese nutrition also advanced research into the physiological processes and characteristics of the Chinese. Spurred by popular New Culture sentiments that envisioned societal advancement through the lockstep development of science and democracy, researchers sought to identify the proper metrics for evaluating the health and well-being of the Chinese populace. They endeavored to identify the physiological standards specific to the Chinese, and in so doing, struggled to reconcile the claims of biomedical universalism against the specificity deemed inherent in the Chinese body.

In developing the language and scientific criteria for normative health that would guide nutritionally-oriented social engineering projects in the 1930s and 1940s, researchers redefined the relations linking scientific research and the social sphere. Biomedical nutritional researchers articulated new sites for the production of experimental knowledge as well as reshaped the international discourse of scientific nutrition to fit a Chinese context. By focusing upon children, researchers lent credence to nationalist arguments that the strength of the nation derived from its children's bodies and helped institute physical examination techniques in institutional settings ranging from community health contests to government schools.

By focusing upon biomedical nutritional research and the Chinese community of researchers invested in the task of integrating nutritional knowledge into the fabric of the Chinese everyday, this dissertation helps fill a lacuna in the historiography of the spread of western science and the social construction of scientific knowledge. Biomedical nutrition in Republican China was neither a simple case of native acquiescence nor local resistance. Local contexts mattered, and self-definition proved a strong current in this tale of medical science in modern China.

Society's Laboratories:
Biomedical Nutrition and the Modern Chinese Body, 1910-1950

A Dissertation
Presented to the Faculty of the Graduate School
Of
Yale University
In Candidacy for the Degree of
Doctor of Philosophy

by
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December 2009

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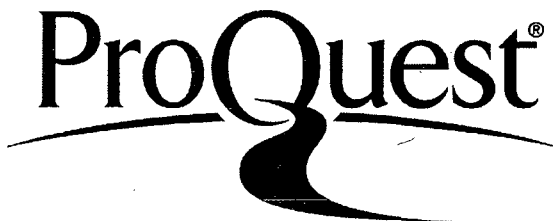
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Acknowledgements

I have benefited enormously from the patience and kindness of many. I cannot claim to have always been worthy of such generosity, and I hope the brevity of these words upon the page will never hide the depth of my gratitude.

My advisor, Jonathan Spence, has been steadfast in his support. Few have both the musicality of language and erudition that he has, and I consider myself lucky to have been the recipient of his insightful, persistent questioning. My time at Yale was all the more meaningful, because I had the opportunity to learn from Beatrice Bartlett, Ann-Ping Chin, Paul Gilroy, Susan Lederer, and Mary Ting Yi Lui. Their help and tutelage has become my model for the very best that the academy can offer.

It is a privilege to thank Morris Bian, Sherman Cochran, Lorraine Daston, Ian Hacking, Christian Henriot, Ping-chen Hsiung, Sean Hsiang-lin Lei, Bridie Andrews-Minehan, Nathan Sivin, Hilary A. Smith, William Summers, Mark Swislocki, and Yi-Li Wu, for their various assistance over the years. The Fulbright Foundation generously supported my year of research in Shanghai and Nanjing. Special thanks to the Prize Fellowship for allowing me three years of uninterrupted writing and research. I want to thank the staff at the Shanghai Municipal Archives, the Shanghai Public Library, the Number 2 Historical Archive in Nanjing, the Rockefeller Archive in Tarrytown, the New York Public Library, the Wellcome Library in London, and the British National Archives at Kew for their assistance in locating materials and providing helpful insights when I returned to the counter in a befuddled state. Martha Smalley, the Special Collections Librarian at the Yale Divinity School Library has always been gracious in helping me find materials associated with Christian child welfare projects in China. Professor Shen Xiaoyun welcomed me to Nanjing University. She was an endless source of research tips and suggestions. Without her assistance and convivial manner, my time in Nanjing would have been much less interesting.

Johanna Ransmeier, Janet Chen, and John Delury were unfailing in their sound advice on all things academic and scholastic; their erudition and kindness have been a godsend. Chris Leighton,

Brooks Jessup, and Felix Boecking were steadfast and funny companions in and outside the archives. Special thanks to Daniel Asen, Masato Hasegawa, Su Yun Kim, Wennan Liu, Hyunhee Park, Farzin Vejdani, Brian Vivier, and Ping-Yuan Wang for enduring my long-windedness and responding with acumen. Cheryl Beredo, Natasha Bershadsky, Dennis Gaitsgory, Laura Grappo, Megan Glick, Kobi and Adi Kremnizer, Di Yin Lu, Barry and Gretchen Mazur, K-Sue Park, Manish Patnaik, Emmanuel Raymundo, Cotton Seed, and Susie Woo have each in wonderfully diverse ways kept me sane, and sometimes even housed, during these not-so-trying, but altogether engrossing times.

Last but never least, I want to thank my family—my wonderfully silly and clever family. Despite our individual peregrinations, Michael, Linsey, and I all keep coming back to a rambling red house lovingly lined with Christmas trees and a periwinkle grocery store just a few blocks from the state capital building. Who could have guessed we would each find so much intellectual fodder in the union of food, medicine, and business? I cannot thank my parents enough for their love and support—that they have never asked for such an accounting is surely a testament to their goodness. And to John, who has generously given me an alphabet of mathematical terms I have yet to incorporate into my own writing, I want to express my steadfast gratitude for sharing with me this path and daily practice.

Introduction

By the spring of 1938, the physical terror and social upheaval that had riven Shanghai society had been largely patched over, and insofar as it was possible, life had resumed many of its former habits. The hundred some thousand refugees that had flooded into the city, especially into its foreign concessions, to escape fighting between Chinese and Japanese forces, had by April 1938 largely reduced in number. Some refugees were repatriated to their home villages; many found resources, through friends, family, guilds, and aid agencies, to leave the camps and forge out on their own. Children returned to schools; shops reopened; factory workers resumed work; and the city's transport—the rickshaws, the buses, the trams—were back to knitting the different sectors of the city into a composite whole.

It was during this period of relative calm that the Shanghai Municipal Council, the governing body of the International Settlement, received a request from one Ni Zhangqi (T. G. Ni 倪章祺), associate researcher of the Henry Lester Institute for Medical Research, who wanted to measure the heights and weights of Chinese schoolchildren attending Settlement schools. His research objective was straightforward. Having already measured the heights and weights of “children who [were] not well nourished,” that is to say, refugee children, Ni wrote, “Chinese children in the Settlement Schools are from comparatively well-to-do families, which can afford to give them better food. It would be interesting to have such children for comparison.”

From our present vantage point, Ni's request seems so unassumingly bureaucratic. To conduct his survey, he petitioned the proper authorities, which passed along his letter of application to the various internal offices with a political stake in Ni's work (e.g., Public Health Department, Commissioner of Schools, etc.). Ni for his part drafted an application that included a reasonably detailed plan of action garlanded with just the right number of scientific platitudes. Swayed by the spirit of scientific cooperation and reassured that Ni's work would neither impinge upon normal school activities nor require municipal funding, the Settlement authorities granted him access to the

schools. Ni's venture into the Municipal school system to measure a portion of its child population did not represent a dramatic innovation in the working relationship emerging between science and local politics. Less than a year previous, Ni's colleague at the Henry Lester Institute of Medical Research, Hou Xiangchuan (H. C. Hou, 侯祥川), had gained the necessary permissions to conduct a series of anthropometric surveys in the name of ascertaining the objective, physiological parameters of improved nutrition. Thus, on the surface, what we find appears to be a routine exercise in the civic life of modern science in Republican China: no outrageous claims, proper paperwork, and reasonable cooperation among all parties.

If, however, we press upon the surface to feel the texture within, the encounter between a medical researcher and young Chinese students originally brought about by a series of innocent, administrative acts, yields a variety of questions, which have largely been unexplored within the context of the history of modern China. How do we define this clinical-research encounter? What role did it play in the formation of the scientific discipline of biomedical nutrition in Republican China? And what kinds of broader historical understandings of the various forces at play in the construction of Chinese experiences of modernity can we elicit from it?

"Society's Laboratories" investigates the practice and proliferation of biomedical research in China from 1910 to 1950 in order to better understand how biomedical research came to be regarded as a body of knowledge applicable to the society as a whole. It demonstrates how biomedical research, particularly in the field of nutritional science, afforded Chinese medical researchers and clinicians opportunities for redefining the Chinese somatic body and its relevance to the actualization of the modern Chinese nation. The trajectory of biomedical nutritional research in Republican period China has traced a path from the laboratory through schoolyard to refugee camp and back again, and throughout these various peregrinations, the moments that sparked my initial interest and continue to undergird the overall structure of this dissertation were those that brought the Chinese nutrition scientists in direct contact with his human subject. To render his work meaningful to Chinese society, the Chinese nutrition scientist needed these encounters to generate evidence and confirm theories

about the nutritional health (*yingyang jiankang* 營養健康) of the Chinese people. But rather than assuming that this clinical-research encounter between the Chinese nutrition scientist and the Chinese patient was simply one among many research methodologies employed in the service of the production of Chinese nutritional knowledge, I want to highlight its potential as a kind of heuristic device with real world implications. The clinical-research encounter as articulated within the context of biomedical nutrition inflected social, intellectual, and political changes to Chinese society during the first half of the twentieth century.

In order to understand how biomedical nutritional research became enmeshed in the political imaginary of a modern China—how its research operations helped dictate the terms by which a normalization of the Chinese body could take place, and how such a body could be enlisted into the service of the Chinese nation—I want to focus our attention upon this moment of scripted interaction between researcher and research subject and parse out the social and ideological factors operating within its midst. Doing so satisfies two objectives. It provides a starting point for a direct analysis of a set of diagnostic practices within, and their significance to the development of, the disciplinary field of biomedical nutrition in Republic China. In addition, the clinical-research encounter enables a tentative spotlighting of the paths leading from the production of scientific knowledge to the more personal realm of collective experience and subjectivity.

Nutrition and its Asymptotes

According to the OED, *nutrition* has long been associated with “the action or process of supply, or of receiving, nourishment or food.” The term can be also be used to describe an object that nourishes or gives nourishment. In both these regards, *nutrition* refers not so much to a state of existence within a single person or for a group of people, but rather to some vital-making quality of that object, which nourishes. Nutrition inured to that which nourished, not to that which was nourished, but by the late nineteenth century, *nutrition* began to be used to designate “the state or

condition of being (well or badly) nourished,” such that a person’s state of health served as an indicator of good or bad nourishment.¹

This enlargement of the semantic field coincided with the rising prominence of nutritional science and its biochemical interpretation of the human body and its physiological needs throughout the United States and Europe. Since the mid-eighteenth century, German scientists had pioneered a new scientific approach to food and eating. Separating foods into water, carbohydrate, fat, protein, and minerals and then concluding that each nutrient served specific physiological functions, German chemists like Justus von Liebig, who famously asserted that proteins, carbohydrates, and fats—the “dietetic trinity”—provided all the nutrition the human frame needed and created an extract of meat that swept the fancies of all manner of healing professions in Europe during the 1860s, were laying the conceptual groundwork for a gastronomic revolution. Instead of considering taste, appearance, or other such factors, German chemists and their successors were, in the words of the historian Harvey Levenstein, “telling people to eat ‘what was good for them’ rather than ‘what they liked.’”²

The discovery of essential food factors, i.e., vitamins, whose absence, as opposed to presence, carried the deleterious consequence of disease, galvanized an avalanche of nutritional research that further refined the social message of eating “what was good for them” to eating “what was good for their bodies.” Christiaan Eijkman was the first to correlate beriberi with the consumption of polished rice when he showed in 1897 that the condition could be induced in fowls by feeding them on polished rice and prevented when rice polishings were included in the diet.³

¹ *Oxford English Dictionary*, http://dictionary.oed.com.ezp-prod1.hul.harvard.edu/cgi/entry/00328677?single=1&query_type=word&queryword=nutrition&first=1&max_to_show=10 (1 June 2009).

² Harvey Levenstein, “The New England Kitchen and the Origins of Modern American Eating Habits,” *American Quarterly* 32.4 (Autumn 1980): 370.

³ Eijkman’s work was especially important in changing scientific opinion about the cause of beriberi, but he was not the first to recognize that beriberi could be prevented by changes to the diet. Takaki Kanehiro 高木兼寛, a young surgeon serving the Japanese navy during the 1870s and 1880s, succeeded in reducing the number of cases of beriberi (*kakke*) among naval cadets by changing the diet to a more European pattern. By decreasing the amount of rice in favor of barley, vegetables, meat, and fish in the sailors’ diets, Takaki avoided many of the health consequences associated with a diet heavily composed of polished rice. Casimir Funk isolated the essential food factor, vitamin D, in 1912. Kenneth Carpenter, *Beriberi, White Rice, and Vitamin B: a Disease, a*

Edward Mellanby, the British biochemist, has suggested that European interest in the clinical investigation of dietary deficiency diseases tarried until one of the more common diseases of Europe, rickets, was also shown to result from the absence of an essential food factor, vitamin D. In other words, until the notion of dietary deficiency disease could be demonstrably applied to the European context, its scientific potential remained largely untapped despite the scholastic rumblings made by Eijkman's work on beriberi and Axel Holst and Theodore Frölich's work on scurvy.⁴

Mellanby observed, "From 1920 onwards, the flame of dietetic and nutritional research became a fire extending over all countries of the world." Mellanby's own role in proving that rickets was a disease primarily due to the absence of vitamin D, a fat-soluble factor, in the diet may have colored his estimation of the field of research prior to his discovery, but at the very least, the 1920s witnessed an intensification of nutritional research in the direction of deficiency diseases as private, public, and commercial players entered the field.⁵ Moreover, his allusion to the international dimension of nutritional research was particularly apt for a couple of reasons. Consider the case of beriberi. Hilary Smith has astutely observed that during the nineteenth century, beriberi was not simply a disease of epidemic proportion it was also a disease of empire that ravaged armies, navies, and native laborers.⁶ Because beriberi's scope of affliction imperiled political and economic

Cause, and a Cure (Berkeley: University of California, 2000), pp. 9-13, 80-94. For a fascinating and compelling counterargument to the common equation of the ancient Chinese disease entity, *jiaoqi*, to beriberi, see Hilary Smith, "Foot Qi: History of a Chinese Medical Disorder" (Ph.D. dissertation, University of Pennsylvania, 2008).

⁴ Between 1907 and 1912, Holst and Frölich attempted to identify a source of an anti-beriberi factor in different foods. Experimenting with guinea pigs, the two collaborators discovered that while the animals remained healthy on a diet of cereal grains and fresh cabbage, if fed on cereal alone, the guinea pigs died—much to their surprise—of scurvy. Their work reaffirmed the century-old suspicions that fresh fruit or fruit juice, especially the most acidic juices, demonstrated antiscorbutic activity. Their work was not uniformly accepted; even Elmer McCollum, the venerable father of modern nutrition who isolated vitamin A and B, doubted that scurvy constituted a vitamin deficiency disease. His reservations stemmed from his use of a different animal model for experimentation, i.e., rats, which are one of the few animals with the capacity to synthesize their own vitamin C. Walter Gratzer, *Terrors of the Table: The Curious History of Nutrition* (Oxford: Oxford University Press, 2005), p. 175.

⁵ Edward Mellanby, "Nutritional Science in Medicine," *British Medical Journal* 2.10-11 (1944): 202. For a more detailed treatment of formative moments and ideas in the formation of nutritional science, see Elmer McCollum, *A History of Nutrition: The Sequence of Ideas in Nutrition Investigations* (Boston: Houghton Mifflin Co., 1957).

⁶ Smith, "Foot Qi: History of a Chinese Medical Disorder," pp. 166-72.

imperatives, nations like Japan and the Netherlands with imperial aspirations had a vested interest in preventing, or at the very least containing, diseases that impinged upon economic and political might. The effects then of nutritional deficiency diseases crossed regional and national boundaries. The research infrastructure to comprehend these kinds of diseases also reflected the global nature of imperial design and ambition. Crisscrossing the competing empires of the late nineteenth and early twentieth centuries lay a network of research institutions dedicated to the task of elucidating the secrets of nutritional health and applying such knowledge to changing the way local populations eat.

Local Science

It was against this shifting backdrop of international science that Chinese nutrition scientists like Ni Zhangqi and Hou Xiangchuan attempted to expand the horizons of Chinese scientific practice and research by probing segments of the population hitherto unexamined (children, farmers, laborers, and soldiers) and at the same time address the specific nutritional challenges facing the country. Theirs was a project that blurred the boundaries between pure and applied science, and instead, pursued what H. G. Earle, the Director of the Henry Lester Institute of Medical Research, the home institution for both Ni and Hou, described as foundational studies—research that contextualized the specific dimensions of universal knowledge as made manifest by local circumstance. This focus upon local difference represented an alternate formulation of Ding Wenjiang's tripartite classification of research as pure, applied, and routine service.⁷ In describing the scientific mission of the newly formed Academia Sinica, Ding distinguished between the three types of research by its relationship to state-building. Pure research contributed neither directly nor indirectly to industrial or economic state-building and instead served as the foundation for applied research, whose immediate goals were in the direct service of the nation. Routine service, in contrast to both pure and applied research, addressed aspects of people's daily lives, e.g., time service, weather forecasts, the testing and standardization of materials and instruments, etc. Foundational studies

⁷ Ding Wenjiang 丁文江, "Zhongyang yanjiuyuan de shiming" 中央研究院的使命 [The mission of the Academia Sinica], *Dongfang zazhi* 東方雜誌 [Eastern Miscellany] 32.2 (January 1935): 5-8

functioned as a cross-section of these three types: it possessed the potential to contribute to scientific theory, but in emphasis tended to pursue empirical questions that either appealed directly to the betterment of people's daily lives or laid the groundwork for more theoretic work.

This focus upon local environment and foundational work should direct our attention to the importance of understanding the dynamics of local science. If we break down the monolith of “Western science” into specific fields or sets of practices, we find that ideas travel at different times and along different paths. Seeking out how specific sciences operated within different local settings helps attenuate the blanket urge to treat “Western science” as a viable conceptual category within a narrative modern triumphalism. Some of the most exciting scholarship being produced today concerns the dynamics of local science in non-Western contexts. Drawing insight from postcolonial and subaltern approaches that emphasized indigenous resistance and appropriation of foreign knowledge regimes, recent scholarship on social and scientific enterprises in non-Western settings have helped elucidate the complexity of local engagements with Western fields of knowledge beyond any simplistic reiteration of “colonizing the body” or “contesting colonial hegemony.”⁸ What scholars like Chandak Sengoopta, Omnia El Shakry, Andrew Barshay, and Cyrus Schayegh have demonstrated from their very different sites of investigation—India, Egypt, Japan, and Iran, respectively—are ways in which Western fields of social and scientific knowledge were dialectically

⁸ “Colonizing the body” refers to David Arnold’s argument that within the dialectics of power and knowledge in colonial India, the body functioned as an important “site of colonizing power and of contestation between the colonized and the colonizers.” His critical examination of the role of medical technologies in the subjugation and colonization of India opened pathways for grappling with the political implications of medical knowledge and its role in creating the proper subjects for its care. Other important scholarship employing a similar vein of analysis include Megan Vaugn’s *Curing Their Ills: Colonial Power and African Illness* (Stanford: Stanford University Press, 1991), and Warwick Anderson’s *Colonial Pathologies: American Tropical Medicine, Race, and Hygiene in the Philippines* (Durham, NC: Duke University Press, 2006). “Contesting colonial hegemony” is a shorthand reference for the body of scholarship that tackles the topic of colonial public health through the vantage point of the indigenous population. Emphasizing instead the local people’s ability to appropriate and refashion conceptions of health and disease brought by colonial forces, scholars like Ashis Nandy and Bridie Andrews demonstrate how local actors creatively used indigenous practices of health, health, and hygiene to confront, question, and reshape Western knowledge. See Bridie Andrews and Chris Cunningham, eds., *Western Medicine as Contested Knowledge* (Manchester: Manchester University Press, 1997); Bridie Andrews, “Tuberculosis and the Assimilation of Germ Theory in China, 1895-1937,” *Journal of the History of Medicine and Allied Sciences* 52.1 (1997): 114-57; and Ashis Nandy, “Modern Medicine and Its Non-modern Critics,” in *The Savage Freud and Other Essays on Possible and Retrievable Selves* (Princeton, NJ: Princeton University Press, 1995).

intertwined with their non-Western sites of production.⁹ Instead of speaking of assimilation or transference, these scholars highlight the process of translation as a creative endeavor that relies upon an already existent grammar of lexical understanding even as it displaces such semantic expressions with modern science.

Although certainly indebted to the work of Joseph Needham, scholars working on histories of science in China have developed more nuanced social analyses by exploring individual fields and showing how dynamic Chinese engagement with Western science and technology from the mid-19th century through the 20th century really was. Benjamin A. Elman has argued that the Sino-Japanese War “altered the frame of reference for the post-1895 period for both the new Chinese and the new Japanese intelligentsia that was emerging from Qing and Tokugawa scholarly elites.” Qing experimentations with arsenals, navy yards, and factories were reinterpreted, particularly by early twentieth century Chinese reformers and revolutionaries, as misguided and backward attempts to mimic rather than develop the country’s scientific potential.¹⁰ In terms of scholarship, this disparagement of Qing nineteenth century efforts has to some degree blinded us to the actual work conducted on the ground. That is to say, we know rather more about how Chinese intellectuals talked about “science” than we do about how Chinese scientists conducted “science.” Fa-ti Fan in his work on British naturalists and their Chinese collaborators in 19th century China has advocated the notion of the cultural borderland in order to highlight the polycentric and multi-layered nature of scientific exchange outside the imperial metropole. Lawrence Schneider and his work on plant genetics, William Haas on botany, Danian Hu on the Chinese physicists and the theory of relativity,

⁹ Chandak Sengoopta, *The Imprint of the Raj: How Fingerprinting was Born in Colonial India* (London: Macmillan, 2003); Omnia El Shakry, *The Great Social Laboratory: Subjects of Knowledge in Colonial and Postcolonial Egypt* (Stanford: Stanford University Press, 2007); Andrew Barshay, *Social Sciences in Modern Japan: the Marxian and Modernist Traditions* (Berkeley: University of California Press, 2004); and Cyrus Schayegh, *Who is Knowledgeable is Strong: Science, Class, and the Formation of a Modern Iranian Society, 1900-1950* (Berkeley: University of California Press, 2009).

¹⁰ Benjamin Elman, *On Their Own Terms: Science in China, 1550-1900* (Cambridge, MA: Harvard University Press, 2005), p. xxxvii and Part V.

have each pursued the question of cultural exchange through the intellectual and institutional formation of specific scientific disciplines in China during the twentieth century.¹¹

The development of biomedical nutrition (*yingyangxue* 營養學) in China affords us a fascinating vista into how science has been practiced in the modern context of nationalism, internationalism, and modern state-building. Since nutrition did not emerge as an experimental scientific research field until after WWI, the new generation of Chinese technicians, researchers, and physicians who had received their training at medical schools and medical research institutes in the 1920s and 1930s were well-positioned to actively contribute to the international exchange and production of nutritional knowledge. Spurred by popular New Culture sentiments that envisioned societal advancement through the lockstep development of science and democracy, Chinese nutrition researchers sought to identify the proper metrics for evaluating the health and well-being of the Chinese populace. They endeavored to identify the physiological standards specific to the Chinese people, and in so doing, struggled to reconcile the claims of biomedical universalism against the specificity and the particularity deemed inherent in the Chinese body.

Facticity and Being

The history of biomedical nutrition in Republican China is a history about the articulation of specific kinds of facts—facts that did not occupy a place of importance within China’s long and venerable tradition of dietetics. In her seminal work, *A History of the Modern Fact: Problems of Knowledge in the Sciences of Wealth and Society*, Mary Poovey identifies two common assignments for facts.¹² On the

¹¹ For work on science societies, see Zuoyue Wang, “Saving China through Science: The Science Society of China, Scientific Nationalism, and Civil Society in Republican China,” *Osiris* 33 (2002). For work on Chinese geology, see Grace Shen; physics, Iwo Amelung, “Naming Physics: The Strife to Delineate a Field of Modern Science in Late Imperial China,” in Michael Lackner and Natasha Vittinghoff, *Mapped Meanings: The Field of New Learning in Late Qing China*; chemistry, David Wright, *Translating Science: The Transmission of Western Chemistry into Late Imperial China, 1840-1900* and James Reardon-Anderson, *The Study of Change: Chemistry in China, 1840-1949*; Peter Neushul and Zuoyue Wang, “Between the Devil and the Deep Sea: C. K. Tseng, Mariculture, and the Politics of Science in Modern China,” *Isis*, 2000, 91:59–88. On Darwinism and social Darwinism, Benjamin Schwartz, *In Search of Wealth and Power: Yen Fu and the West* (Cambridge, Mass.: Belknap, 1964); and James Reeve Pusey, *China and Charles Darwin* (Cambridge, Mass.: Council on East Asian Studies, Harvard Univ., 1983).

¹² Mary Poovey, *A History of the Modern Fact: Problems of Knowledge in the Sciences of Wealth and Society* (Chicago: University of Chicago, 1998).

one hand, facts are seen as particulars distinct and immune from assumptions or biases (as might be implied by “theory,” “hypothesis,” or “conjecture”). On the other, they are deemed to be evidence “that has been gathered in the light of—and thus in some sense *for*—a theory or hypothesis. Because facts register this tension between concrete particular and systematic knowledge, Poovey outlines an historical account of the modern fact, which may be simply characterized by its often numerical appearance and connotations of transparency and impartiality, in order to show how what counts as a fact has shifted over time and become embroiled in theoretical disputes. With respect to Chinese dietetics, my point is a simple one. Facts of the sort prized and privileged in biomedical nutritional research—the chemical properties and relations of foodstuffs, bodily measurements, rates of metabolism, etc.—do not necessarily possess the same meaning and relevance if transported under the terms explored by Chinese dietetic knowledge. We may attribute these facts with the richness and variety embodied in concrete phenomena, or we may emphasize their role in demonstrating aspects of theoretical knowledge, but in neither case can we conclude with absolute certainty that facts about metabolism and weight would perform the same functions—indeed, be as meaningful—in a different epistemological scheme.

Her work, which shares many of the same objectives and intellectual interests as the subset of the history of science that Lorraine Daston has named historical epistemology, stems from the basic premise that the categories by which knowledge is organized informs what can be known and how it is used.¹³ For scholars like Mary Poovey, Lorraine Daston, Peter Galison, and Peter Dear, a critical examination of the categories of facticity, evidence, objectivity, and so forth helps displace the narrative of the inexorable march of “science,” by demonstrating the contingent nature by which the sciences address the problem of selecting and constituting “working objects.”¹⁴ This dissertation does

¹³ Lorraine Daston has ruminated upon the subject of historical epistemology in a variety of contexts. See, for example, Daston, “The Moral Economy of Science,” *Osiris* 10 (1995), pp. 3-24; and Daston and Peter Galison, “Image of Objectivity,” *Representations* 40 (1992), pp. 81-128.

¹⁴ See James Chandler, Arnold I Davidson, and Harry Harootunian, *Questions of Evidence: Proof, Practice, and Persuasion across the Disciplines* (Chicago: University of Chicago Press, 1994); Lorraine Daston and Peter Galison, *Objectivity* (New York: Zone Books, 2007); Peter Dear, *Discipline and Experience: The Mathematical Way in the*

not claim to have accomplished anything as profound as a historical epistemology, but having drawn inspiration from this body of scholarship, “Society’s Laboratories” attempts to flag how shifting definitions and epistemic values encouraged the Chinese embrace of bodily measurements and nutritional guidelines.

The appeal of quantification extended beyond the field of biomedical nutrition. For Republican period China, a whole variety of scientific objects were, in effect, coming into being as they became entangled in webs of cultural significance, material practices, and theoretical derivations, and the commonality shared amongst the different objects was countability. The most immediate evidence of scientific objects coming into being can be discerned in the growth of scientific studies spearheaded and undertaken by Chinese social scientists during the first two decades of the twentieth century, although it should be noted that numerical empiricism may have roots extended deeper than the twentieth century. Factory conditions, the lives and salaries of rickshaw pullers, and the nutritional content in rural and urban diets—all these became topics for investigation and analysis in which measurement and techniques of counting reified diverse social phenomena under a common canopy of comparability and equivalence.

Although scholarship invested in the historical epistemology or the applied metaphysics of scientific disciplines and scientific objects in China is still developing, several scholars of Chinese history have broached the matter from various avenues of inquiry. Benjamin Elman’s *From Philosophy to Philology: Intellectual and Social Aspects of Change in Late Imperial China* provides the best example of how an analysis of the conceptual categories organizing how knowledge can be known and used affords unexpected, if not dramatic, insight into Chinese society. By undertaking a sociology of the formation of *kaozheng xue* 考證學 (evidential learning), Elman illuminates how a shared epistemological perspective—one that prioritized concrete studies and emphasized precise rules of proof and verification as the fundamental tenet of knowledge—emerged. Although evidential

Scientific Revolution (Chicago: University of Chicago Press, 1995); Peter Galison, *Einstein’s Clocks, Poincaré’s Maps: Empires* (New York: W. W. Norton, 2003).

scholarship could not escape the social upheavals of the mid-nineteenth century, its intellectual legacy persisted in the rise of New Text Confucianism during the nineteenth century, which provided the philosophic rationale for the reemergence of the statecraft movement. The apolitical stance of *kaozheng* scholars came under attack, but their rigor and methodology continued to inform the theoretical argumentation and scholastic disposition of their critics. Elman has also suggested that evidential scholarship laid the groundwork for later shifts in Chinese scientific enterprise during the early twentieth century. With regards to paleographical research, Elman observes, “Momentous discoveries are not unprepared for, however. Recognition of the potential importance of the oracle bones for the study of ancient China did not grow out of the introduction of a Western, scientific perspective to Chinese scholarly circles in the late nineteenth century.”¹⁵

Other scholars have pursued the question of Chinese science and social science from the perspective of cross-cultural exchange and institutional dynamics of power. Mark Swislocki has suggested that biomedical debates in the 1920s and 1930s by medical researchers and government agents authenticated and legitimized a notion of malnutrition that directly linked it to issues of urban governance and social relief.¹⁶ Yung-chen Chiang has suggested that social sciences served as a kind of *lingua franca* of the cultural frontier between Chinese and American interests. His examination of three different social science enterprises: Yanjing Sociology Department, Nankai Institute of Economics, and the agrarian research of Chen Hansheng, reveals the complex ways in which Chinese intellectuals developed new modes of governance, expertise, and social knowledge through a social

¹⁵ Benjamin Elman, *From Philosophy to Philology: Intellectual and Social Aspects of Change in Late Imperial China* (Cambridge, MA: Council on East Asian Studies, Harvard University Press, 1984), p. 255.

¹⁶ Mark Swislocki, “Feast and Famine in Republican Shanghai: Urban Food Culture, Nutrition, and the State,” (Ph.D. dissertation, Stanford University, 2001). Swislocki includes a section on the Henry Lester Institute of Medical Research and its role in the “discovery of malnutrition.”¹⁶ His dissertation, as a whole, examines how a history of food in Republican Shanghai illuminates aspects of Chinese modernity, thus his interest focuses on the formation of biomedical nutrition as a kind of social space in which researchers, state officials, social reformers, and social commentators each contributed, expanded, and redefined the concept of health. He provides compelling evidence that the 1934 investigation of living standards of the urban poor undertaken by Bureau of Social Affairs of the Shanghai municipal government demonstrates the Bureau’s own adherence to the biomedical nutritional standards established by medical researchers. What is not clear, however, is how such standards became standards.

scientific framework. One of the consequences of Chinese adoption and transformation of social scientific theories and methodologies was the construction of a number of new social identities. Although process of “making up people” has not been the specific subject for inquiry for the following scholars, it is clear that their research is indebted to the emergent classification schemes and the articulation of new kinds of people during early twentieth century Chinese social sciences.¹⁷ David Strand draws from the sociological surveys of Beijing rickshaw pullers conducted under the guidance of John Stewart Burgess at Yenching University for his book *Rickshaw Beijing: City, People, and Politics in the 1920s*.¹⁸ Composition of urban life as well as the qualities of urban residents as a distinct social group is explored with wonderful detail in Hanchao Lu’s *Beyond the Neon Lights: Everyday Shanghai in the Early Twentieth Century*.¹⁹ Janet Chen’s work on the poor during the late Qing and Republican periods, Gail Hershatzer’s work on prostitutes, and Andrew F. Jones’s initial queries into the explosion of discourse for and about children, childhood, and child development are just a few examples of recent scholarship that invite further reexamination of the early twentieth century epistemological lineaments in the formation of new manners of thinking and new forms of being.²⁰

¹⁷ “Making up people” references the work of Ian Hacking whose interest in the classifications of people led him to observe the curious phenomena in which our sciences create kinds of people that in some sense did not exist before. Hacking is the first to note that this process of “making up people” is by no means straightforward and necessarily demonstrative of top-down power relations. Drawing from the work of Erving Goffman, Hacking has argued that there is a “looping effect” in which categories of people become self-impart and integral to the individual’s own sense of identity. See Ian Hacking, “Autistic Autobiography,” *Philosophical Transactions of the Royal Society B* 364 (2009): 1467-73; “Making People Up,” *London Review of Books* (2006); “Between Michel Foucault and Erving Goffman: Between Discourse in the Abstract and Face-to-Face Interaction,” *Economy and Society* 33.3 (2004): 277-302; *Historical Ontology* (Cambridge, MA: Harvard University Press, 2002); and *Rewriting the Soul: Multiple Personality and the Sciences of Memory* (Princeton: Princeton University Press, 1995).

¹⁸ David Strand, *Rickshaw Beijing: City, People, and Politics in the 1920s* (Berkeley: University of California Press, 1989), chapter 2, in particular.

¹⁹ Hanchao Lu, *Beyond the Neon Lights: Everyday Shanghai in the Early Twentieth Century* (Berkeley: University of California Press, 1999).

²⁰ Janet Chen, “Guilty of Indigence: The Urban Poor in China, 1900-1949” (Ph.D. dissertation, Yale University, 2005); Gail Hershatzer, *Dangerous Pleasures: Prostitution and Modernity in Twentieth Century Shanghai* (Berkeley: University of California, 1997); Andrew F. Jones, “The Child as History in Republican China: A Discourse on Development,” *positions* 10.3 (2002); and M. Colette Plum, “Unlikely Heirs: War Orphans During the Second Sino-Japanese War, 1937-1945” (Ph.D. dissertation, Stanford University, 2006).

Narratives of Deficiency and Medical Pluralism

By prioritizing measurement as a practical, objective form of social analysis, Chinese nutrition scientists worked within an intellectual environment that did not admit the presence or participation of the older, indigenous body of Chinese dietetic knowledge. Although China possesses a long and innovative history of medical dietetics, biomedical nutrition—its physiological principles grounded in a biomechanical conception of the body and its various needs—offered little in the way of invitation or recognition of this alternative epistemology. Indeed, if men like Ni Zhangqi and Hou Xiangchuan, the practitioners and purveyors of biomedical nutrition to the broader scientific community and the general public, expressed any thoughts about indigenous Chinese medical ideas and practices, such sentiments tended toward derision and antipathy.²¹ The main criticism they leveled against Chinese dietetics reflected in most cases unacknowledged ignorance and prejudice. Chinese dietetics, like traditional Chinese medicine, represented a legacy of sustained superstition and sloppy analogic thinking that deceived the populace with ideas about the health-value of exotic items like ginseng and swallow's nest. Indeed, it is not until the late 1930s do we begin to see attempts by Chinese nutrition scientists to explore, reclaim, and reinterpret aspects of Chinese dietetics in terms of biomedical nutrition. But even these tentative reevaluations of Chinese dietetics' epistemological value failed to temper the strong sense among Chinese nutrition scientists and researchers that what Chinese dietetics lacked against its modern counterpart was rigorous, quantitative thinking.

From an historical perspective, this “absence” of quantitative thinking is not a sign of deficiency; nor should we assume it demonstrates a point of failure, because Chinese dietetics

²¹ Zhao Hongjun mentions the disdain and dismissal of indigenous Chinese medicine as unscientific expressed by members of the Chinese Medical Association. See his essay, “Chinese versus Western Medicine: A History of Their Relations in the Twentieth Century,” *Chinese Science* 10 (1991). There were moments of exception. Hilary Smith has observed that by the 1930s, traditional Chinese doctors had assimilated key disease entities from Western medicine in a political bid to redefine the social and political relevance of Chinese medicine to the nation. She focuses specifically on the beriberi-*jiaoqi* connection and translation, but other diseases undergoing reassessment included the ancient diarrheal disorder *huoluan* 霍亂 that became cholera and the febrile disorders *niie* 瘧 and *shanghan* 傷寒 that became malaria and typhoid. Hilary Smith, “Foot Qi: History of a Chinese Medical Disorder” (Ph.D. dissertation, University of Pennsylvania, 2008), pp. 231-46. Based on my work with Chinese biomedical nutritional scientists, the reverse phenomenon, i.e., the reclamation of specific traditional Chinese disease entities, can also be seen from the late 1930s onwards as Western-style Chinese doctors and researchers attempt to consolidate their political and scientific influence through an assertion of an older “claim” to scientific knowledge.

traditionally did not include discussion of the chemical composition of food or the somatometric indices for evaluating nutritional health or numerical guidelines by which to parcel one's daily food allowance. While China's long tradition of dietetics has attracted the defense of notable scholars like Joseph Needham and his longtime collaborator Lu Gwei-djen, who drew upon its history to substantiate claims about the insightfulness and present utility of ancient Chinese knowledge, there is good reason to consider Chinese dietetics as neither a direct intellectual precursor nor competitor to biomedical nutrition.²² Height and weight, proteins and vitamins played no role in the formation of Chinese dietetic knowledge, whether applied in the services of satisfying hunger or treating disease, and while these mainstays of biomedical nutritional knowledge are now deemed inherent truths and part of the factual composition of the human body, it must be recognized that at an experiential level, height and weight, proteins and vitamins are abstractions that mean very little. We may all have a height and weight, but the possession of such characteristics does not by itself dictate their epistemological value.

Although a close relationship between nutrition and medicine can be traced back at least as far as the third century BC—the *Wushier bingfang* (Fifty-two Prescriptions), found in Han tomb no. 3 at Mawangdui, details a variety of concoctions for treating ailments, and the *Zhouli* (Rites of Zhou), which was compiled between the fourth and the first century BC, divides medicine into four branches, including dietetic medicine (*shiyi* 食醫)—there appears to have been little differentiation in

²² In their essay, “A Contribution to the History of Chinese Dietetics,” which first appeared in 1939 and was later republished several times afterward, Lu and Needham reiterate a common interpretation of *jiaoqi* as beriberi. Citing a handful of dietetic recipes found in Yuan dynasty Hu Sihui's *Yinshan zhengyao* (Principles of Correct Diet) and Sun Simiao's *Qianjin fang* (Thousand Golden Remedies), Lu and Needham assert that because some of the ingredients found on the recipes contain vitamin B₁ and the recipes were used to treat *jiaoqi*, *jiaoqi* must be the same as beriberi. Hilary Smith has insightfully explored the problems with this interpretation in her dissertation on “Foot-qi.” Her basic argument is that such an interpretation ignores the full extent to which *jiaoqi* also indicated symptoms and conditions unrelated to beriberi. Assuming a direct equivalence blinds us to the possibility that Chinese dietetic recipes may not have been devised with this particular deficiency in mind. Indeed, deficiency may not have been the governing rubric at all, as Chinese medical thinking and *yangsheng* (cultivation of life) practices conceived of the body differently. Lu Gwei-djen and Joseph Needham, “A Contribution to the History of Chinese Dietetics,” *Isis* 42.1 (April 1951): 13-20

application between drugs and foodstuffs.²³ In terms of medical theory and lexicon, drugs and foodstuffs were distinct, but their difference rested upon function rather than intrinsic qualities. According to the *Taisu* recension of the *Huangdi neijing* (Inner Canon of the Yellow Lord), “The five grains, the five domestic animals, the five fruits and the five vegetables, when used to satisfy hunger are termed foods (*shi* 食), but when used to cure illness are termed drugs (*yao* 藥).”²⁴ During the Tang dynasty (618-907), however, Ute Engelhardt has discerned a trend towards a differentiation between medical and culinary writings as separate genres.²⁵ The extant dietary literature with which Engelhardt builds her argument is limited, but Engelhardt nonetheless makes a compelling case for the Tang separation of *material medica* and *materia dietetica*, and the corresponding distinction between dietary therapy (*shiliao* 食療) and dietary treatment (*shizhi* 食治).

The implications of this differentiation manifested itself differently over the centuries. Zheng Jinsheng has explored how during the Song dynasty (960-1279) the social trend of “drugs as food” became popular in the form of health draughts and supplementary foods that could be purchased at market stalls. Consumed as an everyday beverage with the added benefit of regulating one’s *qi* or strengthening the spleen, health draughts included amongst their ingredients several foodstuffs with a

²³ Ute Engelhardt, “Dietetics in Tang China and the First Extant Works of *Materia Dietetica*,” in *Innovation in Chinese Medicine*, ed. Elisabeth Hsu (Cambridge: Cambridge University Press, 2001), pp. 173-91.

²⁴ Cited in Zheng Jinsheng, “The Vogue for ‘Medicine as Food’ in the Song Period (960-1279 CE),” *Asian Medicine* 2.1 (2006): 40. The *Huangdi neijing* is the most authoritative source for classical Chinese medical doctrine. It comprises of several collections of previously heterogeneous writings, which had been written over the course of century and compiled sometime between the first century BC and the first century AD. According to Nathan Sivin, the *Taisu* recension was probably compiled around 666 and 683. Nathan Sivin, *Traditional Medicine in Contemporary China, A Partial Translation of Revised Outline of Chinese Medicine (1972), With an Introductory Study on Change in Present-Day and Early Medicine* (Ann Arbor: Center for Chinese Studies, University of Michigan, 1987), pp. 5-6, fn. 3.

²⁵ Engelhardt’s main contention about pre-Tang dietary texts rests upon the greater likelihood of conceptual overlap shared by dietary titles on nutritional interdictions (*shijin* 食禁) and works on *materia medica*. Many of the pre-Tang titles refer to “nutritional classics” (*shijing* 食經) and “nutritional recipes” (*shifang* 食方), but these terms, Engelhardt points out, were often used to also designate culinary treatises or cookbooks and therefore cannot be relied upon for indications of dietary application, especially ones therapeutic in nature. She suggests that there were two currents in the development of nutritional literature between the Northern Wei (386-534) and the beginning of the Tang: one emphasized food preparation and technological process; the other integrated aspects of the *yangsheng* (“nourishing life”) tradition and treated the therapeutic value of foods as part of religious striving. Engelhardt, “Dietetics in Tang China,” pp. 174-6.

dual function as food and drug. Chinese dates, ginger, pepper, aniseed, smoked plums, and cinnamon numbered among the more common kitchen ingredients, but which were also recognized for their health-boosting qualities. Specifically medicinal ingredients included Banksia rose, cloves, sandalwood, black cardamom, turmeric, and zedoaria (*exhu* 莪術).²⁶ Zheng argues,

The new healthcare enterprise, embraced by Song society, was to regulate one's bodily functions through the use of conventional medicines and foods, so as to maintain and improve one's general health. Health beverages, which had already made their appearance in the Tang, now saw an explosive development, and physicians devised numerous recipes for health-giving decoctions. The Qi-regulating and spleen-strengthening effects of aromatic drugs meant that they played an important role in such decoctions.²⁷

Although the Song fashion for 'drugs as medicine' later encountered criticism from medical thinkers, who warned against the incursion of illness from excessive consumption of aromatic drugs, its influence upon later dynasties can be found in the handful of recipes included in later dietary works like Hu Sihui's *Yinshan zhenyao* (Principles of Correct Diet) published during the Yuan period. During the Ming and Qing periods, Zheng observes, beverages and foods like rice porridge with astragalus root were used to treat disorders arising from *yang* deficiency and sinking *qi*. While the penchant for health beverages prepared from medicinal ingredients had subsided after the Song, *shiliao* (dietary therapy) recipes continued to flow freely within the populace, since the basic premise behind *shiliao* entailed the application of the intrinsic qualities of everyday foods and beverages to regulate physiological states of the body. Ingredients with the dual function as food and drug possessed few or no side effects and thus could be enjoyed as part of one's everyday health routine.

Nathan Sivin has described the traditional Chinese view of the body as not "a biochemical factory (or a living machine, to use the metaphor of the European Enlightenment) but a congeries of

²⁶ Zheng Jisheng, "The Vogue for 'Medicine as Food' in the Song Period (960-1279 CE)," *Asian Medicine* 2.1 (2006): 38-58.

²⁷ Zheng, "The Vogue for 'Medicine as Food,'" p. 51.

vital processes that makes possible the activities of a social person.”²⁸ Sivin’s emphasis upon “a congeries of vital processes” whose physiological, emotional, and moral balance constituted health resonates particularly strongly when we consider the role of food and diet in the maintenance of health. The popularization of health beverages whose therapeutic value were directed towards the nourishment of vital processes suggest that in terms of access to medical care and healing, the general populace likely employed all manner of remedies, from self-purchased market stall health draughts to consultations with all manner of folk healers and or “Confucian” doctors.²⁹ Recent scholarship in the history of Chinese medicine reaffirms this point. For matters of health and healing, the Chinese social environment was one characterized by medical pluralism. The introduction of Western medical ideas and practices did not result in the replacement or subsumption of indigenous forms such that an all-pervasive enlightenment triumphed against the forces of disorder and ignorance. At best, the convergence of different conceptual schemes and alternate health practices, old and new, entailed a fluid process of negotiation among diverse actors.³⁰

Because this dissertation focuses almost exclusively upon the social and intellectual dynamics of the formation and practice of biomedical nutritional research in Republican China, it is easy to forget that different notions of nutrition continued to occupy space and significance within the lives of the general populace. Concepts of biomedical nutrition operated within an environment

²⁸ Nathan Sivin, *Traditional Medicine in Contemporary China, A Partial Translation of Revised Outline of Chinese Medicine (1972), With an Introductory Study on Change in Present-Day and Early Medicine* (Ann Arbor: Center of Chinese Studies, University of Michigan, 1987), p. 4.

²⁹ Historically, the line separating orthodox/heterodox, rational/symbolic medical repertoires of elite medical healers from folk healers has never been concrete. Elite medical healers included techniques for exorcising demons just as folk healers assumed the authority to dispense herbal prescriptions. The mixing of healing practices among practitioners gives us some indication of the competitive public market in which healers operated. Moreover, it suggests that the patient likely possessed some discretionary power over forms of healing. Kenneth Dean, *Taoist Ritual and Popular Cults of South-East China* (Princeton: Princeton University Press, 1993), pp. 90-91; and Michel Strickmann, *Chinese Magical Medicine*, ed. Bernard Faure (Stanford: Stanford University Press, 2002).

³⁰ Bride Andrews, “The Making of Modern Chinese Medicine, 1895-1937” (Ph.D. dissertation, University of Cambridge, 1996); Carol Benedict, *Bubonic Plague in Nineteenth Century China* (Stanford: Stanford University Press, 1996); Sean Hsiang-lin Lei, “When Chinese Medicine Encountered the State, 1910-1949” (Ph.D. dissertation, University of Chicago, 1999); Caroline B. Reeves, “The Power of Mercy: The Chinese Red Cross Society, 1900-1937” (Ph.D. dissertation, Harvard University Press, 1998); and Ruth Rogaski, *Hygienic Modernity: Meanings of Health and Disease in Treaty-port China* (Berkeley: University of California, 2004).

characterized by plurality, in spite of claims to the contrary so often made by Chinese nutrition scientists. The possibility that biomechanical ideas about the human body and its nutritional needs and quantitative practices could co-intermingle with, for example, the Chinese theory of correspondences was not simply likely, but in fact the unspoken source of much of the consternation and impatience exhibited by Chinese nutrition scientists. Enwrapped and invested as they were in articulating a modern discourse of deficiency to explain China's social, economic, and political position vis-à-vis Western nations and Japan, Chinese nutrition scientists often perpetuated essentialist notions of an unchanging, static, and backward Chinese medical tradition.³¹ Doing so enabled them to accomplish a couple of projects including the construction of biomedical nutrition as a distinct field of endeavor for modern China.

As Ruth Rogaski has demonstrated in her examination of *weisheng* 衛生 (health or hygiene) in treaty-port Tianjin, the concept of health became a battleground upon which the political contest for modernity was waged.³² The modern notion of *weisheng* rendered health as a kind of instrumental knowledge for public governance and a modern discourse that defined the difference between a sovereign nation and a subjected tribe. In contrast to “premodern” incarnations of *weisheng*, modern *weisheng* linked biomedicine, public health, and personal hygiene and served as a gauge of Chinese deficiency in contradistinction to an imagined West that was clean, organized, disciplined, and

³¹ The trope of a static, unchanging China, let alone the system of medical thought and practice we call “traditional Chinese medicine,” was also distinctive element of the “impact and response” paradigm that had dominated Chinese historiography from the 1950s to the 1980s. Although many of these classic studies like John Fairbank's *Trade and Diplomacy on the China Coast: The Opening of the Treaty Ports, 1842-1954* (Cambridge, MA: Harvard University Press, 1953) and Mary Wright's *The Last Stand of Chinese Conservatism: The T'ung-chi Restoration, 1862-1874* (Stanford: Stanford University Press, 1957) demonstrated the complexity of the Chinese response, the implicit assumption remained that real change only occurred once China was forced to confront the West. The historiography of Chinese medicine has echoed this refrain in some its more progressivist or positivist approaches that take the confrontation of China and the West as the necessary precursor for the advance of rationality and modernity. See, for example, K. Chimin Wong and Wu Lien-teh, *History of Chinese Medicine: Being a Chronicle of Medical Happenings in China from Ancient Times to the Present Period* (Tientsin: Tientsin Press, 1932).

³² Ruth Rogaski, *Hygienic Modernity: Meanings of Health and Disease in Treaty-port China* (Berkeley: University of California, 2004).

healthy.³³ Chinese nutrition scientists aided this project of hygienic modernity by advocating for the rationalization (*helihua* 合理化) of the Chinese diet and disparaging the age-old dietetic wisdom that had encouraged the average folk to see health as a manifest extension of wealth and abundance.

“Premodern” *weisheng*, which Rogaski associates with the *yangsheng* 養生 (“nourishing life”) tradition, constructed the body through dietary guidelines and proscriptions, sexual economy, and the circulation of vitalities. The greatest danger to one’s health came from internal depletion. Although depletion could result from the strains of poverty, inadequate food, or poor accommodations, the more likely culprit for internal depletion came in the form of excess: too much emotion, too much thinking, too much sex, etc. As Rogaski writes, “It is clear that if any one group bears the stigma of lack with regard to *weisheng*, it is the elite. They can afford a surfeit of the good things in life, and yet they lack the moral vigilance to enjoy them wisely. *Weisheng* in late imperial China was the product of a wealthy, cosmologically confident society whose primary anxiety was that it possessed too much.”³⁴

In contrast, modern *weisheng* marked an epistemological shift that reinterpreted all aspects of daily life, from the simple act of washing hands to collecting night soil, as part of a larger moral confrontation between tradition and modernity. The fixation upon the scientific basis of the Chinese diet, the articulation of the physiological norms for the Chinese body, the emphasis upon proper, rational eating habits all served as proxy contests for determining China’s place within a hygienic modernity.

³³ For a fascinating examination of the visual dimension shaping China’s identity as the “Sick May of Asia” as well as Chinese conceptions of their own identity, see Larissa N. Heinrich, *The Afterlife of Images: Translating the Pathological Body Between China and the West* (Durham, NC: Duke University Press, 2008).

³⁴ A corollary to this preoccupation with excess can be found in Hillel Schwartz’s *Never Satisfied: A Cultural History of Diets, Fantasies and Fat* (New York: Free Press, 1986). For Americans during the late 19th century, public preoccupations with abundance and what became identified as “over-nutrition” altered the bodily ideal towards balance. Fat became inextricable from gluttony, obesity from disease. To counter such dangers, domestic scientists, home economists, and other social activists expounded on the need for economy and order. Learning how to run a scientific kitchen, how to evaluate the nutritional content of foods, how to regulate excess all served to bolster a new kinaesthetic ideal: the balanced body. Curiously, although we find resonance between cultural ideals of balance in Imperial China and turn-of the century America, a strong difference emerges in who may suffer from excess. Whereas Rogaski finds that *weisheng* as guarding life had been largely an elite preoccupation—she cites a thirteenth-century physicians, Li Gao, who ruminates on how, in terms of health, the poor may have benefited from their circumstances—Schwartz finds the problem of excess to be a concern plaguing the rich and poor. For moral authorities, nutrition scientists, and physical culturalists, luxury and over-indulgence by the rich was profligacy among the poor. The battle against excess knew no bounds within society and was seen to be general problem for all Americans, especially the poor.

Thus even as the scientific work produced by men like Ni Zhangqi and Hou Xiangchuan has largely faded from collective memory, there remains intellectual territory to chart during this period of social and scientific transformation.³⁵ As Ka-che Yip has argued, the Nationalist leadership perceived health to be a part of national reconstruction, and given this formulation, they attempted to build a modern healthcare system conformed to a specific understanding of modern healthcare as sustained by a high-level research and a state medical infrastructure.³⁶ Although few Chinese nutrition scientists would have disagreed with this formulation (i.e., health as a form of nation-building), their specific role in the building of a modern healthcare system depended upon their institutional base. Because the field lacks comprehensive studies that explore how biomedicine was practiced in the context of modern nationalism and state-building, our understanding of the processes of local production, adaptation, and reproduction of biomedical knowledge is limited. Put simply, we do not know how biomedical researchers working in fields like nutrition, physiology, biochemistry, clinical surgery, pediatrics, etc., conducted their experiments; how they defined and constructed objects for scientific inquiry; or how they interacted with public officials and local communities. Without a clearer understanding of how modern science worked in Republican China, we are hard pressed to explain how the conceptual terrain underlying ideas about experience and experiment changed as Chinese scientists attempted to negotiate ownership of new forms of knowledge.³⁷

³⁵ Since Ni and his colleagues grounded themselves fully and self-consciously within a Western medical tradition, recent histories of Chinese medicine have naturally looked elsewhere when tackling questions about experiences of illness or healing or processes of change in medical praxis. A good review of scholarship on the history of Chinese medicine is TJ Hinrichs, "New Geographies of Chinese Medicine," *Osiris*, 2nd series, vol. 13 (1998): 287-325.

³⁶ Ka-che Yip, *Health and National Reconstruction in Nationalist China: The Development of Modern Health Services, 1928-1937* (Ann Arbor, MI: Association for Asian Studies, 1995). See also AnElissa Lucas, *Chinese Medical Modernization: Comparative Policy Continuities, 1930s-1980s* (New York: Praeger, 1982).

³⁷ Sean Hsiang-lin Lei has argued that Chinese physicians of Chinese medicine reinterpreted the value of personal experience in an attempt to reposition Chinese medicine as an experimental science. See his essay, "How did Chinese Medicine Become Experiential? The Political Epistemology of *Jingyan*," *positions* 10.2 (2002): 333-64, and Yang Nianqun, *Zai "xiao" bingren: zhongxiyi chongtuxia de kongjian zhengzhi, 1832-1950* (Beijing: Zhongguo renmin daxue chubanshe, 2006).

Structural Outline

This dissertation consists of five chapters that trace the changing precepts governing biomedical nutrition in Republican China. Chapter one examines how different local actors, both Chinese and foreign, enabled the development of a systematic exploration of the Chinese body through the introduction of anthropometric surveys. Encoding the human body in quantitative terms required sustained and deliberate investigations that parceled the population into discrete units, but defining such terms often required an extended process of trial and error. Markers of identity like age, sex, and place of origin were far from obvious in either structure or content, and Chinese and Western researchers engaged in anthropometric research had to navigate the rough tides of actual practice to reach even the most basic of conclusions.

Anthropometric surveys served as the basis for the human component of biomedical nutrition. To assess nutritional health, a working understanding had to be created about what constituted the normal Chinese body, and throughout the 1920s and 1930s, this understanding became ever more enmeshed in measurement. Chapter two compares the divergent forms of diagnostic examination found in Chinese and Western medicines. To broach the material ways in which the modern physical examination with its emphasis upon quantification and tactile manipulation of the human body would have subtly altered one's experience of being Chinese in the first half of the twentieth century, I have chosen to explore two different methodologies for fashioning cohesion and consensus from the myriad of bodily expressions associated with the human body. The differences separating the four methods of diagnosis (*sixben*) in classical Chinese medicine and the modern physical examination as emerged from nineteenth century Western medicine are many, but the significance of such differences depends upon the social and institutional structures enabling the actual practice of such examinations. The modern physical examination was popularized throughout urban and rural China through its incorporation in Chinese health education campaigns

of early twentieth century and, in particular, achieved social and political currency through its targeting of China's child and student populations.

Chapter three examines the broader institutional setting in which nutritional research developed. Although certainly influenced and guided by international activities in biomedical nutrition, Chinese nutrition scientists and their institutional organs for research were early advocates for the promise of local science. By pursuing topics whose conceptual parameters directly pertained to the Chinese environment, Chinese nutrition scientists created institutional opportunities that celebrated the merits of locally-grounded, theoretically-sharp research work. Just as anthropometric research on different subsets of the Chinese population had formed the physiological backdrop for nutritional assessment, Chinese nutrition research, which included biological assays of local foodstuff, dietary surveys, and epidemiological studies of deficiency diseases, encouraged the forces of localization to assume priority in the production of scientific knowledge. After the outbreak of war with Japan and the inland migration of many of China's preeminent research institutions, the landscape for scientific research receded in the face of tremendous hardship. A scarcity of resources, lab materials, and financial support all worked to constrain quotidian scientific operations, and yet in spite of the many difficulties, nutritional research continued, but for it to do so, the institutional setting had to change.

Chapter four shifts the focus from the institutional infrastructure to how Chinese nutrition scientists viewed the specific dimensionality of China's nutrition problem and attempted to constructively intervene in the international discourse of nutritional standards and norms. By bringing the League of Nations' nutritional standards directly into conversation, Chinese nutrition scientists articulated intellectual spaces within which they could disagree with international conventions and usher in new collaborations and experiments for domesticating biomedical nutrition in China. Debates about specific energy requirements, the role of race and inheritance in nutritional health, or the nutritional value of plant proteins afforded Chinese nutrition scientists a legitimate and

international platform from which to redefine the universalism of western science through the particularity of the Chinese body.

By developing the language and scientific criteria for a normative understanding of nutritional health, Chinese nutrition scientists helped guide nutritionally-oriented social engineering projects in the 1930s and 1940s. Nutritional activism represented one way in which the emergent scientific discipline of biomedical nutrition confronted and addressed social trials and tribulations of its time. The refugee crisis in Shanghai during the winter of 1937 and 1938 proved a unique opportunity by which laboratory science could directly insinuate itself into the fabric of daily living. At issue lay the extent to which normative measures of health could be promoted and deployed as objective measures for the health of the nation. Through the relief works of the Shanghai Refugee Children's Nutritional Aid Committee and the Chinese Nutritional Aid council, nutritional advocacy and activism displayed an interventionist spirit into how the average person ought to relate to their food choices. Nutrition researchers and social workers working on these committees attempted to reform popular conceptions of the relationship between food and health by leveraging social institutions as proactive forces for the remolding of individual behavior. Nutritional activists sought to reshape the social structures of bodily knowledge. By attempting to mandate how refugees were fed, by insisting upon specific measures for improving the nutritional health of refugee children, and by seeking to inculcate their nutritional products into the regular diets of all Chinese children, nutritional activists shifted the parameters by which outside observers and nongovernmental agents could intervene upon the daily lives of common people.

Chapter 1: Human Measurement and the Language of Normality in China, 1910-1949

Introduction

Among the earliest initiatives backed by the newly formed Shanghai Municipal Health Bureau (*weishengju* 衛生局) in April 1929 was a citywide campaign to evaluate student health.¹ With twenty of the larger, more thoroughly equipped, municipal schools serving as the testing ground, the Public Health Bureau began conducting examinations of the physical constitution of the students.² Zhu Zhanggeng, who oversaw the Bureau's school health (*xuexiao weisheng* 學校衛生) operations beginning in the spring of 1930 and his successor, Sun Jiaji, began compiling empirical data in an attempt to construct a table of heights and weights specific to Chinese children. Previous anthropometric efforts had drawn upon Thomas D. Wood's height-weight tables,³ but as the Chinese authors of the 1932 report on Shanghai's health experiment explain, "Because [the tables] are derived from statistics on American children, and the racial makeup (*renzhong* 人種) and physical development (*tige fayu zhuangkuang* 體格發育狀況) [of American children] are different from Chinese children, they are not applicable to China."⁴ By the summer of 1931, the Shanghai Municipal Bureau physicians had examined and measured 9,426 students between the ages of four and fifteen.

¹ For a more detailed discussion of the origins of the Shanghai Municipal Health Bureau, please see, Chieko Nakajima, "Health, Medicine, and Nation in Shanghai, ca. 1900-1945" (Ph.D. dissertation, University of Michigan, 2004), pp. 131-56. Improving the country's infrastructural conditions as means towards ensuring physical wellbeing of the population was a fundamental part of the broader initiative by Chiang Kai-shek's Nationalist government for national reconstruction. Although the degree of implementation and success of the Nationalist government's health administration at both the national and municipal levels varied dramatically by locale, their policies and programs laid the groundwork for post-1949 medical modernization efforts by the Communists. Ka-che Yip, *Health and National Reconstruction in Nationalist China: The development of Modern Health Services, 1928-1937* (Ann Arbor, MI: Association for Asian Studies, University of Michigan, 1995) and AnElissa Lucas, *Chinese Medical Modernization: Comparative Policy Continuities, 1930s-1980s* (New York: Praeger, 1982).

² Xu Shijin and Wu Ligu, "Shanghai shi xueling ertong shenchang tizhong zhi cubu yanjiu" [A preliminary study of the heights and weights of school-age Shanghai children], *Zhonghua yixue zazhi* [National Medical Journal of China] 18.6 (1932): 977-87.

³ Thomas D. Wood and Hugh Grant Rowell, *Health Supervision and Medical Inspection of Schools* (Philadelphia: W. B. Saunders, 1927).

⁴ Xu Shijin and Wu Ligu, "Shanghai shi xueling ertong shenchang tizhong zhi cubu yanjiu," p. 977.

The stated objective of creating height-weight tables specific to Chinese children was straightforward and not that uncommon in scope or execution. Since 1910, Western medical practitioners in China had undertaken similar projects aimed at obtaining the somatic measurements for their Chinese patients, young and old. Western-trained Chinese physicians and researchers superseded their Western counterparts in the production of this type of medical research in China by 1926.⁵ But while the investigators may have changed, the structures of experimental work remained largely intact. Like their research predecessors, the Shanghai physicians dispatched by the Public Health Bureau to the twenty municipal schools examined all students and determined by set procedure the height and weight of each student.⁶ For height, each student was measured standing erect against a wall without shoes. For weight, each student—again shoeless and stripped down to his or her undergarments—was measured in kilos on a scale.⁷ Once all the heights and weights had been measured, the physicians submitted their data to a statistical analysis to determine the standard deviation and normal distribution. The associated charts and tables representing the pattern of growth, the relationship between normal and abnormal children, and the differences in development between the sexes, formed the bulk of the presentation the authors of the Shanghai study then made at the September 1932 meeting of the Chinese Medical Association.

At a discursive level, these charts had the power to make definitive certain kinds of bodies as real Chinese bodies, while at the same time elevating Chinese claims to deserve membership in the community of modern nations. For the nascent Chinese republic, building a cohesive and comprehensive student health program represented an act of defiant modernity in the face of internal fissures of power and authority. Even if the domestic landscape confronting the Nationalist

⁵ In brief, this passing of the guard may be attributed to the expansion of medical educational opportunities for the Chinese in the early decades of the Republic. More on this topic will be discussed later.

⁶ I have not been able to determine the personnel details of the Health Bureau's school health campaign. In terms of total staff, the Health Bureau did grow its staff from 38 in 1927-1928 to 107 in 1931-32, 174 in 1933-1934, 272 in 1934-1935, and 435 in 1936-1937. The increase in staff from 1928 to 1932 was greater by nearly threefold and helps contextualize the department's ability to expand their social engagement with the general community. Chieko Nakajima, "Health, Medicine, and Nation in Shanghai, ca. 1900-1945," p. 138.

⁷ Xu Shijin and Wu Liguo, "Shanghai shi xueling ertong shenchang tizhong zhi cubu yanjiu," p. 97.

Government was rife with schisms and instability—warlords refusing to be pacified, political unrest by contentious Communists, and increasingly aggressive motions from Japan in the Northeast—identifying the correct metrics of normative health for children distinguished China on the international stage. Modern nation-states were ones that demonstrated attention and concern for their children, and China could hardly afford to exempt itself from the rule. That the local reality of state concern with child and student health was very often less than what had been promised should not be surprising. But in so far as the Nationalist government had adopted the modern discourse of the normative health of the Chinese child, efforts like the Shanghai Municipal Health Bureau's school health examinations suggested more than a superficial commitment.

In practice, however, the Nationalist government was not a lone player, or even the most important player, in this search for physiological norms. The construction of height-weight tables while most obviously related to the development of school health programs was in fact the most common form of anthropometric research conducted in China from the early years of the republic through the 1940s.⁸ Western and Chinese researchers in fields ranging from physical anthropology to the nutritional sciences all contributed to identifying the quantitative parameters of the Chinese body.⁹ Beyond the question of administrative practicalities associated with building a comprehensive school health program, there was more at stake than simply the precedence of one chart over another. Couched within the ongoing search for quantitative standards of normal health raged the fire of self-determination and the right to national/cultural particularity. That health, in particular child and student health, lay at the center of the search should flag our attention towards the socio-political, and epistemological contestations marking China's experiences of hygienic modernity.¹⁰

⁸ Height and weight were the most common measurements undertaken on the Chinese population, but depending upon the specific research objective, a number of other metrics were also explored: blood pressure, metabolic rates, chest girth, dental characteristics, etc.

⁹ Other fields included pediatrics, physical culture (*tiyu* 體育), and public health.

¹⁰ Ruth Rogaski, *Hygienic Modernity: Meanings of Health and Disease in Treaty-port China* (Berkeley: University of California, 2004).

In raising this example of the height-weight study made by the Shanghai Municipal Health Bureau, I want to explore how the development of biomedical research, specifically research relating to the identification of physiological norms or standards, in China produced real-life effects beyond the disciplinary domain of medicine alone. On its surface, this Shanghai study might seem uninteresting. It does not advance understanding of the conceptual intricacies of the biomedical construction of the human body nor does it fine-tune or complicate contemporary theories of human growth and development. For physicians committed to expanding health care and creating a state medical system as part of national reconstruction—C. C. Chen and his rural health experiment in Dingxian—this study did not provide practical insight for developing social or medical remedies for the problems identified with abnormal health—problems like dental caries, tuberculosis, and trachoma. And yet this study with its unstated premise that anthropometric data possessed the potential for medical efficacy is important. In setting out to identify normal heights and weights of Shanghai students, the Health Bureau physicians performed two separate, but related, tasks. They helped to construct the kind of body the study itself attempts to reveal, i.e., the normal, healthy Chinese body, and they effected the sorts of institutional ties that make such a body visible and politically significant. In other words, the Health Bureau physicians were among a new generation of Chinese researchers who were changing the definition, and even the constitution, of what was normal for the Chinese body. Through their efforts, particularly with children and students, the concept of normativity assumed a depth of reality quite unimagined in classical Chinese medicine. Their engagement with specific subsets of the population coupled with the institutionalization of examination techniques through community and school health examinations redefined what it meant to be normal and Chinese.

What follows is a two-part exploration that traces how biomedical research in China created a set of everyday technologies that naturalized a way of being modern through bodily habits.¹¹ In this

¹¹ Francesca Bray, *Technology and Gender: Fabrics of Power in Late Imperial China* (Berkeley: University of California Press, 1997).

chapter, I will map out how anthropometric techniques and surveys came to function as the common, modern language of scientific research on the Chinese body. In the subsequent chapter, I will proceed to focus upon the bodily practices associated with health examinations and examine how the popularization of such examinations shaped the material experience of being Chinese in the first half of the twentieth century.

Institutional Infrastructure

Looking Back

In December 1944, Wu Xian (吳憲, 1893-1959), the famous biochemist, published a retrospective summary entitled, “Guoren shengli shuizhun zhi yanjiu” (Research on the physiological levels of the Chinese people), in which he presented a detailed account of the various branches of research contributing to knowledge of the Chinese physiological self.¹² Throughout the review, Wu highlights the importance of such knowledge for the constitution of the Chinese race (*zhongzu* 種族) and nation (*minzu* 民族).¹³ Mankind possesses a uniformity of physiological function such that different races are neither ontologically nor compositionally different. But while humans may be

¹² Wu Xian, “Guoren shengli shuizhun zhi yanjiu” [Research on the physiological levels of the Chinese people], *Xueshu huikan* 1.2 (December 1944): 31-97. Wu was among the first class of sixty-two Boxer Fellows who sailed to the United States in 1911 for academic study. He graduated from MIT in 1917 and then joined the laboratory of Professor Otto Folin at the Harvard Medical School. Just two years later, he completed his Ph.D. in biochemistry. In 1920, he returned to China and joined the faculty of the Peking Union Medical College. His scientific accomplishments included the Folin-Wu method for blood analysis (his dissertation work), the mathematical explication of the exchange of red cells and plasma of electrolytes and water under varying pressures of oxygen and carbon dioxide, and a theory for explaining the denaturation of proteins. With his wife, Daisy Yen, Wu and Yen conducted a series of experiments on the different effects of a vegetarian diet similarly constituted as the one found common in northern China on laboratory rats. Their work demonstrated that a vegetarian diet did not infract the overall health of the laboratory rats, although they did find that the rats grew more slowly, particularly when young. Wu and Yen also performed some of the earliest and most extensive biological assays of the vitamin composition of the north China vegetarian diet. Wu also wrote extensively about nutrition in non-specialist forums. He helped create the journal *Duli pinglun* (*Independent Thought*), and he authored several popular textbooks, including the 1929 *Yingyang gailun* (*Principles of nutrition*), which was reprinted three times prior to the publication of the author's revised edition in 1938.

¹³ Since the nineteenth century, there have been several terms for *race* including *zhongzu* and *minzu*. Why Wu distinguishes between the two is not entirely clear from the text alone, but the extent to which the two words can stand distinct as well as intermingled is suggestive of the complexities surrounding the concepts of race, nation, and ethos. For more on the discursive construction of race, please see Frank Dikötter, *The Discourse of Race in Modern China* (Stanford: Stanford University Press, 1992).

fundamentally the same the world over, in terms of metrics, Wu argues, there can and does exist a spectrum of physiological variation. Curiously, Wu Xian avoids attributing such differentials solely to heredity. He argues, “To be sure, physiological differences within a race can be explained by the science of heredity (*yichuanxue zhi lilun* 遺傳學之理論), but for the majority of physiological characteristics (*shengli tezhen* 生理特徵), we must look to life habits (*shenghuo xiguan* 生活習慣) and social environment (*shehui huanjing* 社會環境) to understand their true significance.”¹⁴

His emphasis upon bodily habits and social environment as contributing factors to the manifestation of differences in physiological levels (*shengli shuizhun* 生理水準) is noteworthy, because while much has been written about the emergence of Han Chinese “ethnonationalism” and its importance to the construction of the modern Chinese identity, Wu’s nominal claim of racial difference associated with physiological levels does not stem from a notional Han-Chinese racial purity.¹⁵ He cites three practical reasons in addition to the epistemological value afforded by pure science for investigating physiological levels. Firstly, Wu writes,

physiological levels shift up and down, and in doing so, they reflect the improving or declining state of national health (*minzu jiankang* 民族健康). We must be positive of the [right] physiological levels before we can decide upon the appropriate course for improving national health. Secondly, we have to know the origins of each physiological level in order to then assess the results of physical examinations (*tige jiancha* 體格稽查) and give quality judgments. Finally, physiological levels represent the general physiological state (*pingjun shengli zhuangkuang* 平均生理狀況) of normal individuals (*zhengchang ren* 正常人). Levels that are too high or too low are categorically abnormal (*fanchang* 反常), and thus medical diagnosis (*yiliao zhenduan* 醫療診斷) relies upon knowledge of physiological levels.¹⁶

¹⁴ Wu Xian, “Guoren shengli shuizhun zhi yanjiu,” p. 32.

¹⁵ For more on Chinese racial identity, see Emma Jinhua Teng, “Eurasian Hybridity in Chinese Utopian Visions: From ‘One World’ to ‘A Society Based on Beauty’ and Beyond,” *positions: east asia cultures critique* 14.1 (2006): 131-63; Hiroko Sakamoto, “The Cult of ‘Love and Eugenics’ in May Fourth Movement Discourse,” *positions: east asia cultures critique* 12 (2004): 330-76; Yuehsen Juliette Chung, *Struggle for National Survival: Eugenics in Sino-Japanese Contexts 1896-1945* (New York: Routledge, 2002); Peter Zarrow, “Introduction: Citizenship in China and the West,” in *Imagining the People: Chinese Intellectuals and the Concept of Citizenship, 1890-1920*, ed. Joshua A. Fogel and Peter Zarrow (Armonk, NY: M. E. Sharpe, 1997), pp. 3-38; Frank Dikötter, *Imperfect Conceptions: Medical Knowledge, Birth Defects, and Eugenics in China* (London: Hurst & Co., 1998).

¹⁶ Wu Xian, “Guoren shengli shuizhun zhi yanjiu,” p. 32.

From Wu's vantage point in spring 1944 when he began his review by first burrowing into the holdings of the medical library at West China University (Huaxi daxue yike tushushi), thirty-some years of medical research on Chinese physiological levels had transformed the intellectual landscape for medical scientists and clinicians. Slow, but steady advances had been made in research on developmental metrics like height and weight, hematology, circulation and respiration, basal metabolism, excretory system, sensory organs, reproductive organs, and vital statistics (mortality and morbidity rates for children, adults, and the general population). But while much had changed in the field of medical research, one concern persisted, namely that for whichever area of interest, the somatometric data being obtained for the Chinese yielded consistently smaller values than the values for their Western counterparts.

How important was this difference, and was it alterable? Wu's answer to these two questions can be seen in his conviction that bodily habits and social environment played important roles in the manifestation of physiological variation. His training in biochemistry had insured a strong commitment to the notion of a singular, universal body shared by all peoples, but his situation in the nascent Chinese republic required a constant negotiation with difference. This tension from navigating between scientific universalism and Chinese particularity is one of the defining conceits of biomedical research on physiological norms and standards. Wu Xian's three justifications for such an endeavor are particularly striking for the subtle map they provide us. By 1944, biomedical research in China had steadily evolved from its organic, but unorganized roots towards greater state participation and institutional professionalization. Its main proponents and participants were no longer the Western medical missionaries and clinicians who sought to save the nation from itself, but rather the Chinese men and women who had been educated at missionary-sponsored medical schools, the handful of state-run institutions, and/or received graduate training abroad. To understand fully how such changes in situation and personnel shaped the search for physiological norms and standards, however, we have to go back, with Wu Xian's first justification in mind, to the imperative of knowing.

Disciplinary Fluidity

In 1908, a notice appeared in the British journal *Nature* describing a set of “average measurements of various dimensions of Chinese boys and youths between the ages of ten and twenty-four years” that had been submitted by Mr. A. H. Crook of Queen’s College, Hong Kong. Mr. Crook had measured the height, weight, circumference of the chest (normal and expanded), and the circumferences of the neck, wrist, and hips of 679 boys and youths, ages 10 to 23. The journal had taken the liberty of presenting a selection of the anthropometric data from Crook’s survey alongside the British Association averages for English boys and youths of the same age. The result of such a presentation led the editors to remark, “From the figures it will be seen that Chinese boys, though lighter in weight, are taller than the English boys up to the age of sixteen. After that the stature of the English boys increases much more rapidly than that of the Chinese boy.” Crook suggested the difference in growth curves may be attributed to the less amount of exercise taken by Chinese body than their English counterparts; the editors politely demurred, “It may be partly due to that, but it is highly probable that the greater part of the difference is racial.” A disagreement of causation did not, however, temper the editors’ enthusiasm for such work. They concluded, “Mr. Crook’s measurements are of considerable value, and it is much to be desired that Englishmen residing among little-known races should imitate his example.”¹⁷

Mr. Crook’s contribution to the international (specifically, European and American) scientific community’s knowledge of “little-known races” was typical of early efforts at gathering anthropometric data on segments of the Chinese population. Private, small-scale intellectual initiatives guided by the conceptual beacon of race and undertaken by physical anthropologists like Julian Talko Hryniewicz, Koganei Yoshikiyo (Y. Koganei), and Aimé-François Legendre accounted for the earliest anthropometrical studies in China.¹⁸ Hryniewicz (1850-1936), physician,

¹⁷ A. H. Crook, “Measurements of the Chinese,” *Nature* 78.2033 (15 October 1908): 607.

¹⁸ For a more detailed bibliography of anthropological studies of the Chinese, see Li Ji, “The Formation of the Chinese People: An Anthropological Inquiry” (Ph.D. dissertation, Harvard University, 1926), pp. 49-51. For more on the formation of the academic field of anthropology in China, see Shinji Yamashita, Joseph Bosco, and Jeremy Seymour Eades, eds., *The Making of Anthropology in East and Southeast Asia* (New York: Berghahn

anthropologist, and Siberian explorer, published the first report, “Notes on Anthropology of Chinese” in 1899.¹⁹ Koganei, who had been Professor of Anatomy in the Imperial University of Tokyo, conducted his study on Chinese soldiers captured during the Sino-Japanese War of 1895. He published in German.²⁰ Legendre was a French physician and amateur sinologist who worked in the border regions of Sichuan.²¹ Although the specific details concerning how these men pursued their respective anthropometric projects are difficult to ascertain, it is nonetheless tempting to see these men as representative of different, but interrelated, imperial projects of knowledge production near the turn of the twentieth century.

The main Chinese contribution to this early body of anthropometric work came from Li Ji (李濟, 1896-1979), who earned his doctorate in Anthropology from Harvard University and pioneered the field of physical anthropology in China. His dissertation, “The Formation of the Chinese People: An Anthropological Inquiry,” investigates the origins of the Chinese people by combining historical material and anthropometrical data.²² As part of his argument that an

Books, 2004) and Gregory Eliyu Guldin, *The Saga of Anthropology in China: From Malinowski to Moscow to Mao* (Armonk, NY: M. E. Sharpe, 1994).

¹⁹ Cite in W. W. Cadbury, “Height, Weight, and Chest Measurements of the Chinese,” *National Medical Journal of China* 8 (1922): 158. I have not been able to locate an actual copy of Hryniewicz’s study.

²⁰ Koganei, Yoshiakiyo, *Messungen an chinesischen Soldaten* [Measurements of Chinese soldiers] (Tokyo: Medizinische Fakultät der Kaiserlich-Japanischen Universität zu Tokyo, 1903). I have not been able to locate a copy of Koganei’s paper, but general details of his work can be extracted from L. H. Dudley Buxton, “The Inhabitants of Inner Mongolia,” *The Journal of the Royal Anthropological Institute of Great Britain and Ireland* 56 (1926): 143-61, esp. 153 fn 1 and P. C. Mahalanobis, “On the Need for Standardization in Measurements on the Living,” *Biometrika* 20A.1/2 (July 1928): 1-31.

²¹ A. F. Legendre, “Etude anthropologique sur des Chinois du Setchuen” [An anthropological study of the Chinese in Sichuan], *Bulletins et Mémoires de la Société d’Anthropologie de Paris* 6.2 (1911): 102-24 and “Les Lolos,” *Bulletins et Mémoires de la Société d’Anthropologie de Paris* 5.1 (1910): 77-94. There is a brief description of Legendre’s work in Charles Forsdick, *Victor Segalen and the Aesthetics of Diversity* (Oxford: Oxford University Press, 200), pp. 207-8. Legendre also played an important role in the formation of an Institut Pasteur in Chengdu in 1911, which managed to carry out its operations until 1927.

²² Li Ji, “The Formation of the Chinese People: An Anthropological Inquiry” (Ph.D. dissertation, Harvard University, 1926). For a closer examination of Li Ji’s contribution to the writing of Chinese ancient history, see Lam Kwong-wai, “Zhongguo gushi yanjiu de xueshu gongxian” [Li Ji’s contribution to research in Chinese ancient history], (Ph.D. dissertation, University of Hong Kong, 2002).

investigation into the origin of the Chinese cannot rely primarily upon etymological or philological research, Li stresses,

To study this problem [the origin of the Chinese] properly, a consideration of the physical traits of the Chinese seems to be the only rational starting-point. The Chinese head, the Chinese body, the Chinese hand, and the Chinese foot must be studied, in order to establish a firmer concept of the physical status of the Chinese. Without a firm concept of the physical anthropology of the Chinese, it is hard to see how we can search for their origins.²³

Li's examination of the physical traits of the Chinese drew upon two subject groups with a total of 111 adult males (18 years and older): Chinese studies in the Eastern universities in the United States and Chinese laborers, all from Guangdong, working in Boston. An abridged Chinese translation of Li's study by Lei Baohua was published in the journal *Kexue* (Science) in 1925.²⁴

In sum, the earliest attempts to produce scientific knowledge of the Chinese body were primarily concerned with the question of race and were undertaken by physical anthropologists, and not, as one might be inclined to assume, by anthropometricians. Anthropometry (*renti celiangxue* 人體測量學) did exist as a distinct scientific field of inquiry in Republican China through its institutionalization as the Anatomical Laboratory at the Peking Union Medical College (PUMC), which had been founded by the China Medical Board of the Rockefeller Foundation in 1917. But in practical terms, anthropometry was not a highly populated field, and formal practitioners—men like Paul Stevenson and Zhu Futang (F. T. Chu, 諸福棠) who possessed formal training in anthropometric techniques and access to the assortment of specialized equipment—were few and far between.²⁵ It did not occupy a prominent place in medical school curriculum, and other than through

²³ Li Ji, "The Formation of the Chinese People," p. 5.

²⁴ Li Ji, "Zhongguo renzhong zhi goucheng" [Formation of the Chinese race], trans. Lei Baohua, *Kexue* 9.11 (April 1925): 1305-72.

²⁵ Paul Stevenson was an American, graduate of Washington University Medical School, who moved to Beijing in 1918 with his wife and two children to take up a research position at the newly organized Peking Union Medical College (PUMC). Zhu Futang specialized in pediatrics. He was a graduate of the Junior College, University of Nanjing (1919) before enrolling at PUMC for both premedical and medical training. "St Louisan is a Research Worker Among the Chinese," 25 September 1932, folder 78, box 12, CMB INC, Rockefeller Archive Center, Sleepy Hollow, New York and "Chu Fu-t'ang," folder 848, box 117, CMB INC, Rockefeller Archive Center, Sleepy Hollow, New York. Arguably, Zhu Futang was not a strict practitioner. Although

the work of Paul Stevenson, head of the PUMC's Anatomical Laboratory, its influence as an independent field of inquiry was limited.²⁶ Anthropometry's situation as a medical subfield may also have been hampered from the start by the material conditions formal practitioners deemed essential for its proper execution. In a piece jointly authored by P. H. Li, Zhu Futang, and Paul Stevenson—all physicians at PUMC—the list of standard equipment required for the proper measurement of children included “a measuring table with fixed vertical end-piece, movable transverse member, moveable indicator, a firm mattress, and a stool;” linen tap; sliding calipers; and scales or balances. Although they provided instructions for how to convert a table—in their case, one of the pediatric clinic's examining tables—into a “suitable measuring table,” accumulating the correct kinds of equipment would have been a feat in itself, particularly given the wide variety of circumstances in which biomedical doctors found themselves working. Perhaps with this in mind, the authors did express their willingness to help furnish some of the requisite instruments at cost.²⁷

Anthropometry's liminal status did not prevent the field from exerting an influence—an epistemological influence resulting from its adaptable methodology and techniques that could be put to the service of other disciplines. For the first two decades of the twentieth century, anthropometry served as a nodal point at which a number of different scientific endeavors converged. Physical anthropology, and later biomedical nutrition, pediatrics, and public health, each dabbled their fingers in the anthropometric pot. The unifying theme linking these various fields and their application of anthropometric thinking was the identification and classification of the Chinese body. By furnishing a common language with its own lexicon that facilitated translations into alternate spheres of social

trained and fluent in the techniques, his interest in anthropometry derived not from the field itself, but from its application within the realm of pediatrics.

²⁶ It should be noted that Stevenson's interests in anthropometry often led him to more remote parts of China either on solo or joint expeditions with visiting physical anthropologists, including L. H. Dudley Buxton, mentioned in footnote 19 above. See, for example, Paul H. Stevenson, “Notes on the Human Geography of the Chinese-Tibetan Borderland,” *Geographical Review* 22.4 (October 1932): 599-616.

²⁷ P. H. Li, F. T. Chu, and P. H. Stevenson, “Measuring Infants and Children: Choice of Measurements, Equipments & Technique,” *Chinese Medical Journal* [henceforth *CMJ*] 52 (October 1937): 549-70.

relations, anthropometry provided the objective means by which the production of scientific knowledge could also be coded as the production of social and political knowledge.

This conjunction of epistemic projects permitted a high degree of fluidity in the formation of a standard of body of anthropometric data. Disciplinary boundaries were not that rigid in China during the early twentieth century. Physical anthropologists worked alongside medical physicians who drew upon anthropological texts, which were at times published in medical journals.²⁸ The study undertaken by A. H. Crook of Queen's College, Hong Kong, though originally published in *Nature* in 1908, appeared in translation in the Chinese journal *Kexue* (Science) almost a decade later and provides a good example of how Chinese commentators began engaging with this emergent, global conversation about the Chinese body.²⁹ The translator, unnamed, reproduces the numerical data obtained by Crook and offers an alternative to Crook's assertion that somatometric differences in the growth curves between Chinese and English boys was due to contrasting exercise regimes.

“Although his [Crook's] explanation seems logical, [it is important to note that] Hong Kong is located near the tropics (*redai* 熱帶) and the [rate of] growth of people in the tropics outpaces those in temperate or frigid zones. Shandong people develop slower than Guangdong people.”³⁰ With this in mind, the translator then introduces a study by J. F. Bobbitt, who had measured the sons of Chinese merchants in the Philippines and data from William T. Porter's *The Growth of St. Louis Children* (1894) as counterpoints in the comparison of national growth curves.³¹

For the translator, the anthropometric data afford objective argumentation for qualitative assessments (see Table 1 and

²⁸ See, for example, Paul H. Stevenson, “A Convenient Anthropological Record Form for Field Workers,” *Man* 30 (May 1930): 78-81.

²⁹ “Weisheng tan: Zhongguo ren zhi tige zai lun” [Conversation on health: revisiting the topic of Chinese physique] *Kexue* 3.10 (October 1917): 1119-21.

³⁰ “Weisheng tan: Zhongguo ren zhi tige zai lun,” p. 1120.

³¹ J. F. Bobbitt, “The Growth of Filipino Children,” *Pedagogical Seminary* 16 (1909): 3-34, cited in “Weisheng tan: Zhongguo ren zhi tige zai lun,” p. 1120. *Pedagogical Seminary* was a journal founded by psychologist G. Stanley Hall and later renamed the *Journal of Genetic Psychology*.

Table 2). He juxtaposes Bobbitt's heights and weights for Filipino boys against values for Chinese, Japanese, and American boys and observes, "Chinese boys on average weigh about three kilos or 6 pounds more than Japanese boys of the same age, while American boys tend to weigh about three kilos or 6 lbs more than Chinese boys of the same age."

Table 1 : Weight (kilo)

	8 yrs	9 yrs	10 yrs	11 yrs	12 yrs	13 yrs	14 yrs	15 yrs	16 yrs	17 yrs
China			24.7	25.2	27.0	30.4	33.6	35.1	46.3	
Japan	17.6	19.1	21.1	22.8	25.0	27.0	29.4	32.5	35.2	38.2
Philippines	18.9	20.8	21.8	23.4	26.2	29.5	32.4	35.9	41.5	45.9
US	21.7	23.8	26.1	28.3	31.0	33.5	36.6	40.4	46.5	51.6

Table 2: Height (cm)

	8 yrs	9 yrs	10 yrs	11 yrs	12 yrs	13 yrs	14 yrs	15 yrs	16 yrs	17 yrs
China			123.7	127.5	128.6	134.8	139.0	144.2	158.5	
Japan	106.5	111.0	115.6	120.0	124.8	128.7	133.4	137.6	142.1	146.1
Philippines	114.8	119.1	121.1	125.2	120.9	136.6	140.8	146.1	154.1	158.5
US	114.0	119.1	124.3	128.9	133.8	138.2	142.9	148.6	154.9	160.3

When he turns to the topic of height, he notes, "Based on the above table, Chinese and Filipino boys in the same age groups are about comparable in terms of height and generally between 5.6 to sixteen centimeters taller than Japanese boys of the same age. Our ancient histories have called the Japanese "dwarfs" (*wokou* 倭寇). Could it not be because of this? In comparison to American boys, Chinese boys evince no particular inferiority."³² The choice of description is important. *Wokou* has long been used in reference to the Japanese, and while the term conveys a strong sense of the smallness of stature, it also connotes piracy and marauding invaders.³³ The jab at Japan was most likely meant to be belittling and thus indicative of the national mood. 1917 was only two years after the acquiescence of the Yuan Shikai government to Japan's Twenty-one Demands, which included more extensive economic rights for the Japanese subjects in Manchuria and Inner Mongolia; a joint Sino-Japanese

³² "Weisheng tan: Zhongguo ren zhi tige zai lun," p. 1121.

³³ The *Hanyu da cidian* notes that *wokou* was frequently used to describe overseas invasions by Japanese pirates against China and Korea during the 14th through 16th centuries. The term resurfaced with greater frequency during the Second Sino-Japanese War.

administration of the iron and coal works in central China; the stationing of Japanese police and economic advisors in north China; and extensive commercial rights in Fujian province. Although the Yuan Shikai government achieved some modification to the original Twenty-one Demands, the public response to the government's policy of appeasement was neither passive nor positive. News of the government's decision provoked a firestorm of public animosity as nation-wide anti-Japanese rallies and a general boycott of Japanese goods swept the country. That Japanese boys should be demonstrably smaller and lighter than their Chinese and American counterparts was some kind of saving grace.

The scaled hierarchy of ethno-nationalities constructed through the translator's analysis of the empirical data mimics the racial categorization originally motivating physical anthropological studies. Average height and weight—although in fact abstractions because of their function as a representation of a composite not an individual and as a result of an arithmetical operation—are treated as *real* features of a population. In the manner of Lambert A. J. Quetelet's *l'homme moyen* (average man), which Quetelet had introduced as “new objective measurable conception of a people,” physical anthropologists studying the Chinese body were not simply pursuing measurement for its descriptive capacity.³⁴ Ian Hacking has argued that because Quetelet's interest lay not in an average for the human species, but rather with the “characteristics of a people or a nation, as a racial type,” Quetelet's idea of the average man came to embody a standard of objectivity through its

³⁴ The ideational power of Quetelet's *l'homme moyen* has been characterized by Ian Hacking as follows:
 We can think of average height as an abstract—the convenient result of an arithmetical operation—but we can also begin to think of its as a ‘real feature of a population. In 1988, it was noted that the longevity of Japanese has been increasing every year, to the point where the Japanese are now the most long-lived nation on earth. We find it hard not to think of this as being a real feature of Japanese life and culture, just as ‘real’ as the fact that Japanese corporate entities have among them the world's largest accumulation of disposable capital for investment.
 It was Quetelet's less-noticed next step, of 1844, that counted far more than the average man. He transformed the theory of measuring unknown physical quantities, with a definite probable error, into the theory of measuring ideal or abstract properties of a population. Because these could be subjected to the same formal techniques they became real quantities. Hacking, *The Taming of Chance* (Cambridge, UK: Cambridge University Press, 1990), p. 107.

In terms of nineteenth century political thought, Stephen Stigler has suggested, “The idea of the average man caught the imagination in 1835 as it does now. As a psychological ploy it was a brilliant device. It captured the egalitarian idea of a common man in a precise and apparently scientific way that was quite congenial to nineteenth-century political thought, and it served a valid and useful statistical purposed.” Stephen Stigler, *History of Statistics* (Cambridge, MA: Belknap Press of Harvard University Press, 1986), pp. 170-71.

distillation of a race to its measurements of physical and moral qualities.³⁵ As intellectual heirs to the epistemic transformation wrought by an “avalanche of numbers” after 1800, particularly in the social sciences, physical anthropologists were in essence mapping out the viable terrain upon which a scientific discourse of race could be erected.³⁶

The intrinsic worth and international standing of a nation and its people could be assessed through the rubric of abstracted racial physiology. The preoccupation with articulating race through quantitative measures did not, however, yield equal fascination in the question of health. Crook’s study of Chinese boys and youths facilitated the exercise of comparative analysis. His Chinese translator accepted this premise and expanded upon it to include more countries, but at no point does he attempt to extrapolate from the data determinations of health and wellbeing as direct consequences of the values themselves. The greater value of the average height or weight was sufficiently demonstrative of national advantage or hereditary hardiness. Finding that Chinese boys were noticeably and consistently taller and heavier than Japanese boys was a good thing. But had the converse been discovered, i.e., that Chinese boys were smaller and lighter than Japanese boys, it is not clear that the general conclusion would then be that the Chinese were physically less healthy. Simply put, the numerical data point did not correlate with the physiological expression of positive or negative health, because the data lacked a frame of reference by which to evaluate how the anthropometric values for average height and weight for Chinese boys was or was not changing. For health, let alone national health, to be of concern, additional data had to be gathered and analyzed with the objective of identifying normal trends and patterns. Thus while physical anthropologists paved the way for producing knowledge of racial bodies through anthropometric data, their work

³⁵ Ian Hacking, *The Taming of Chance*, p. 107.

³⁶ For more on the statistical revolution, please see Ian Hacking, *The Taming of Chance* (Cambridge, UK: Cambridge University Press, 1990); Lorraine Daston, *Classical Probability in the Enlightenment* (Princeton: Princeton University Press, 1988); Theodore M. Porter, *The Rise of Statistical Thinking, 1820-1900* (Princeton: Princeton University Press, 1986); and Stephen Stigler, *History of Statistics* (Cambridge, MA: Belknap Press of Harvard University Press, 1986).

had limitations, particularly for medical practitioners seeking answers to questions on everyday health and wellbeing.

Practicality and Western physicians

Jeffrey P. Brosco has remarked that while Quetelet had been the first to suggest that anthropometric data could be employed for medical purposes—Quetelet’s desire to reveal the underlying laws of human development led him to argue that studying healthy patients would be more insightful for understanding illness—recognition of anthropometric data’s medical utility was late in gaining general acceptance among American physicians.³⁷ Indeed, Brosco finds that medical interest in height and weight did not occur until after 1870.³⁸ Henry P. Bowditch, a professor of physiology at Harvard Medical School, is generally credited with igniting the interest of his fellow physicians in anthropometry’s diagnostic value. Highlighting Englishman Percy Boulton’s longitudinal study of children’s average weights, Bowditch recommended that serial measurements of weight could be used to aid diagnosis and potentially prevent tuberculosis. In his 1882 address before the Section on the Diseases of Children of the American Medical Association, he said, “It seems probable that the accurate determination of the normal rate of growth in children will not only throw light upon the nature of diseases to which childhood is subject, but will also guide us in the application of therapeutic measures.”³⁹

For Western physicians working in China, Bowditch’s argument resonated with unexpected possibility. Numerically small and unequally dispersed throughout the country, Western physicians, many of whom originally arrived with expectations of transforming Chinese lives through modern

³⁷ In contrast, J. M. Tanner dates the emergence of a new tradition of growth studies, which had been “born of the reaction of [Western European] humanitarians to the appalling conditions of the poor and their children,” to the early part of the nineteenth century. These growth studies, which Tanner denominates as auxological epidemiology,” used “growth data to search out, and later to define, sub-optimal conditions of health.” J. M. Tanner, *A History of the Study of Human Growth* (Cambridge, UK: Cambridge University Press, 1981), p. 143.

³⁸ Jeffrey P. Brosco, “Weight Charts and Well Child Care: When the Pediatrician Became the Expert in Child Health,” in *Formative Years: Children’s Health in the United States, 1880-2000*, ed. Alexandra Minna Stern and Howard Markel (Ann Arbor: University of Michigan Press, 2004), p. 92.

³⁹ Quoted in Jeffrey P. Brosco, “Weight Charts and Well Child Care,” p. 93.

medicine and the Christian faith, endeavored to develop and maintain pathways into local Chinese communities. Since the mid-nineteenth century, Protestant medical missionaries had benefited from the terms and stipulations of the so-called “unequal treaties” that had been settled between the Qing government and Western powers. The Treaty of Nanjing (1842) that concluded the first Opium War between China and Great Britain, and the first of a series of treaties that would help to redefine social, political, and economic relations with foreign powers, instituted the law of extraterritoriality for foreign subjects and created five new treaty-port cities for foreign trade.⁴⁰ For Christian missionaries, these treaties, whose immediate objectives sought to eliminate barriers inhibiting or constraining western trade, nonetheless eliminated many of the practical and logistical difficulties of proselytizing in China. Missionaries were legally permitted to rent properties to serve as hospitals, churches, and cemeteries. The Treaty of Tianjin signed in 1858 ensured protection of open preaching of Christianity, as well as travel anywhere inside China. State protection and later the right to buy property enabled western missions to establish a greater presence and begin growing local congregations through the establishment of churches, schools, hospitals, and dispensaries.⁴¹

Insofar as Protestant medical missionaries deployed western medicine as a strategy for the increasing Christian conversion among the Chinese population, their success was rather limited. The American Board of Commissioners for Foreign Missions had been the first missionary body to adopt

⁴⁰ Although the terms of the Treaty of Nanjing had originally applied to Sino-British relations, the inclusion of an ingenious “most-favored nation” clause, which had been intended to protect British interest in light of Chinese treaty arrangements with other powers, meant that new concessions arranged with other western powers were necessarily and uniformly applicable for all western powers.

⁴¹ Scholarship on Christianity in China has tended to focus almost exclusively upon the foreign nationals who sought to spread the word of God among the Chinese. See, for example, Nicolas Standaert, ed., *Handbook of Christianity in China 630-1800* (Leiden: Brill, 2001); Kenneth Scott Latourette, *A History of Christian Missions in China* (New York: Macmillan, 1929); and Jane Hunter, *The Gospel of Gentility: American Women Missionaries in Turn-of-the-Century China* (New Haven: Yale University Press, 1984). In contrast, as new archival sources emerge, scholars have shifted their analytic view towards understanding Christianity for and among the Chinese themselves, as well as the role of Chinese Christians in making of modern China. See Ryan Dunch, *Fuzhou Protestants and the Making of Modern China* (New Haven: Yale University Press, 2001), and Daniel H. Bays ed., *Christianity in China from the Eighteenth-Century to the Present* (Stanford: Stanford University Press, 1996).

“the idea of making the practice of medicine an auxiliary to introducing Christianity to China.”⁴²

Having sent their first missionary to China in 1830, the American Board helped to formally usher the “age of the so-called medical missionaries” when they sent Peter Parker, the first Protestant missionary with complete medical training to Canton in 1833.⁴³ Parker opened a clinic just outside of Canton and achieved quite a reputation among the locals largely on account of his minor surgical procedures. While it is debatable whether or not western medical techniques and pharmacology of the time offered distinct advantages over Chinese healing, Parker’s surgical procedures, such as the removal of external tumors and cataract operations, marked a sharp contrast with local practices and attracted “an incessant stream of patients from near and far.”⁴⁴ Parker himself remarks,

When it was the practice to admit patients daily, I observed some of them with lanterns, with which they left their homes at two or three o’clock in the morning, in order that they might be there in season; when the days of admission were limited, they sometimes came the previous evening, and remained all night, that they might secure a ticket in the morning.⁴⁵

Parker’s success as a practitioner, however, did not easily translate into missionary success—a fact to which he himself was sensitive. At the heart of the matter lay a conflict of means. For sponsoring mission societies, medicine was simply a tool for proselytizing.⁴⁶ For medical practitioners, curative

⁴² Cited in K. Chimin Wong and Wu Lien-teh, *History of Chinese Medicine: Being a Chronicle of Medical Happenings in China from Ancient Times to the Present Period* (Tianjin: Tianjin Press, 1932), p.176.

⁴³ Peter Parker arrived at Canton on 26 October 1834. “Age of the so-called medical missionaries” is taken from Paul Unschuld, *Medicine in China: A History of Ideas* (Berkeley: University of California Press, 1985), p. 238 and may be taken to reflect Unschuld’s critical stance of both the conventional assumption that elevates the missionaries’ western medical techniques above indigenous ones without regard to time and circumstance, and the challenges encountered when medicine and missionary activities are linked.

⁴⁴ Unschuld, *Medicine in China*, p. 238.

⁴⁵ Cited in Wong and Wu, *History of Chinese Medicine*, p. 178.

⁴⁶ In the words of J. L. Maxwell,, speaking before his colleagues in 1905, “It does not matter very much in what kind of building your medical and surgical work is preformed, provided it gives you an opportunity of preaching the gospel to your patients; and, further that seeing that the spiritual results are the chief thing, there is no special call to lay yourself out for and to be ready to deal with difficult cases. Such cases will take up a lot of time, and will give the medical missionary a good deal of anxiety and trouble; therefore, it would be well to cultivate only those cases that can be easily and quickly managed.” Cited in Unschuld, *Medicine in China*, p. 240.

work afforded an opportunity to demonstrate—sometimes dramatically as with cataract surgeries—the benefits and efficaciousness of “modern medicine.”⁴⁷

Ruth Rogaski has demonstrated that the history of China’s encounter with Western medicine does not yield itself to a strict dichotomy of conceptually distinct polarities. Rogaski notes, “Theories of disease causation and disease prevention in China and Europe [and by extension, the United States] did not manifest great divergence for most of the nineteenth century, in spite of the congratulatory self-evaluation of Europeans as they established their military superiority over the Qing empire. What did differ was the political and social organization of disease prevention”⁴⁸ Western medical practitioners played a critical role in the establishment of hospitals and dispensaries, most of which were located in cities and towns. Between 1880 and 1910, Protestant medical missionary activity experienced rapid expansion. Although there were only about 50 medical missionaries in China prior to 1870, Michelle Renshaw estimates that from 1870 to 1880, an average of 3.8 missionaries arrived per annum: “[T]he rate increased to 13.2 per annum for the next twenty years. It accelerated again to 19.7 per annum for the five years to 1905.”⁴⁹ In addition, between 1880 and 1910, 126 Protestant missionary hospitals were established.⁵⁰ By 1916, the number of hospitals had increased to 265 with 420 attendant foreign doctors.⁵¹

⁴⁷ Unschuld notes that this conflict between theologians and medical practitioners was grounded in a larger complex of shifting relations occurring in the United States and Europe and for the most part, activities in China did not loom large upon this internal contestation. Unschuld, *Medicine in China*, p. 241.

⁴⁸ Ruth Rogaski, *Hygienic Modernity: Meanings of Health and Disease in Treaty-Port China* (Berkeley: University of California Press, 2004), p. 77.

⁴⁹ Michelle Renshaw, *Accommodating the Chinese: the American Hospital in China, 1880-1920* (New York and London: Routledge, 2005), p. 11.

⁵⁰ Ibid. Renshaw also notes that the dispensary form was particularly popular among medical missionaries for its practicality and economy. Although she does not tabulate the number of dispensaries created during the same period, she does emphasize that the dispensary form permitted a large number of patients to be seen at little cost and with little delay. She notes, “Once the physician had acquired sufficient of the local language, the only physical necessities were a room (or sometimes a courtyard) in which patients could congregate, a supply of the most basic drugs, a table, and a stool.” Renshaw, *Accommodating the Chinese*, p. 142.

⁵¹ Ka-che Yip, *Health and National Reconstruction in Nationalist China: The Development of Modern Health Services, 1928-1937* (Ann Arbor: Association for Asian Studies, 1995), p. 20.

In the global scheme of China's healthcare needs, 420 doctors and 265 hospitals could hardly effect much practical change in the lives of average Chinese people, but when considered in terms of biomedical research, these seemingly isolated sites of medical care become coordinates for an interlocking map of communal anthropometric data gathering. Moreover, because hospitals tended to occupy locations near other centers of mission activity, particularly schools, there was a density of population and an availability of subjects for study. Missionary involvement in the early twentieth century in the development of medical education in China further facilitated the imbrication of knowledge production and knowledge dissemination. By 1921, nine of the twenty-eight medical schools in China were missionary sponsored and funded.⁵² This is not to suggest that medical schools funded by mission sources were well-equipped with the most advanced research facilities available for the time period or that its physician professors were abreast of the latest advances in medical science. Ka-che Yip has described the conditions in these schools as generally "poor," minimally staffed, and absent of laboratory work.⁵³ But while this was most likely the case—at least until 1914 when the Rockefeller Foundation began exploring its options for shaping the development of medical education in China—too much focus upon the laboratory as the primary site for the generation of scientific research obscures the more organic ways in which Western medical practitioners began initiating anthropometric studies of their Chinese patients.

The earliest anthropometric surveys undertaken by physicians were drawn directly from private practices. Western physicians like Drs. E. M. Merrins and Duncan Whyte, in addition to penning pieces about the general need for anthropometric data and the creation of physiological standards for the Chinese population, also elicited bodily measurements directly from their patients.⁵⁴

⁵² Ka-che Yip, *Health and National Reconstruction in Nationalist China*, p. 21.

⁵³ Ibid., p. 22 and Ka-che Yip, "Medical Education in China: The American Connection, 1912-1937," in *Sino-American Relations since 1900*, ed. Priscilla Roberts (Hong Kong: Center of Asian Studies, University of Hong Kong, 1991), pp. 94-96, 99-100.

⁵⁴ The two journals merged in 1932 to form the *Chinese Medical Journal*. E. M. Merrins, "Anthropometry of Chinese Students," *CMJ* 24 (1910): 318ff; and G. D. Whyte, "Height, Weight and Chest Measurements of Healthy Chinese," *CMJ* 32.6 (1918): 22.

Merrins published height and weight measurements of 219 Chinese males ages eleven to twenty-two years and 69 females ages twelve to twenty-one years in Wuchang, Hebei. Whyte undertook a larger-scale investigation, measuring the heights and weights of 651 males from Shandong and 438 females from various southern provinces.⁵⁵

The Search for Normal

For many Western commentators, the absence of quantitative data on the body tended to elicit something akin to moral opprobrium. The handful of anthropological treatises on the Chinese, while certainly demonstrative of some kind of progress, was nonetheless insufficient for the numerically-minded. The editorialist of a 1924 notice in the *China Medical Journal* could barely restrain his annoyance and general frustration at the dearth of “accurate vital statistics,” which are needed “in order to estimate aright the physical and social condition of a people of a nation.”⁵⁶ Seething with something like contempt for the Chinese, who “like nearly all Orientals . . . care nothing for perfect accuracy in numerical statistics,” the author called upon the journal’s Western medical readership to assist in the monumental task of collecting statistical data concerning the Chinese (“in their own country” at that!) by, in this instance, submitting figures extracted from their own practices. In doing so, one Dr. Oppenheim would then be able to begin calculating the sex proportion of Chinese births for the country more broadly. The editorial notice expressed explicitly a popular western stereotype

⁵⁵ Other studies appearing at the time: G. D. Whyte, “The Need for Physiological Standards in Clinical Research,” *CMJ* 26 (1912): 325; R. A. Bolt, “A Plea for more Systematic Medical Inspection and Physical Examination of Chinese Students,” *CMJ* 27 (1913): 208; A. Shoemaker, “,” *CMJ* 27 (1913): 362; Annie Scott, “Size and weight of 269 Chinese children and young adults,” *CMJ* 34 (1922): 305; A. C. Hutcheson, “Height, Weight and Chest Measurements of Healthy Chinese,” *CMJ* 34 (Anat. Sup) (1920): 13; E. C. Wilford, “Note on Anthropometric Measurements of Chinese,” *CMJ* 35 (1921): 190; C. L. Kao, “Blood Pressure in Healthy Chinese,” *National Medical Journal* 8 (1922): 101; and W. W. Cadbury, “Pulse Rate and Blood Pressure of Normal Individuals,” *CMJ* 35 (1921): 242. Cadbury has a number of similar articles about pulse, blood pressure, and other bodily statistics published in the *National Medical Journal*, *CMJ*, and the *Archives of Internal Medicine*.

⁵⁶ “Vital Statistics of the Chinese,” *CMJ* 38 (1924): 837-38. The *China Medical Journal* had been named the *China Missionary Medical Journal* from 1887 to 1907. It later underwent another name change in 1932 when it was merged with the *National Medical Journal of China*. The result of the merger, the *Chinese Medical Journal*, continues to be printed in Shanghai and Taipei as *Zhonghua yixue zazhi*.

of the untrustworthy Chinese or, more mildly, the obfuscating Chinese whose fear of losing face complicated the efforts of the intrepid Western scientific investigator.⁵⁷

Time and time again, from both Western and Chinese investigators working in biomedical research, the absence of figures and tables of Chinese heights and weights—the most commonly cited of bodily measurements—became a kind of leitmotif foregrounding the general significance of the research undertaken. “[W]e have no exact idea about the Chinese, their ‘normal’ stature, their ‘normal’ weight, nor the relationship between height, weight and age.”⁵⁸ Paul H. Stevenson of the Anatomical Laboratory at Peking Union Medical College helped to bring about a more ambitious study by enlisting the services of his fellow members in the Research Committee of the China Medical Missionary Association. From 1915 to 1925, physical measurements for over ten thousand individual Chinese persons were collected, because “this committee felt that a final evaluation of much of its other work, especially along the line of the regional incidence of certain diseases and the varying effects of these diseases upon the different populations of the various regions of China, could not be made in the absence of some knowledge of the normal physical standard of the people of the different regions concerned.”⁵⁹ For the Chinese physicians, Xu Shijin and Wu Liguo, working on the school health initiative under the auspices of the Shanghai Municipal Health Bureau, Stevenson’s work provided a model in terms of methodology but not necessarily for analysis. Xu and Wu write, “Presently, when a student undergoes a physical examination, an examination record of the

⁵⁷ The author includes a quotation from Arthur Henderson Smith’s, *Chinese Characteristics*, first published in Shanghai in 1890, which is actually quite interesting as an example of the shifts in meaning taking place in the West with the idea of objectivity. Although the passage is meant to demonstrate the sharp contrast, and the attendant cultural misunderstandings, between the Occidental who wants to “ascertain everything with unerring exactness” and the Chinese who “does not know how many families there are in his native village, and he does not wish to know,” it highlights the historicity of the belief in the unerring exactness represented by numbers. The end of the quotation is thought provoking. “What any human being can want to know this number for, is to him an insoluble riddle. It is ‘a few hundreds,’ ‘several hundreds,’ or ‘not a few,’ but a fixed and definite number it never was and never will be.” Cited in “Vital Statistics of the Chinese,” *CMJ* 38 (1924): 837. For further discussions of historical constructions of truth, objectivity, and facts, see Steven Shapin, *A Social History of Truth: Civility and Science in Seventeenth-Century England* (Chicago: University of Chicago, 1994); Mary Poovey, *A History of the Modern Fact: Problems of Knowledge in the Sciences of Wealth and Society* (Chicago: University of Chicago, 1998); and Lorraine Daston and Peter Galison, *Objectivity* (New York: Zone Books, 2007).

⁵⁸ S. M. Shirokogoroff and V. B. Appleton, “Growth of Chinese,” *CMJ* 38 (1924): 401-2.

⁵⁹ Paul H. Stevenson, “Collected Anthropometric Data on the Chinese,” *CMJ* 39 (1925): 855-6.

height, weight, and other important organs is prepared for each student. For heights and weights, however, we lack the appropriate charts of standard heights and weights that facilitate comparison.”⁶⁰

For biomedical physicians and researchers, “normal,” though often represented as numerical averages and in line graphs, was never just the average or mean for a particular subject group. Their interest in what constituted typicality and commonness for the Chinese body type meant that the measuring and calculation of statistical data served a commonly perceived need for reliable, scientific information. But in pursuing the question of what was normal for the Chinese, Chinese and Western anthropometric investigators aligned the more descriptive aspects of their work with a more urgent desire for real knowledge. Not knowing the normal stature or the normal weight of the Chinese was akin to not knowing the Chinese at all. Not knowing the normal physical standard of Chinese people in different regions suggested a greater degree of specification about the state of ignorance the researchers possessed, but the conclusion was still largely the same. What the researchers lacked in knowledge were concrete, objective details about what made the Chinese Chinese. Identifying and understanding what was normal for the Chinese, what comprised the normal physical standard for the Chinese, was a necessary precondition for China to develop into a modern nation, because if there was anything a modern nation knew, and knew well, it was the make-up of its people.

The Early Years

How did researchers and physicians broach the idea of normal physical standards? From its earliest appearance in E. M. Merrin’s 1910 study of the heights and weights of Wuchang students, anthropometric research had tended to emphasize the question of physical growth as the main problematic motivating the collection, compilation, and calculation of bodily measurements. The researchers, who included Western medical practitioners and an emergent group of Western-style Chinese physicians and scientists, rarely engaged in philosophical discussion about the constitution and mechanisms of growth—how it occurred, what accounted for the diminution of growth velocity

⁶⁰ Xu Shijin and Wu Liguo, “Shanghai shi xueling ertong shenchang tizhong zhi chubu yanjiu,” p. 977.

with age, i.e. the physiology of growth.⁶¹ Instead, they focused upon accruing empirical data in an effort to identify the somatometric parameters of normal Chinese children and adults. These sorts of studies operationalized a preexisting conception of normal health, because investigators often deliberately excluded those individuals determined from the outset to be inappropriate test subjects. The criteria for exclusion is not always explained, although based on those studies that include a description of their selection process, “not normal” covers those individuals who appear to be malnourished, suffering from anemia (*pin xue* 貧血), have an enlarged thyroid (*jiazhuangxian pang da* 甲狀腺肥大) or enlarged tonsils (*biantaoxian pang da* 扁桃腺肥大), or have tuberculosis (*feijiehe* 肺結核). Thus, although the anthropometric surveys were intended to be descriptive, i.e., the numerical values reflect the actual composition of a specific group, it is worth keeping in mind that such descriptions were weighted.

Beginning in 1917, the Russian anthropologist/ethnologist S. M. Shirokogoroff, who was most well known for his Tungusic studies, conducted an investigation of the process of physical growth among Chinese children. The culmination of his work was published in 1925 under the title *Process of Physical Growth among the Chinese, Volume I: The Chinese of Chekiang and Kiangsu*.⁶² Shirokogoroff had originally intended to take measurements of Tungus, Manchu, and Mongol children as an

⁶¹ That is not to suggest that there are no examples of Chinese debates on points of theory, but rather, the more common treatment of the topic assumed the form of *précis*. See, for example, Cheng Fanyu, “Shengchang de yanjiu” [Study of growth], *Kexue* 17.6 (June 1933): 923-39.

⁶² S. M. Shirokogoroff, *The Process of Physical Growth Among the Chinese, Volume I: The Chinese of Chekiang and Kiangsu* (Shanghai: Commercial Press, 1925). Although important within the academic literature on physical growth—later researchers duly noted its scholastic contribution by including its citation—a contemporary review of Shirokogoroff’s work was far from laudatory. The reviewer expressed a fair degree of exasperation, writing, “It is not clear that the discussion of the changes in the relative growth of parts of the body is worth the effort lavished on it. Data on the appearance of the teeth are given in such form as to be well nigh useless. Various endocrine activities are posited as causes for the observed course of growth. On the whole, this is one of the most pretentious and ill-written publications in many a day.” Leslie Spier, *American Anthropologist* 29 (1927), 119-20. Beyond academic reception, it is important to note that Shirokogoroff’s interest in physical growth reflected an intellectual commitment to an anthropological project that sought “to base our knowledge of peoples of eastern Asian upon objective physical measurements instead of the mere subjective impressions of travelers.” C. W. Bishop, “Review: Anthropology of China,” *Geographical Review* 18.2 (April 1928): 343. A brief scan of his publications, which yields titles like “Anthropology of Northern China,” “Who are the Northern Chinese,” and “Anthropology of Eastern China and Kwangtung Province,” attests to this commitment.

extension to his previous research on the non-Chinese population of northern Asia. He found, however that “the undertaking of measurements of Tungus, Manchu, and Mongol children were, practically speaking, impossible under the existing conditions of field work.”⁶³ What those conditions were, Shirokogoroff does not clarify, although one suspects that growing political unrest and military pressure from Japan could hardly have helped him in his fieldwork. Instead of focusing upon ethnic minorities, he redesigned his plans and combined forces with Dr. V. Appleton, who as a missionary physician working in China “was already interested in this problem from a medical standpoint.”⁶⁴ During the spring of 1924, Appleton, with the assistance of other persons “connected with the school work,” carried out the measurements of 900 children at mission schools in Ningbo and Hangzhou in Zhejiang and Shanghai, Jiangsu. She examined boys between the ages of five and nineteen and girls between six and twenty. Appleton also made descriptive notes of “hair on the body and face; menstruations; degree of development of the breast in girls; pubic hair; dentition; state of teeth, —caries and irregular ones; and degree of nutrition, —poor, fair, good, excellent,” which, while subjective, were meant to provide some kind of indication of “the degree of development of muscles, bony system, fat deposit, and general impression.” Shirokogoroff drew from her findings to tabulate the formulas of growth for height, weight, etc. He then analyzed the potential significance of the various patterns he discerned from the numerical data.⁶⁵

⁶³ Shirokogoroff, *The Process of Physical Growth Among the Chinese*, p. 1.

⁶⁴ Ibid. Dr. Vera Appleton was a fixture in missionary-related health campaigns in the 1920s and worked alongside the Council on Health Education, Shanghai. In addition to her own medical practice, she wrote for journal *Health* in which she reported about the establishment of child health centers around China as well as her own school visitations and physical examinations. See for example, *Weisheng* [Health] 1 (Shanghai: Weisheng jiaoyu hui, 1924).

⁶⁵ Shirokogoroff, *The Process of Physical Growth Among the Chinese*, p. 6. Dr. Appleton published her portion of the study as “Growth of Chinese,” *American Journal of Diseases of Children* 30 (July 1925): 43-9. In addition, the *CMJ* printed abridged versions of their cooperative study: S. M. Shirokogoroff and V. B. Appleton, “Growth of Chinese,” *CMJ* 38 (1924): 400-13; and S. M. Shirokogoroff, “Notes on the Physical Growth among the Chinese Females and Males of Chekiang,” *CMJ* 39 (1925): 1029-40.

Shirokogoroff's study, both in terms of its scale and objectives, was certainly not unique.⁶⁶ Around the same time as its publication, Dr. Paul H. Stevenson of the Anatomical Laboratory of the Peking Union Medical College published his report, "Collected Anthropometric Data on the Chinese," which synthesized the work of members of the China Medical Missionary Association undertaken between 1915 and 1925. Motivated by the "desirability of an investigation of normal physical and physiological standards among the Chinese," particularly in light of possible insight such data may yield for disease incidences, the China Medical Missionary Association's Research Committee solicited voluntary contributions of anthropometric data from its membership.⁶⁷ Whereas Shirokogoroff's study had been a fairly unified and systematic study under his and Dr. Appleton's direct administration, Stevenson was reporting the research work of thirty-two different physicians located in various provinces throughout China. Each physician adopted a similar, but not identical, approach to the collection of anthropometric data. This diversity of participation yielded a mix of positives and negatives. Stevenson himself was quick to address the immediate drawbacks of the study. He noted in a later article, "A detailed analysis of the character and geographical sources of the data thus collected [between 1915 and 1925], however, shows that in practically 80% of the cases only height and weight are recorded; while the geographical distribution of the individuals measured shows an overwhelming concentration in a very few of the provinces."⁶⁸

Despite these drawbacks, the study was nonetheless important for both its scope and breadth of data collected. The range of participants' ages far exceeded Shirokogoroff: the youngest being two years old and the oldest between sixty and seventy. Whereas Shirokogoroff and Appleton identified growth in children as the main object of study, the physicians involved in the Stevenson

⁶⁶ His study seems to have been rather indifferently received by the medical community. Wu Xian largely dismisses the study as having been laden with errors and instead identifies Appleton's two studies on the growth of Guangdong children in Hawaii as more reliable. Wu Xian, "Guoren shengli shuizhen zhi yanjiu," p. 35. V. B. Appleton, "Growth of Chinese children in Hawaii and in China," *American Journal of Physical Anthropology* 10.2 (April/June 1927): 237-52 and "Growth of Kwanttung Chinese in Hawaii," *American Journal of Physical Anthropology* 11.3 (April/June 1928): 473-500.

⁶⁷ Paul H. Stevenson, "Collected Anthropometric Data on the Chinese," *CMJ* 39 (1925): 855-98.

⁶⁸ Paul H. Stevenson, "Anthropometry in China: An Extended Outline of Research," *CMJ* 40 (1926): 96.

report were mainly full-time physicians making the most of their clinical practices as the basis for scientific research. Some physicians drew from hospital records; others from student examinations conducted at missionary and Chinese-run schools and orphanages.⁶⁹ In total, Stevenson's survey consisted of physical measurements from 10,863 Chinese (9,630 males and 1,233 females) from eighteen provinces.⁷⁰ The overall scope of Stevenson's survey was far wider, and more importantly, we see through its incorporation of the voluntary contributions of so many different physicians the extent to which the desire to fill in the blanks about what constituted the "normal physical standard" gripped the biomedical community in China. For Stevenson, such a positive response to the Research Committee's initial call for anthropometric data demonstrated the "feasibility of cooperative effort in such a study [i.e., one that investigates physical standards]" and pointed "the way towards the formulation and execution of a more adequate program of study along this line for the future."⁷¹

Other surveys undertaken during the 1920s were generally smaller in scope than Stevenson's. Noel Keys and W. W. Cadbury examined 179 boys and youths between the ages of eight and nineteen at the Canton Christian College, which was later renamed Lingnan University in 1927.⁷² In the north, Kang Liang Hsu and I-Wen Liang, biomedically trained researchers at PUMC, undertook systematic physical examinations of 740 males and 232 females between the ages of five and eighteen at local Beijing primary schools. Hsu and Liang had two objectives for their study: "first, to contribute to the normal physical standards now being collected by the Anthropological Section of the Research Committee of the China Medical Association under the leadership of Dr. Paul H.

⁶⁹ Stevenson, "Collected Anthropometric Data on the Chinese," p. 866.

⁷⁰ Stevenson organized his analysis into three geographical regions: North China (comprising Zhili, Henan, Shanxi, Shandong, Shaanxi, and Gansu), Central China (Anhui, Jiangsu, Zhejiang, Jiangxi, Hubei, Hunan, and Sichuan), and South China (Fujian, Guangdong, Guangxi, Yunnan, and Guizhou). While representation was certainly claimed from all eighteen provinces, the distribution was lopsided and largely in favor of Henan, Zhejiang, and Hunan, where many of the physician participants resided.

⁷¹ Stevenson, "Anthropometry in China," p. 96.

⁷² Noel Keys and W. W. Cadbury, "An Age-Height-Weight Study of Cantonese School Boys," *CMJ* 40 (1926): 14-24.

Stevenson; and second, to determine the physical fitness and criteria for normal growth of school children in Peiping.” They actively selected school children from schools known for having children from “well-to-do families.” For those “children of P’ing-Ming school [who] did come from poorer families,” Hsu and Liang reassure the reader that their composites amount to no more than 6% of the total.⁷³ Both of these studies focused upon students, but researchers were also interested in children much younger. From July 1922 to November 1929, S. W. Lee, who worked in the Department of Obstetrics and Gynecology at PUMC, made measurements of newborn infants delivered in the maternity ward of the PUMC Hospital. He reports that during that seven-year timeframe, 1,984 newborn infants were delivered, of whom 1,437 were full term Chinese babies whose parents came from just about every province in China except Gansu. He obtained the weights and measurements of the fetal skull for 719 boys and 718 girls.

All of these studies when taken together suggest a degree of flexibility in the requisite parameters for conducting research. Academic institutional affiliation was important, particularly in light of the growth of tertiary education and professional training programs throughout China, but as is evident in the Stevenson’s report (1925), contributions to medical research were not constrained by a lack of specialized facilities or technical training. Stevenson was an active research member on the faculty of the newly created Peking Union Medical College (PUMC).⁷⁴ He and his colleagues worked

⁷³ Kang-Liang Hsu and I-Wen Liang, “A Study of the Growth Development of School Children in Peiping,” *National Medical Journal of China* 16 (1930): 195-214.

⁷⁴ The Union Medical College, which later became PUMC, was founded in 1906 by Thomas Cochrane, a Scottish medical missionary, with the cooperation of the major foreign missionary organizations working in China, including the American Board of Commissioners for Foreign Missions, the London Missionary Society, and the Medical Missionary Association of London. The China Medical Board, a subsidiary entity created by the Rockefeller Foundation in 1914 to oversee its plans for developing medical education in China, purchased the Union Medical College and renamed it PUMC in 1915. It was modeled after the John Hopkins University School of Medicine and came play an integral role in developing, educating, and providing research opportunities for the next generation of biomedical physicians and researchers in China. For more information, please see Mary E. Ferguson, *China Medical Board and Peking Union Medical College: A Chronicle of Fruitful Collaboration 1914-1951* (New York: China Medical Board of New York, 1950); John Bowers, *Western Medicine in a Chinese Palace: Peking Union Medical College, 1917-1951* (Philadelphia: Josiah Macy, Jr. Foundation, 1972); Mary Brown Bullock, *An American Transplant: the Rockefeller Foundation and Peking Union Medical College* (Berkeley: University of California Press, 1980); and Qiusha Ma, “The Peking Union Medical College and the Rockefeller Foundation’s Medical Programs in China,” in *Rockefeller Philanthropy and Modern Biomedicine: Institutional Initiatives from World War I to the Cold War*, ed. William H. Schneider (Bloomington, IN: Indiana University Press, 2002).

in a unique environment that united clinical care with laboratory research. The physicians who contributed to his report represented a more diverse lot. Stevenson suggests as much in his outline for an extended research program in anthropometry in China. Having detailed at length the kinds of measurements one ought to take, the manner in which they ought to be taken, and the necessary equipment entailed, he delineates the ways in which researchers could attain the desired measurements.

Schools, or police and soldier barracks however often yield the most satisfactory results in the way of the number of measurements secured in a given period of time. The semi-official relations often existing between the mission doctor and such special groups in his locality may provide exceptional opportunities for anthropometric research in connection with physical examinations or other types of service rendered.⁷⁵

To conduct anthropometric research in China, the scientifically-minded physician needed an enterprising spirit and the willingness to explore the possibilities inherent in the domestic and the mundane.⁷⁶ Drawing from one's own practice or taking the advantage afforded by circumstance functioned as a kind of research entrepreneurialism that bolstered the belief that science—empirical, objective, and supported by experiment—could ameliorate and strengthen society. Stevenson himself enjoyed a rare privilege when granted permission by the Christian General Feng Yuxiang to conduct an anthropometric survey of Feng's troops stationed at Nanyuan. According to the notice in the

⁷⁵ Paul. H. Stevenson, "Anthropometry in China: An Extended Outline of Research," *CMJ* 40.2 (February 1926): 122.

⁷⁶ A ready example may be found in a letter sent to the *China Medical Journal* dated 28 December 1920 by a physician working in Chengdu. Dr. W. C. Wilford addressed his letter to the editor of the journal and explained, "In the CMJ [*China Medical Journal*] (Anatomical Supplement) July, 1920, page 15, the author of the article on Anthropometric Measurements of Chinese says: 'It would be interesting to have statistics from West China, Szechwan in particular, . . . So I take the liberty of presenting the following measurements of students of the C. M. M. Dormitory, Union Middle School, West China Union University, Chengtu, Szechwan:

Number of students examined	70
Average age:	18.28 yrs.
Average height:	5' 5.4"
Average weight:	101.05 lbs.
Chest:	
Inspiration:	31.25"
Expiration:	28.71"

"Correspondence," *China Medical Journal* 35 (1921): 1990.

China Medical Journal, the General had even ordered his own army medical officers to actively facilitate the work. The notice described further,

These troops, comprising the main body of General Feng's army and numbering something over 30,000 men, are recruited from certain portions of the provinces of Honan, Anhwei, Chihli, Shantung, and Northern Kiangsu. The survey involves the organization of a specially fitted out anthropometric laboratory at Nan Yuan and will engage the attention of a small team of workers throughout the spring and a part of the summer months. In addition to the valuable data ultimately available from this study, an excellent opportunity will be afforded through it for instruction and experience in the technique of somatological studies which it is hoped will be of value to a small group of students interested in similar studies in other parts of China.⁷⁷

His measurements of men from Feng's army were included in his paper entitled, "Detailed Anthropometric Measurements of the Chinese of the North China Plain."⁷⁸

Changing of the Guard

Western medical researchers and clinicians dominated the production of anthropometric research from 1910 through 1925, but by the mid-twenties, a younger generation of Chinese students educated in missionary schools at home or institutions abroad ascended to the foreground to assume ever greater prominence in scientific research. Their increased participation coincided with the expansion of formal institutional structures encouraging and funding scientific research. The first two decades of the newly founded Republic witnessed a flurry of institutional activity with the creation of a number of colleges and universities of diverse form and function at national, provincial, and more local levels. By 1922, there were five national universities, two provincial universities, thirteen private universities, and fourteen Christian universities.⁷⁹ Universities such as Nankai, Qinghua, and Jiaotong set up more rigorous science programs under the instruction of Chinese students formerly studying

⁷⁷ "News and Comment," *China Medical Journal* 38 (1924): 252-53.

⁷⁸ Paul H. Stevenson, "Detailed Anthropometric Measurements of Chinese of the North China Plain," *Anthropologia Sinica* 2 (Shanghai: Commercial Press, 1938; rpt. 1940). A summary of this paper can also be found in reviews section of *Xueshu huikan* 1.1 (November 1942): 147-8.

⁷⁹ See Table 3, "Major colleges and universities in China and their distribution, 1922," of E-tu Zen Sun, "The Growth of the Academic Community 1912-1949," in John K. Fairbank and Albert Feuerwerker, ed., *The Cambridge History of China*, vol. 13 *Republican China 1912-1949*, pt. 2 (Cambridge: Cambridge University Press, 1986), pp. 378-9.

in Europe, the United States, and Japan.⁸⁰ Organizations like the Geological Survey of China, established in 1916, and the *Zhongguo kexue she* (Chinese Association for the Advancement of Science), more commonly known as the Science Society, played an early role in promoting scientific research and providing a forum within which Chinese scientists could share their work. The Science Society, whose formation was due to the efforts of Chinese students at Cornell University in 1914, was a particularly prominent fixture of the scientific scene. Their activities included the publication of the journal *Kexue* (Science), meetings for the presentation of research papers, Chinese translation of scientific texts, and the establishment of a library and biological laboratory in Nanjing.⁸¹ Add to this, the formation of the Peking Union Medical College (PUMC, 1917) in Beijing, which was funded by the Rockefeller Foundation through the China Medical Board; Academia Sinica (1927), a consortium of thirteen research institutes with strong support from the Nationalist government; and the Henry Lester Institute for Medical Research (Shanghai, 1932), a privately-endowed institution whose intellectual proclivities were oriented towards Great Britain, and one glimpses a vital and cosmopolitan setting for the production of scientific knowledge and research.

Wang Jimin (王吉民, 1889-1972), who became a leading figure in the Medical History Movement in China and founded the *Chinese Journal of Medical History*, is generally recognized as

⁸⁰ Between 1896 and 1937, some 50,000 Chinese students studied in Japan. Previous scholars have estimated that of those studying in Japan from 1905-1939, approximately 414 Chinese students—3.5% of the total—graduated in medicine from Japan's 23 upper-level medical schools. This figure does not include, however, students who may have begun their studies in different subjects and then later transferred into medicine; nor does it account for those students studying medicine at comprehensive universities. Japan's influence far exceeded the specific number of students studying there. As Western learning achieved greater prominence as a model for science and modern institutions, Chinese students and scholars assimilated many of those ideas and concepts through Japanese translations and linguistic adaptations. The discursive intensity of exchange can be seen in the many journals and translated books undertaken by returning students as well as the adoption of neologisms like health (*baojian*) and hygiene (*weisheng*), physiology (*shengli*), anatomy (*jiepou*), endocrine secretions (*neifen mi*), and thyroid gland (*jiazhuanxian*) from Japanese. Li Jingfeng, ed., *Zhongwai yixue jiaoliu shi* [A Chinese-Foreign exchange history of medicine] (Changsha: Hunan jiaoyu chubanshe, 1998), pp. 273-79.

⁸¹ The journal *Science* published its first issue in 1915. E-tu Zen Sun, "The Growth of the Academic Community 1912-1949," pp. 382-3. For more recent monographs about the Science Society, please see Zhang Jian, *Kexue shetuan 'zai jindai Zhongguo de mingyun: yi Zhongguo kexue she wei zhongxin* (The Science Association and the change of society in modern China: a study of the Science Society of China) (Jinan: Shandong jiaoyu chubanshe, 2005) and Sheng Jia, "The Origins of the Science Society of China, 1914-1937" (Ph.D. dissertation, Cornell University, 2005).

having published the first Chinese anthropometric study. Published in 1925, Wang's study determined the average height, weight, head and chest circumference of young children and compared the figures against Western standards.⁸² Many of these Chinese researchers possessed institutional ties to universities or medical schools and drew upon these more formal structures for establishing the parameters of their research. Those closely affiliated with PUMC tended to focus upon subject groups living in and around Beijing. Dong Chenglang (C. L. Tung, 董承琅) gathered anthropometric data on 351 Chinese resident of Beijing in 1928.⁸³ Zhu Shenzhi (Ernest Tso, 祝慎之) measured the increases in weight experienced by 584 newborn babies in 1930.⁸⁴ Other studies of interest include that of Kang Liang Hsu and I-Wen Liang, which focused upon children and youths at local Beijing primary schools, and S. W. Lee's work with infants delivered at the maternity ward of the PUMC Hospital.⁸⁵ Correspondingly, those working for newly created state agencies like the Shanghai Municipal Health Bureau or hospitals affiliated with major medical schools like Xiangya Medical College in Changsha, Hunan, founded in 1914 with the participation of Edward H. Hume and the Yale-in-China Association, drew upon local resources to advance the epistemological project on the normal development of the Chinese body.⁸⁶

⁸² Wang Jimin, "Zhongguo yinghai tige zhi di'er ci baogao" [The second report on the physique of Chinese infants and children], *Zhonghua yixue zazhi* [National Medical Journal of China] 11 (1925) cited in Wu Xian, "Guoren shengli shuzhun zhi yanjiu," p. 85. According to Wu, the first study was also included in the above titled "Second report."

⁸³ Dong Chenglang, "Physical Measurements of the Chinese," *Chinese Journal of Physiology*, 1 (1928).

⁸⁴ Ernest Tso is perhaps best remembered for his work on soybean milk. Zhu Shenzhi (Ernest Tso), "A study of the fat, lactose, and protein content of Chinese women's milk," *China Medical Journal* 38 (1924) and "Birth Weight and Growth of Chinese Infants during the First Year," *Chinese Journal of Physiology* 4 (1930): 31-9.

⁸⁵ Both of these have been discussed above on pp. 25-6.

⁸⁶ Other studies include Zhao Lin (female nurse), "Nanjingshi xueling ertong ji xueling qian ertong shengao tizhong zhi chubu yanjiu" [Preliminary research on the heights and weights of pre-school and school-age children in Nanjing], *Gonggong weisheng yuekan* [Public Health Journal] 1.2 (1935); Wu Xingye, "Kangjian Zhongguo nanren zhi pingjun shencai" [Average statures of healthy Chinese men], *Zhonghua yixue zazhi* [National Medical Journal of China] 20 (1934): 829; Gordon King and Tang, Yu The, "Obstetrical Criteria in North China: the Weights and Measurements of the Mature New-born Child," *CMJ* 52 (October 1937): 501-6; Di Peiqing, "Hangzhoushi ertong tizhi zhi chubu diaocha" [A preliminary investigation of children's physiques in Hangzhou], *Zhonghua yixue zazhi* [National Medical Journal of China] 24 (1938): 179; Xu Deyin, "Zhongguo ertong tige celiang ji ying'er fayu zhi guancha" [An examination of bodily measurements of Chinese children and infant development], *Zhonghua yixue zazhi* [National Medical Journal of China] 25 (1939); and Su Tsu-fei

This growing imbrication of state and society through participation in medical research assumed national urgency by 1937. Researchers at the Henry Lester Institute for Medical Research resituated their work within the midst of refugee camps, and in concert with the humanitarian effort to ensure the health and safety of hundreds of thousands of refugees, who had been residents of the Chinese-controlled territories like Nanshi and Zhabei or had flooded into the city from outlying areas, researchers pursued a variety of research initiatives designed to illuminate different forms of pathology brought on or exacerbated by the on-going military conflict. Hou Xiangchuan (候祥川) and his colleague Ni Zhangqi (T. G. Ni, 倪章祺) undertook a series of measurements of refugee children in order to determine the potential benefits of soybean milk upon general growth as well as the children's states of health in residence at the refugee camps.⁸⁷

Classificatory Data

In seeking to understand the health of the Chinese population, physicians and researchers set the terms for how the physical body ought to be identified, recorded, and classified. They distilled the physical body into concrete units that could be measured. Height, weight, chest girth, and sitting height functioned metonymically, whether as topical references to China as a whole, or China by regional specification. As units of analysis, these measurements provided markers for evaluating how quickly or slowly changes took place over time, and while changes in the form of increase or decrease do not necessarily imply a corresponding set of positive and negative associations, researchers tended to view increase, be it height, weight, or chest expansion, as indications of positive growth. In sum, the measurements helped to confirm the integrity of a group of people as a group. Most of the studies were cross-sectional studies rather than longitudinal, i.e., the tracking of changes for a single

and Liang Chueh-ju, "Growth and Development of Chinese Infants of Hunan Province," *CMJ* 58 (July 1940): 104-12.

⁸⁷ Hou's and Ni's individual studies can be found in H. C. Hou, P. G. Mar, T. G. Ni, and B. E. Read, *Nutritional Studies in Shanghai* (Shanghai: Henry Lester Institute for Medical Research, 1939), pp. 27-46, 59-74. For more on the social implications of biomedical research in nutrition, see Part II, Chapter 4, "Nutritional Activism: The Science of Nutrition and Social Relief, from Shanghai to the Southwest, 1937-1945."

individual or group over a set duration of time. Because researchers worked with composite groups, often times with students of many different ages and grades, they emphasized the importance of making “specific mention of such factors as race, sex, or other items of identifying information in connection with each individual measurement in any series.”⁸⁸

The purpose of such details extended beyond organization. On the one hand, clear and detailed accounting of the subject’s sex, age, and nativity (place of) helped the researchers to identify and organize internal patterns of differentiation emerging from the data. Did Chinese males experience a similar rate of growth as Chinese females? Between what ages did growth appear to increase, decrease, or plateau? Did rates of growth correlate with geographic circumstance, or conversely, were geographic factors influencing rates of growth for children? If so, how? Understanding how to sort the data was essential for analysis, but in addition to its methodological function, details like sex, age, and nativity were instituted and normalized as markers of one’s social identity. An individual child became a subject for knowledge-making through his transformation from person to points of data. But the reverse was also true. By reaffirming the epistemological value of sex, age, and nativity as distinguishing features of individual’s social identity, the person becomes unknowable unless such details are included.⁸⁹ How such categories of identification were rendered and ascertained required negotiation, and it was through the course of initiating, conducting, and publishing anthropometric studies that one finds researchers and clinicians actively shaping the proper contours and content of such categories.

Sex

Sex as classification adhered strictly to the male-female binary, but one of the unintended consequences of organizing data according to the sex of the subjects was the light thus shown upon the experimental practice of measurement itself. Researchers had to contend with the social and

⁸⁸ Paul H. Stevenson, “Anthropometry in China: An Extended Outline of Research,” *CMJ* 40.2 (February 1926): 122.

⁸⁹ Knowing a person’s sex, age, and place of birth, however, is insufficient for identifying any singular person. Add height and weight to the mix, and the possibility of separating out one specific person increases but not to such an extent that that person is irrevocably distinct from someone else.

cultural implications of measurement, which may not have been immediately recognized when initially planning the logistics for undertaking an anthropometric survey. Stevenson observes, “On the basis of sex, the tabulated material comprises 8,127 males and 1,233 females, or roughly a 7:1 ratio for the entire country. It will be noted from the regional sex totals in the right hand column of Table II that a considerably larger number of males have been measured in Central [3,509 males] than in either North [2,200 males] or South China [2,464 males].”⁹⁰ The ratio of 7:1 was not a reflection of the demographics of the local population, and Stevenson points out,

Over one half of the total number of females comes from South China [671 females]. The male to female ratio for this section of China is a little less than 4:1, an evidence of the active interest of several women missionary physicians of this part of China in the relative physical standards of the Chinese women and girls of their respective regions. The ratio of males to females reported from North China is approximately 8:1, while that from Central China is over 12:1. The particular need of an increased interest in this problem on the part of women physicians and educators of these regions is thus evident.⁹¹

By highlighting the “active interest of several women missionary physicians,” Stevenson suggests an alternate order of practical concerns associated with studying females. Although Stevenson does not elaborate further, his identification of female anthropometric data with the specific efforts of female physicians directs our attention to the social settings in which such measurements could have taken place.

Consider the following incident. In April 1938, Ni Zhangqi (T. G. Ni, 倪章祺) contacted Dr. Marie A. Hadden of the School Medical Service for the Shanghai Municipal Council to request permission to take physical measurements of Chinese school children attending Council schools. He and Bernard E. Read, both researchers at the Henry Lester Institute for Medical Research, deemed the measurements essential for understanding the nutritional status of and the likely nutritional disorders afflicting Chinese children living in the International Settlement. Internal discussion within the Municipal Council of Ni’s request hinged upon the degree to which the proposed examination

⁹⁰ Paul H. Stevenson, “Collected Anthropometric Data on the Chinese,” *CMJ* 39.10 (October 1925): 859.

⁹¹ The number of females measured from North China was 279 and Central China 183. Stevenson, “Collected Anthropometric Data on the Chinese,” pp. 859-60.

was of a “purely routine nature with measurements taken of pupils either fully dressed or in athletic costume.”⁹² The Acting Superintendent of Education, H. G. Huckstep, cautioned, “If however children are required to strip the formal sanction of parents would certainly be advisable and such factors as the facilities in the various schools for conducting the examination, the danger of contracting chills, and the necessity for a lady doctor in the case of girls, would have to be taken into consideration.”⁹³ The Municipal Council granted Ni’s request on the condition that “this examination is of a purely routine nature, involving the taking of measurements of pupils fully-dressed.”⁹⁴ When Ni published his findings in 1939, his description of the method employed lacked any details of the students’ state of dress, and instead, focused upon equipment. He writes, “Weight Measurements were made on a standard lever balance registering to the nearest quarter of a pound. Standing heights were taken with the measuring rod attached to the scale. The subject stood straight with heels together, the arms at the side and with the eyes directed straight forward.”⁹⁵

This episode involving Ni’s arrangements with the Shanghai Municipal Council prior to conducting his examinations of Chinese students is curious, precisely because attention has been drawn to the question of undress and the possible necessity of procuring the services of a “lady doctor” to supervise the examination of female students. The standard practice one consistently finds throughout the medical literature for measuring height and particularly weight was to measure the child in a state of almost complete undress—the undergarments being the lone exception. Physicians from the Shanghai Municipal Health Bureau measured a student’s height by having the student stand shoeless (*jiang xie tuo qu* 將鞋脫去) and erect against a wall. On the other hand, the proper procedure

⁹² SMA U1-16-366. Hadden notes in her own letter on the topic of Ni’s request that medical examinations of students were “purely voluntary, from the pupils’ point of view.” The Shanghai Municipal Council debated the idea of instituting mandatory physical examinations for students in as early as 1933, but I have found no confirmation of its implementation. SMA U1-16-1080.

⁹³ SMA U1-16-366.

⁹⁴ SMA U1-16-366.

⁹⁵ Ni Zhangqi, “Height-Weight Measurements of Shanghai School Children,” in *Nutritional Studies in Shanghai* (Shanghai: Henry Lester Institute for Medical Research, 1939), p. 60.

for weighing a student required that the student be without shoes and stripped of all clothing except undergarments (*yifu ze yi tuo zhi danyi wei zhi* 衣服則以脫至單衣為止). Ni's colleague, Hou

Xiangchuan, measured children in refugee camps in the following manner:

Two technicians through the entire period [1937-1939] measured the children at the camps with all clothing stripped. Height was obtained with the children lying flat on a table against a wooden measuring stick, the head being held against a perpendicular piece at one end of the stick, the legs held straight with the heels against a sliding block by which the reading on the scale was made. The weighing was made with a Salter's improved family scale No. 50 accurate to 0.02 kilo. All weighings were made in the morning between the hours of 9 and 12.⁹⁶

Peter G. Mar's study of Cantonese schoolboys in Shanghai stipulated, "all somatometric measures were made on the naked body."⁹⁷

The extant records do not facilitate any reconciliation of the difference in method employed in Ni's study and these other examples. At best, we are left with tantalizing questions: Was the Shanghai Municipal Council's concern one of female propriety? If so, on whose part? Were administrators worried about the comfort of the female student who was to be asked to undress and be examined by a stranger? Or were they worried about the parents' reaction or opposition to the exercise? What kind of economy of female modesty did schools support and perpetuate, and to what extent did such values differ between schools administered by the International Settlement and by local Chinese authorities? How does class or socio-economic level operate within the category of female modesty? One might expect that refugee children as de facto wards of the state would be entitled to less individual privacy, but the children in Peter G. Mar's study were hardly impoverished or derelict.⁹⁸ That they were all boys may be the determining factor, but one cannot say for certain.

⁹⁶ Hou Xiangchuan, "Height and Weight Measurements of Young Children in Refugee Camps in Shanghai, 1937-1938," in *Nutritional Studies in Shanghai* (Shanghai: Henry Lester Institute for Medical Research, 1939), p. 27.

⁹⁷ P. G. Mar, "Physical Measurements of Cantonese School Boys in Shanghai," in *Nutritional Studies in Shanghai* (Shanghai: Henry Lester Institute for Medical Research, 1939), p. 49.

⁹⁸ Mar describes the subject group as "all students of the Shanghai Branch of Lingnan School, being of Cantonese origin born and brought up in Shanghai or its environs. With the exception of a few orphaned and working students, all the boys came from well-to-do homes, their parents being of the educated class, and connected with the large commercial, governmental or educational institutions, and though they may have

Age

If the category of sex provoked a myriad of sometimes conflicting tensions that, at the very least, highlight the social dimensions implicit within anthropometric research, the question of age produced a whole different set of headaches. In terms of recordkeeping, sex was straightforward. Stevenson, in his outline of the proper procedures associated with conducting somatometric measurements, reminds the reader, "A conspicuous notation of the sex of the individuals whose measurements appear thereon should always appear at the top of each record sheet."⁹⁹ Age, however, required correction, elaboration, and standardization. The difficulty lay primarily in counting, but also with respect to calendar: lunar rather than solar. A newly born Chinese child is one *sui* at birth in contrast to an American or European child who does not become one year of age until twelve months after birth. This discrepancy had to be reconciled in a systematic and standardized way to support the claims of scientificity being invoked through the course of experimentation. Stevenson emphasizes, "In order that our anthropometric and other studies of the Chinese be directly comparable with similar studies on other racial groups it is of the greatest importance that all possibility of ambiguity in the definition or designation of age be excluded."¹⁰⁰

Stevenson published a slide rule for computing and converting Chinese dates and ages in 1922, but the successful application of his tool depended upon two pieces of information from the Chinese subject: the exact year and month of their birth in terms of the Chinese calendar.¹⁰¹ This exchange of birth details, however, could not always be assured. "Many individuals, especially children, . . . are unable to state off hand the year of their birth, although quite capable of giving their

suffered material losses due to the present hostilities, were still capable of providing their children with good home surroundings." Mar, "Physical Measurements of Cantonese School Boys in Shanghai," p. 48.

⁹⁹ Stevenson, "Anthropometry in China," p. 123.

¹⁰⁰ Stevenson, "Anthropometry in China," p. 123.

¹⁰¹ Paul. H. Stevenson, "A Slide Rule for Computing and Converting Chinese Dates and Ages," *CMJ* 36.4 (1922): 327-30.

Chinese age and the month of their birth.”¹⁰² In devising the table, Stevenson and Pan sought to provide clinicians, educators, and others working among the Chinese with a clear and precise chart that eliminated “the tedious counting back process to determine the real age in actual years in each individual case.”¹⁰³

Despite Stevenson and Pan’s assurance that their slide rule eliminated the general obfuscation surrounding the process of conversion, in practice, the task of ascertaining a student’s age raised a variety of logistical challenges that far exceeded the theoretical convenience of a single tool for age conversion. Indeed, some would contest the second half of Stevenson and Pan’s claim, namely that most individuals are “quite capable of giving . . . the month of their birth.” William W. Cadbury, the resident physician attending students at the Canton Christian College, observes, “The plain fact is that a considerable percentage of Chinese, and particularly Chinese children, do not really know their own age either by Chinese or foreign reckoning; so that no question, however skillful can be relied upon to discover the truth. A slight acquaintance with the foreign calendar and foreign methods of reckoning has merely served in most instances to render this confusion worse confounded.” His study, which had been carried out by Chinese students in a class on statistical method in the Department of Education of the Canton Christian College, sought to provide medical and educational workers in South China with reliable height-weight data charts with explicit applicability for the Cantonese and devoid of inaccuracies resulting from “age reckonings.” Cadbury did not look upon this task lightly. “The problem is the more serious from the fact that inaccuracies arising from this source [age reckoning] are so often of a constant nature, whereas,” Cadbury argues, “merely variable errors might be trusted to balance themselves out where the number of measurements is large.”¹⁰⁴

¹⁰² Paul H. Stevenson and Pan Ming-Tzu, “On Converting Chinese Ages to their Foreign Equivalents: A Conversion Formula and Table of Subtractions,” *CMJ* 40.2 (February 1926): 128.

¹⁰³ Ibid.

¹⁰⁴ Noel Keys and Wm. W. Cadbury, “An Age-Height-Weight Study of Cantonese School Boys,” *China Medical Journal* 40 (1926): 14.

Thus, despite the fact that the College had adopted annual measurements of its student population as standard practice from 1916 through 1926, detailed and systematized recording of students' ages had not been staple feature of such efforts. To render this data available for use, it was deemed imperative by Cadbury and his team that "the first essential was to arrive at an accurate determination of the ages of as many of these boys as possible." Cadbury writes,

The first task was, therefore, to secure a reasonable number of individuals whose ages could be verified. In June of 1924 the purpose of the investigation was explained to the students then on the campus, and those who felt certain as to the date of their own birth were asked to fill out and hand in a slip stating the Chinese month in which they were born and the year, both by foreign calendar and Chinese reckoning. No attempt was made to secure an answer from every one, but instead it was repeatedly emphasized that only those who felt confident of their information should reply. As these questions were put only to students of middle school and college standing, it was hoped that the replies might prove trustworthy, but this was not the case. Nearly one-half of the returns had to be discarded because of a difference between the year as indicated by Chinese and foreign calendar or some equally serious discrepancy.¹⁰⁵

When this approach failed to produce the desired results, Cadbury and his team prepared a different questionnaire in the following autumn. Rather than asking for the Chinese month and year of birth, the questionnaire framed the issue in terms of the student's age in *sui* and the Chinese month of birth. This second questionnaire alone neither simplified nor correctly determined the student's real age—Cadbury points that many of the students, while perfectly cognizant of their age in years, were still uncertain of the exact month of birth—but as additional corroborating evidence, it could help whittle down or eliminate the discrepancies plaguing Cadbury's age reckoning. He and his team drew from these two questionnaires age—figures that were then checked against each other or against:

1. The Chinese age as entered on the form filled out upon first admission to the school. This was considered fairly reliable as these forms are usually made out with the help of a parent or older relative.
2. The Chinese age as stated to the physician or principal on the occasion of the first physical examination. This proved uncertain.
3. The responses obtained from individual cross-examination. The latter served to clear up a seeming discrepancy or else to reveal a hopeless confusion, making it necessary to throw that student out of consideration entirely.¹⁰⁶

¹⁰⁵ Ibid.

¹⁰⁶ Ibid.

Cadbury ultimately achieved his objectives and presented a height-weight table for Cantonese schoolboys, but not without having suffered a few additional calculations.¹⁰⁷ The importance of his efforts, however, lies not with the end result but rather the procedural manner in which age becomes integrated and embedded into the fabric of a student's social identity. Throughout his description of their quest to determine the real age of students, Cadbury unintentionally draws our attention to the largely subsidiary role a student's age played in his school life. Age, but not birth, was noted upon admission to the school; and age was again recorded on the occasion of the *first* physical examination. On the whole, students tended to possess clear apprehension of their age in years, but not the month, let alone day, of birth. On the part of school officials, teachers, and attending physicians, age was not yet so important as to be an essential factor for the administration of student studies or placement. But to render their bodies into comprehensible and comparable units for analysis, age assumed epistemological priority and became instituted as a constituent part of one's identity. Individual height and weight could only be assessed with respect to one's age, which anchored the degree to which the individual's specific metrics matched or coincided within a range approximate to others within one's age group. By extension, age comes to determine how one ought to relate to the group; it becomes one of the primary forms of categorization that organizes people into identifiable groups with specific character traits.

¹⁰⁷ Cadbury explains, "Since the exact month of birth was in so many cases unknown, all computations were first made in terms of age in years only, reckoning the true age in each case as one year less than the Chinese traditional age." But as the individual age was important only insofar as it correlated the individual's specific bodily measurements with respect to all other measurements for that age group, Cadbury took the following additional steps. "1. The mean date of birth, Chinese calendar, was calculated for the sixty-five individuals supplying this information and was found to fall on the twentieth day of the seventh moon and not a mid-year. In fact over forty per cent of those reporting proved to have been born in the eighth, ninth, or tenth month of the Chinese calendar, a circumstance apparently to be explained by the custom among Canton and Hong Kong merchants of leaving wives and families in their village home, which the father rarely visits save at Chinese New Year. 2. The mean date of the physical examination was also calculated, and found to fall on the fifth day of the tenth moon, as the examinations are always made in the fall summer. 3. A simple calculation will now show that at the time of examination the students were on the average just two-and-a-half months past their birthday. The true mean age was, therefore, three quarters of a year less than the Chinese or traditional age. All computations were accordingly modified by adding one-fourth of the difference between the mean for each age and the mean of the next year older." Cadbury, "An Age-Height-Weight Study of Cantonese School Boys," pp. 17-8.

Cadbury and Stevenson were not alone in voicing their frustration with Chinese dates and ages,¹⁰⁸ and one finds recurrent attention in medical and public health literature on the problem of determining accurately the exact age (or “real age”) from the Chinese age. The nature of the problem changed as fewer and fewer of the Chinese subjects were born under the dynastic system, and concern shifted from differences in calendar (dynastic to Gregorian) to differences in counting (age one at birth). But for researchers and clinicians, the objective in converting Chinese ages was always more than practical. Because the value of anthropometric data lay rooted in its potential for yielding truths of a comparative nature, the insistence that the Chinese reckoning of age was false and imprecise and required conversion functioned as a mundane, but uncontroversial, codification of the Chinese body into modern, internationalist terms. As part of scientific practice, this act of translation enabled the physicians and researchers to situate a local investigation of Chinese physiological characters within the larger discourse of the universal man. Time became singular, encompassing, and universal.

Geography

By the late 1930s, researchers and clinicians expressed general agreement that the criteria of normalcy in China differed from those which obtain elsewhere, and as Gordon King and T’ang Yü Teh of the Department of Obstetrics and Gynecology of Cheeloo University School of Medicine in Tsinan, Shandong observed, “the accepted normal western standards have consequently to be subjected to a certain degree of modification before they can be applied to the conditions prevailing in China.”¹⁰⁹ But how these “normal western standards” were modified depended upon how

¹⁰⁸ “Among the Chinese where the importance of age is exceeded only by the inaccuracies attending its computation by the people themselves, the scientific observer is often at quite a loss to interpret correctly the more or less vague information usually forthcoming along this line from the persons under observation. Although this difficulty is one that must frequently confuse a great number of clinical observers and adversely affect their observations and statistics especially in the case of infants and children, still it becomes of even greater annoyance to those engaged in the collection of accurate anthropometric data of any kind, particularly when dealing with that part of these data bearing upon dentition, growth curves, or general somatic indices among the immature.” Stevenson, “A Slide Rule for Computing and Converting Chinese Dates and Ages,” p. 327.

¹⁰⁹ Gordon King and T’ang Yü Teh, “Obstetrical Criteria in North China: The Weights and Measurements of the Mature New-born Child,” *CMJ* 52 (October 1937): 501.

researchers addressed the question of regional diversity and environmental influence upon the expression of physiological variation. Assuming the sample size was large enough, the most obvious approach to geographic difference emerged in the form of a tripartite division: North China, Central China, and South China. In general, North China was comprised of Zhili, Henan, Shanxi, Shandong, Shaanxi, and Gansu; Central China: Anhui, Jiangsu, Zhejiang, Jiangxi, Hubei, Hunan, and Sichuan; and South China: Fujian, Guangdong, Guangxi, Yunnan, and Guizhou. This tripartite division typified the general scientific strategy for understanding regional diversity, but it also reflected popular wisdom of China's internal complexities. More locally-inflected studies parsed regional identification in terms of province or municipality.

By recognizing the importance of regional identifications as integral to scientific analysis, researchers helped to define which regional identifications were epistemologically valuable. Stevenson, in his outline for the development of anthropometric studies in China, recommended privileging ancestral home over birthplace. He writes, "With increasing mixing of population, especially in cities and large industrial area, it becomes advisable to record the province and district of the family's ancestral home, rather than those of the individual's birth places, as a designation of the region represented by the individual measured."¹¹⁰ This decision may have been culturally expedient, as the question of geographical affiliation naturally yielded responses from participants of anthropometric studies that reflected the broader consciousness, particularly in the South, that prized lineage and native-place as constituent aspects of one's social identity. On the one hand, reinforced and regularly reenacted through the performance of ritual, and on the other, supported by the social and institutional networks that were created through emotional ties of common territory, ancestry, local culture, and language, ancestral home or native-place ties played a crucial and sometimes contentious role in the formation of the modern Chinese identity.¹¹¹ But while the decision resonated with

¹¹⁰ Paul H. Stevenson, "Anthropometry in China," p. 122.

¹¹¹ The scholarship on native-place identity and Chinese identity is wide-ranging and incredibly rich. For more on native-place identity and its role in shaping population nationalist mobilization, see John Fincher, "Political

contemporary social and cultural practices, it sometimes proved perplexing when transcribed and sanctioned by medical research.

In his 1925 report, Stevenson identified different patterns of growth for subject groups in North, Central, and South China. Growth appeared to reach its final plateau for North and Central Chinese around the age of twenty-two as opposed to nineteen for South Chinese. The earlier retardation of growth for the South Chinese was matched by an earlier onset of puberty, between eleven and thirteen years of age, and thus, an earlier date of maturation. In contrast, Stevenson found that puberty appeared a few years later for Central Chinese (twelve to fourteen years of age) and North Chinese (fourteen to sixteen years of age). Period of fastest growth also appeared to vary dramatically between the three groups: in the South, years one through five witnessed the fastest growth; for Central China, years ten to fifteen; and in the North, the period of fastest growth coincided with puberty, years fourteen through sixteen.¹¹² These were general observations, and not necessarily incongruent with conventional wisdom. More targeted anthropometric studies like K. H. Uttley's "The Birth Weight of Full Term Cantonese Babies," could challenge these observations, but perhaps not overturn them, because of the confluence of popular and scientific expectation. Uttley reported the weight analysis of 5,000 babies delivered in the maternity ward of the Civil Hospital, Kowloon, between the years 1934 and 1939. He calculated the frequency distribution of the weights of male and female babies, and he showed how the babies' weights were correlated with the mothers'

Provincialism and the National Revolution," in *China in Revolution*, ed. Mary C. Wright (New Haven: Yale University Press, 1968): pp. 185-226; R. Keith Schoppa, "Province and Nation: the Chekiang Provincial Autonomy Movement, 1917-1927," *Journal of Asian Studies* 36.4 (1977): 661-74; Prasenjit Duara, *Rescuing History from the Nation: Question Narratives of Modern China* (Chicago: University of Chicago Press, 1995); and Bryna Goodman, "The Locality as Microcosm of the Nation? Native Place Networks and Early Urban Nationalism in China," *Modern China* 21.4 (October 1995): 387-419 and *Native place, City, and Nation: Regional Networks and Identities in Shanghai, 1853-1937* (Berkeley: University of California Press, 1995). For the role of local cultures and ethnicity, see Emily Honig, *Creating Chinese Ethnicity: Subei People in Shanghai, 1850-1980* (New Haven: Yale University Press, 1992); Tao Tao Liu and David Faure, eds., *Unity and Diversity: Local cultures and Identities in China* (Hong Kong: Hong Kong University Press, 1996); and David Faure, *Emperor Ancestor: State and Lineage in South China* (Stanford: Stanford University Press, 2007).

¹¹² Paul H. Stevenson, "Collected Anthropometric Data on the Chinese," *CMJ* 39 (1925): 855-98.

ages, i.e., the baby's weight increases with the age of the mother. When he compared his findings with those from other parts of China, he notes,

... it will be seen from Table 8 that if my series is not included, there is a tendency for the smaller babies to be born in the North, and larger ones in the South, with Central China in a middle position. This is in accordance with the popular view among the Chinese themselves. Unfortunately my figures do not bear this out so far as Cantonese are concerned, because they are almost identical with the Peking figures.¹¹³

Although Uttley goes on to reaffirm the popular belief in the Cantonese as “one of the smallest of the races that make up China,” he also disputes the prevailing sense that southern babies are heaviest. He deemed the idea “fallacious,” concluding instead, “It is a fact there has been no large series of reliable statistics published for Cantonese, who incidentally comprise the largest ethnic group in South China. The idea [that Southern babies are heaviest] is probably based on figures such as Oppenheim's which deal with Fukienese, who come from the province immediately north of Kwangtung, and who are a bigger race than the Cantonese.”¹¹⁴

Although most physicians and researchers focused their efforts on a study of the Chinese people—Shirokogoroff's stated interest and previous investigations in non-Han peoples being an exception—the scientific spirit of investigation did not preclude the possibility of including “measurements of individuals representing Manchu, Tibetan, Turki, or other nearby ethnic groups whenever the opportunity to do so [was] given.”¹¹⁵ Researchers and clinicians actively sought to understand that which was Chinese and that meant not only juxtaposing Shanghainese against Cantonese, for example, but also against Americans, Russians, Jews, and the British. Average heights and weights represented real quantities for a population, and their significance depended upon a comparative framework that pitted one putative people or nation against another.

¹¹³ K. H. Uttley, “The Birth Weight of Full Term Cantonese Babies,” *CMJ* 58 (November 1940): 589. S. W. Lee calculated the average birth weight of Chinese babies in the North (Beijing) to be 3090 g for males and 2949 g for females; King and Tang, working in Shandong, found 3138 g for males and 3038 g for females. Uttley's values for average birth weight of Chinese babies born in Hong Kong were 3075 g for males and 2961 g for females.

¹¹⁴ *Ibid.*, p. 589.

¹¹⁵ Stevenson, “Collected Anthropometric Data on the Chinese.”

The Question of Representativeness

Although attempts were made on the part of individual researchers to adopt specific techniques so as to unify and systematize anthropometric work, a singular, cohesive protocol was not established and enforced by the scientific community. Often, the main contention arousing debate and spurring more research centered upon the question of representativeness. The author of the study, "Size and Weight in Two Hundred and Sixty-nine Chinese Children and Young Adults," wrote, "The number [of this study] is too small to feel that we can use the tables as standards but these statistics are published with the hope that they may stimulate others interested in this subject to assist in the collection of data which will help us to formulate charts which can be used by pediatricians and Child Welfare workers in estimating the nutrition of the Chinese child."¹¹⁶ The general assumption had been that the greater the sample, the smaller the probable error. Stevenson warned, "It is unsafe to rely on averages based on less than 25 individual measurements, and it should be remembered that the reliability of statistics varies directly as the square of the number of cases represented, so that doubling the number of observations reduces the relative probable error of the sampling four times."¹¹⁷ But aside from the lower boundary of twenty-five individuals as insufficiently small for a sample base, how large was large enough? The Stevenson Report of 1925 included over 10,000 Chinese persons in twelve different provinces and signaled the prospects of more systematic, more precise investigations to come, but its scientific contribution—the degree to which it shaped future studies by serving as a precedent—was less optimistic. The rise in prominence of Chinese researchers working on the question of physiological standards coincided with the growth of governmental and institutional structures for research, but even these studies—the Shanghai Municipal Health Bureau examined over 10,000 students, and there are reports of studies undertaken between 1943 and 1948 of 10,200 students between the ages of five and twenty—failed to eliminate

¹¹⁶ Anon., "Size and Weight in Children and Young Adults," pp. 306-7.

¹¹⁷ Stevenson, "Anthropometry in China," p. 127.

the debate over representative size.¹¹⁸ These later studies targeted with greater urgency the issues of nutritional health and its correspondent biometrics,¹¹⁹ but regardless of the shift in focus and the ongoing questions about proper sampling size and representativeness, the research community shared a consensus about the composition and determinants of the modern Chinese body. Bodily measurements coupled with age, sex, and geography, codified and routinized by the mutual sharing of common record-keeping forms and research publications, continued to serve as the basic lexicon for researchers and clinicians, even as the goals had shifted.

Conclusion

For biomedical physicians and researchers, anthropometric data about the Chinese physical body possessed the power to explain a plethora of problems ailing both the individual somatic body and the body politic. The physicians working to determine the quantitative contours of specific Chinese bodies were, in a way, also “attempting to insure continuity and fixity of reference,”¹²⁰ in that their mappings were designed to yield real knowledge that would then be amenable to practical interventions. The operative presumption by men of science (Western and Chinese) had been that there simply did not exist “information of basic value in clinical as well as preclinical teaching and research.”¹²¹ Because normal standards for physiological characteristics were essential for a comprehensive understanding of the physical body and its relation to the national body, establishing such standards constituted the primary task for Chinese practitioners and researchers alike. If medicine and the burgeoning field of public health were to achieve substantive changes to the health

¹¹⁸ Mention of these studies in 1943-1948 can be found in draft report, “Revising the Research on the Commonly Used Age-Height-Weight Comparison Tables” (Xiuxin tongyong ‘nianling shenchang tizhong duizhaobiao’ de yanjiu), Number Two Historical Archives, Nanjing (hereafter NJ) 5-15054.

¹¹⁹ For a closer consideration of anthropometric research as related to nutritional health and the formation of nutritional standards, please see this dissertation, Chapter 3.

¹²⁰ Lorraine Daston, “Type Specimens and Scientific Memory,” *Critical Inquiry* 31.1 (Autumn 2004): 157.

¹²¹ ABMAC Research Group, “Physiological Characteristics of the Chinese,” *Chinese Journal of Physiology* 17.1 (1949): 47.

of the Chinese populace, there had to be workable knowledge of the external conditions facing the Chinese people as well as the internal particularities that defined the Chinese people as Chinese (as opposed to American, European, Jewish, Russian, etc., i.e., the hodgepodge of national, ethnic, racial categories).

How they pursued the topic varied, not only in emphasis but also in circumstance. Whereas the early decades of medical research had been diffuse and interwoven with the local practices of Western medical doctors, from the mid-1920s onwards Chinese researchers assumed ever-greater prominence and responsibility for defining and implementing the objects and parameters of research. With the change in investigators also came a more systemic shift in the site of production of scientific knowledge. Although the main engines for research came from the private sector with the Peking Union Medical College and the Henry Lester Institute for Medical Research contributing the bulk of medical research publications, the Nationalist Government, though hampered by internal and external political crises, supported research initiatives through its local offices of public health administration.¹²² In addition, although the Peking Union Medical College was by far the largest benefactor of the Rockefeller Foundation's Chinese investments, the Rockefeller Foundation supported more than 75 different institutions in sixteen provinces throughout China.¹²³

The search for physiological standards for the Chinese included many avenues for exploration, but in practical terms, the most important may have been those on height and weight. The anthropometric data contained within height-weight tables possessed the potential for practical implementation.¹²⁴ Once distilled and organized into a series of charts that were then disseminated to

¹²² See Jin Baoshan, *Selected Papers by the Staff of the National Health Administration and Central Field Health Station, 1934* (Nanjing, 1935).

¹²³ Mary Bullock, "Reconsidering Rockefeller Philanthropy in Republican China" (paper presented at "Transnational Histories of Public Health in Asia," Harvard University, Cambridge, MA, May 2008).

¹²⁴ School health programs provide an obvious example of the practical implementation of height-weight tables. In addition, M. Colette Plum has shown that the height-weight table was a stable fixture of state initiatives providing care for war orphans insofar as every child admitted into state care was first measured. As Plum indicates, "The bodies of war orphans were not abstractions: from the moment a child entered a child welfare system, this child's body was measured and evaluated, and put through a series of practices aimed at

school and health workers, anthropometric data welded descriptive insight with normative power, particularly when applied to children and students. These charts served as guidelines for evaluating normal (*zhengchang*) and abnormal (*fei zhengchang*) health and thus could change both behavior and thought. A comprehensive school health program, one that inspected and scrutinized the student's individual body for signs of abnormality (over/underweight, physical deformities, deficiencies, and disease) depended upon a knowledgeable staff armed with the appropriate tools. But the true power of a chart lay not with its singular application, but with its implied reorganization of daily life and the forms of authority erected. As the Shanghai Municipal Health Bureau physicians noted in their report on the heights and weights of Shanghai school children, "We cannot simply base a decision of the examinee's health as good or bad on a single physical examination. The best thing would be to regularly observe the child's development and to use the height and weight measurements as indications of whether or not growth and development are progressing normally. It is to this end [i.e., assessing normal growth and development] that makes a proper, standardized height and weight chart so important."¹²⁵

strengthening the child, and hence, the *minzu*." M. Colette Plum, "Unlikely Heirs: War Orphans During the Sino-Japanese War, 1937-1945" (Ph.D. Dissertation, Stanford University, 2006), p. 154.

¹²⁵ Xu Shijin and Wu Liguo, "Shanghai shi xueling ertong shenchang tizhong zhi cubu yanjiu" [A preliminary study of the heights and weights of school-age Shanghai children], *Zhonghua yixue zazhi* [National Medical Journal of China] 18.6 (1932): 984.

Chapter 2: Measuring Up: Normal Health and Physical Examinations for Chinese Children

Introduction

To assess the health of the child, it is imperative to conduct a physical examination. This line of reasoning had become commonly accepted by medical professionals like the Shanghai Municipal Health Bureau physicians and by non-specialist, popular writers. In books like Zhang Renhua's *Ertong zhi weisheng* (The Health of the Child) and Zhou Shang's *Ertong baojian yu jiaoshi* (The Care and Education of Children), in popular journals like *Weisheng* (Health) and *Jiating zhouban* (Family Weekly), and in local, municipal, and even provincial level health fairs and competitions, the physical examination (*tige jiancha* 體格檢查) afforded experts and laymen alike the possibility of apprehending in objective terms the true state of a child's health. But as the Shanghai Health Bureau physicians pointed out in their survey of the heights and weights of Shanghai students (Xu and Wu 1932), a single examination was limited in its interpretative potential.¹ To really gauge the health of the child, regular and repeated examinations had to be undertaken. Consistency and steadfast application were important qualities differentiating the physical examination as a diagnostic technique. Potential knowledge did not lie in the single encounter alone, but rather in the accumulation of interactions that generated data for the researching physician. But what exactly did the physical examination mean? What sorts of techniques were applied? How did advocates make the idea and practice of physical examinations, especially the significance of measurement, compelling to the literate Chinese public?

In detailing their work, the Shanghai Municipal Health Bureau physicians took care to delineate the research parameters shaping how they conducted their examinations of 9,426 school

¹ Xu Shijin and Wu Liguo, "Shanghai shi xueling ertong shenchang tizhong zhi cubu yanjiu" [A preliminary study of the heights and weights of school-age Shanghai children], *Zhonghua yixue zazhi* [National Medical Journal of China] 18.6 (1932): 977-87.

children. Age was counted from the most recent birthday.² Height was measured in centimeters and with the student standing shoeless and erect against a wall. Weight was measured in kilos. Students having their weight taken were expected to have previously removed all of their outer garments—inner garments were retained—and shoes. In addition to these measures, examiners applied a number of criteria to the possible candidates for height and weight measurements. Students who exhibited signs of malnutrition (*yingyang bujia* 營養不佳) or anemia (*huan pinxue* 患貧血, literally, “suffering from weak blood”), an enlarged thyroid (*jiazhuangxian pengda* 甲狀腺膨大), or inflamed tonsils requiring surgical intervention (*biantaoxian pengda zhi xu xing qiechu shoushu* 扁桃腺膨大至須行切除手術) were exempted from further consideration.³ Students suffering from TB (*feijiehe* 肺結核), heart or other organ problems and those possessing physical infirmities were also eliminated. Indeed, any student who evinced three deficiencies (*quedian* 缺點) of any sort or of those mentioned above was disqualified from the examiner’s pool of healthy subjects.⁴

These details are important, because they describe the general circumstances imposed by the researchers and thus narrate for the reader how to interpret the numerical data resulting from the researchers’ efforts. In essence, details about age, states of dress, and such serve as signposts for scientific rigor and analysis. By clarifying the degrees to which they worked to ensure standardized, systematic, and consistent treatment of the survey’s subjects—the determination of age follows a specific rule; all the children were weighed without shoes; when taking height, each child stood

² For further discussion of the ambiguities of age calculation, please see Chapter 1, “Human Measurement and the Language of Normality in China, 1910-1949.”

³ Whether or not these students were measured cannot be ascertained from the text. At best, we can assume these students were examined to the extent that the examination revealed their ineligibility for inclusion with the statistical data for *normal* health, and if also measured for height and weight, such measurements were then excluded from the final data series.

⁴ With respect to dental caries, Xu Shijin and Wu Liguang reaffirmed the common perception that poor dental hygiene obstructed normal growth and development, but rather than including dental caries as part of the selection criteria, they argued instead that children with dental caries often demonstrated other, more obvious signs of ill health, e.g., enlarged thyroid, inflamed tonsils, poor blood, or malnutrition. Thus, the mechanism for selecting out those of ill or poor health was already being addressed.

straight, heels against the wall, head straight and eyes forward—the researchers paid due respect to the formal dictates of the scientific enterprise, demonstrated their own membership within the larger community of like-minded, similarly trained professional medical scientists, and provided a roadmap for subsequent studies. But leaving the formalism and statistical abstractions aside for the moment, what can we learn about the process of conducting a physical examination, let alone receiving one? How did the Shanghai Municipal Health Bureau physicians organize the students into orderly groups to be examined? Did the students enter one by one, or were there several examinations taking place in the same room at the same time? The protocol for measuring weight required the students to have undressed down to their undergarments, but was it common for students to wear undergarments? Did a single physician conduct the entire examination, or was the examination parceled into discrete units: a height station, a weight station, a general assessment station, etc., and the students examined according to an organized, assembly-line routine?

The 1932 report of the Shanghai Municipal Health Bureau physicians' work sheds little light on many of these questions. To understand more clearly what exactly happened during a physical examination, we need to look elsewhere. Drawing from other contemporary sources, we can begin to reconstruct the material experience of being examined as well as render more thickly the kinds of bodily practices being exercised upon, and assimilated by, Chinese school children. Anthropometric research opened intellectual paths for the abstraction and normalization of the Chinese body. By permitting the direct synthesis of the physical and physiological body's various aspects into numerical patterns of general types, anthropometric research shifted the intellectual landscape of medical practice and public health and encouraged the development of a culture of quantification.

But in addition to these less tangible effects were sensorially rich reconfigurations and adaptations for how one handles, touches, and manages physical bodies. Taking heights and weights required training and specific skills; and although a steady feature in Chinese health literature of the 1920s and 1930s, height and weight measurements were neither always nor necessarily a fundamental component of the physical examination in the Western or Chinese medical traditions. In other words,

the physical examination has a history—one that skirts alongside different medical systems and has been shaped by its deployment in different social settings.

For Chinese children, being examined whether in nurseries, schools, or community health contests was something done to them. Are there ways to recuperate how such impositions, however benign, were assimilated into individual and collective understandings of being Chinese? Indeed, can we map the development of some kind of bodily commonsense through the introduction of a specific kind of physical examination? The historian of medicine, Shigehisa Kuriyama, has suggested such possibilities in his argument that different ways of perceiving the body are bound up in different ways of being a body.⁵ By considering the vicissitudes of the physical examination first introduced to the Chinese person by Christian missionary doctors and later codified by the Nationalist government in its promulgation on school health examinations of 1929, we may begin to grapple with the material experience of Chinese modernity.

This chapter will first situate and compare the physical examination in the Chinese and the Western medical contexts. It will then proceed to examine how the physical examination with its emphasis upon bodily metrics was incorporated into campaigns to spread health education and national wellbeing.

Learning to Read: Diagnosis in Chinese Medicine

How did Chinese physicians develop a tradition for examining the body? On one level, the question is deceptive. “Examining the body”—a phrase that has achieved particular vibrancy, because of its common invocation in connection with the growing scholarship on the topic of the body in the human sciences in the last few decades of the twentieth century—seems to imply some kind of close physical contact and or the tactile appreciation of the human form. Although other senses are also engaged by both the examiner and the examinee, it is the sense of touch that seems most prominently employed and activated—two fingers gently firm against the inside of one’s wrist,

⁵ Shigehisa Kuriyama, *The Expressiveness of the Body and the Divergence of Greek and Chinese Medicine* (New York: Zone Books, 1999).

the cold metal of the stethoscope that impresses the act of listening upon one's chest, and the quick, but efficient search for spots of tenderness, swelling, or pain. Even the standing upon the metal scale with its clanging adjustable weights and extending arm to permit the measurement of height is a distinctly physical, tangible experience of different surfaces, textures, and proximities. As a form of appraisal and assessment, the physical examination synthesizes a range of activities that treats the physical body—its surface, sounds, and fluids, to say the least—as somatic territory for exploration and penetration. But for all the diagnostic tests that may have elevated one's contemporary biomedical experience to the level of science fiction, the physical examination remains a rather more blunt affair with its fair share of poking, prodding, and plying the human body for its various secrets.

While one may certainly examine one's own body, e.g., the breast self-exam, it is rather more likely that a medical professional examines one's body. Context is highly significant. Colloquial usage of the phrase often implies specific institutional contexts wherein one can "examine the body": hospitals, clinics (private or associated with schools, military bases, or sports), and morgues. In terms of the medical encounter, we believe the physician and patient share a special kind of relationship, and with the expectation that the physician can, and in fact does, know something more about our bodies than we ourselves are aware, we give our bodies over for professional, expert assessment. To wait silently, if slightly chilled by the flow of air against one's back, is the natural course of events when visiting the doctor. Anticipation and anxiety may mingle in the patient about what discoveries the doctor might make, and after the examination, the patient may come to doubt or even disregard the physician's opinion. But even these flights of fancy and consternation demonstrate how the very structure of the engagement reinforces the doctor's authority and medical prerogative. After all, even those with reservations begin by seeking another physician's opinion. The importance of the physical examination then far exceeds the stricter parameters of epistemological merit. Its purpose is to reveal the mysteries of the body, but its actual practice consolidates not so much knowledge, as relationships. The physical examination, as Roy Porter has suggested, actualizes "a ritual enactment of the identities of being a doctor and being a patient, confirming *inter alia* the fact that the

doctor's role confers special privileges—the right to ask intimate questions, and, above all, to touch and penetrate the body.”⁶

Recognizing how “examining the body” is so often situated within a sensualist framework of sights, sounds, and sensations or how it reaffirms specific identities for the examiner and the examinee opens pathways by which to probe the historicity of the physical examination itself. But while the above rough description of “examining the body”—with its allusions to hospital gowns, medical equipment, and clinical settings—strikes chords of familiarity for the present, it does not serve well as a model for physical examinations of both a different time and place. Indeed, too great an emphasis upon contemporary exercises in bodily examinations can obscure the extent to which physical examinations have changed in practice and meaning within Western medicine (biomedicine) as well as how the question, How did Chinese physicians develop a tradition for examining the body, contains within it the competing interpretations of the body advanced by Chinese and Western medical practices. We can attribute this tension to the original point of departure for this inquiry: the introduction and application of the physical examination as part of anthropometric research in early twentieth-century China. But to fully understand the various contours of Chinese examination techniques during the early twentieth century, we would have to also consider the diagnostic practices associated with classical Chinese medicine and its potential for shaping how biomedical techniques were transplanted amongst the Chinese population.

As part of a broader, self-consciously modern initiative to spread the gospel of good health and hygiene, the physical examination in the Western medical sense became a component of urban Chinese civic and institutional life through the efforts of Christian missionaries and Chinese reformers. Neither party extended much consideration to Chinese medicine's practical and intellectual value in addressing the severe health problems and high mortality facing much of the Chinese population, and if anything, they tended to view Chinese medicine as part of the problem,

⁶ Roy Porter, “The Rise of Physical Examination,” in *Medicine and the Five Senses*, ed. W. F. Bynum and Roy Porter (Cambridge: Cambridge University Press, 1993), pp. 179-80.

not the solution. Missionary affiliated organizations like the Council of Health Education and Chinese physicians like those working for the Shanghai Municipal Health Bureau did not, however, conduct their physical examinations within a social and cultural vacuum, and one suspects that Chinese medicine in its various cultural permutations must have, at least in part, shaped the social imaginary for how the examinee understood the process of being examined as well as how the examiner implemented ideas for how to conduct examinations. Thus even if the early promoters of Western-style physical examinations dismissed the insights and techniques afforded by indigenous medical practices, it is worthwhile setting forth how Chinese medicine “examined” the body and in this way establish a basis for comparison.

Senses and Sense Perception

Classical Chinese medicine identified four methods for ascertaining the sources of discomfort and illness (lit. “four examinations,” *sizhen* 四診): observation (*wang* 望), auscultation and olfaction (*wen* 聞), interrogation (*wen* 問), and pulse-taking and palpation (*qie* 切). The basis of a physician’s diagnosis depended upon the proper and trained exercise of these faculties. Although each method played a role in helping the physician evaluate a person’s condition, they were neither equally ranked in importance, nor comparably demonstrative in the evidence gained about the true causes for bodily distress. Indeed, there seems to have been a particularly close affinity between seeing (*wang*) and touching (*qie*) as evidenced by the overlapping of procedural and linguistic aspects of these two modes of sensory perception.⁷

In perhaps the most famous of anecdotes related in histories of Chinese medicine, the legendary physician Bian Que’s encounter with Duke Huan, the execution of all four methods in diagnosis does not even appear.⁸

⁷ For a philosophical treatment of role of the senses in epistemology, see Jane Geaney, *On the Epistemology of the Sense in Early Chinese Thought* (Honolulu: University of Hawaii Press, 2002).

⁸ Bian Que is believed to have lived during the fourth-fifth centuries B.C.E. and is the most celebrated of early practitioners of the Chinese medical arts. His biography can be found in Sima Qian’s *Shiji* (Records of the

When Bian Que passed by (the state) of Qi, Marquis Huan of Qi retained him as a guest. Entering the court for an audience, (Bian Que) said, 'You, lord, have an illness; it is located in the pores and fibers (of the skin). If not cured, it will go deeper.' Marquis Huan said, 'My humble self has no illness.' Bian Que left, and Marquis Huan addressed his attendants, saying, 'The way that physicians are fond of profiting is that they desire to achieve merit by way of ones who are not (really) ill.' Five days later, Bian Que again had audience, and said, 'You, lord, have an illness; it is located in the blood vessels. If not cured, I fear it will go deeper.' Marquis Huan said, 'My humble self has no illness.' Bian Que left; Marquis Huan was not pleased. Five days later, Bian Que again had audience and said, 'You, lord, have an illness; it is located amongst the intestines and the stomach. If not cured, it will go deeper.' Marquis Huan did not respond. Bian Que left, and Marquis Huan was displeased. Five days later, Bian Que once again had audience. Observing (from a distance), he looked at Marquis Huan, then withdrew and hurried away. Marquis Huan sent someone to ask the reason for it. Bian Que said, 'When an illness is located in the pores and fibers of the skin, decoctions and medicated ironings are what can reach it. When located in the blood vessels, needles and stones are what can reach it. When it is located in the intestines and stomach, alcoholic brews are what can reach it. But when it is located in the bones and marrow, even the Controller of Destiny could not do anything about it. It is now located in the bones and marrow, and for this reason I have no requests (for the marquis in terms of a cure).' Five days later, Marquis Huan's body began to ail. He sent someone to summon Bian Que, but Bian Que already had fled and gone. Marquis Huan subsequently died."⁹

While the account can certainly be read as testimony of Bian Que's acumen, Shigehisa Kuriyama discerns a more cautionary tale of the limits of medicine as a science. Despite the acuity with which Bian Que identifies the sources of bodily distress—even forms of distress that have yet to manifest—his advice cannot overcome distrust. Bian Que identified six incurable ailments—the first of which was associated with the type of patient who was arrogant, unrestrained, and unwilling to discuss with reason. Had Duke Huan listened and trusted Bian Que, his illness need not have progressed as it had. Thus, the death of Duke Huan serves as a lesson, not to physicians, but to patients.

But insofar as the anecdote highlights the powers of medical perception, the actual techniques employed are limited to sight alone. For the physician-aspirant, this tale may provide little in terms of clear instruction and rather more in inspiration. And yet the renown that surrounds Bian Que's status as a diagnostician was not confined to his clairvoyance—a vision enhanced by his

Grand Historian), but the historical verisimilitude of Sima Qian's account is questionable. A variant version of the encounter with Duke Huan also appears in *Hanfeizi*, chap. 21, "Yu lao" (juan 7, 2b-3a).

⁹ "Sima Qian, 'Account of the Legendary Physician Bian Que,'" in Victor H. Mair, ed., *Hawaii Reader in Traditional Chinese Culture* (Hawaii: University of Hawaii Press, 2005), pp. 174-78.

initiation into the medical arts through his acceptance of secret arts and recipes from Changsang Gong (“Venerable Tall-Mulberry,” a legendary figure known as a transmitter of arcane arts). Bian Que could literally see through walls, but his penetrating insight was never meant to be a function of his eyes alone. After all, he had achieved fame from examining vessels (i.e., diagnosis by palpating the *mo* or vessels).¹⁰ He could certainly see what others could not, as evidenced in his precise accounting of the development of the Duke’s malady from a distance. But his manner of seeing suggests, in Kuriyama words, “a sense of spatial layering . . . a conception of the body structured by the logic of depth and a theory of sickness understood as the progressive penetration of poisons.”¹¹ Bian Que’s mystical ability to see through the various layers to the source of the ailment was never meant to be singular to him alone. The good physician, by paying keen attention to the *mo*, could also *see* to the source. This conception of the body as layered space, vulnerable to the infiltration of noxious breaths from without, required sensitive, acute perception of all the main sensory organs—it is as if the work performed by each sense is both highly comparable to that of another sensory organ and correlated to the natural objects of perception for each organ: eyes that see through somatic walls, fingers that feel the vicissitudes of depths below (i.e., the flow of the *mo*, the skin and flesh), ears that discern pitch, tone, timbre, and presence, and a nose that seeks out and distinguishes the body’s variegated smells.

¹⁰ *Qimo* (切脈), or palpating the *mo* (脈), may also be pronounced *mai*, is often rendered in English as pulse-taking, but the pretense of semantic equivalence is actually quite deceptive. Shigehisa Kuriyama, in his splendid comparison of Greek and Chinese conceptions of the body, shows how the like appearance of common gestures—the physician silently feeling the inside of the patient’s wrist—obscures the wide gulf of substantive differences between the pulse and the *mo*. He writes, “*Qimo* began as and essentially remained exactly what its name indicated: palpation of the various *mo*, that is, a procedure for tracking changes in the conduits that so powerfully affected the body’s pains and powers. The *mo* grasped in diagnosis was the same *mo* burned and needled in therapy. *Qimo* inquired not into the single voice that Greek doctors called *sphygmōs*, but into a multiplicity of vital streams.” Shigehisa Kuriyama, *The Expressiveness of the Body and the Divergence of Greek and Chinese Medicine* (New York: Zone Books, 1999), p.45. Elisabeth Hsu considers the ten case histories related in the biographies of Bian Que and Cangong, “Master of the Granary,” which comprise the 105th chapter of Sima Qian’s *Shi ji*, as sufficiently detailed in its rendering of a particular form of pulse diagnostics. Please see, Elisabeth Hsu, *The Telling Touch: Pulse Diagnostics in Early Chinese Medicine, with Translation and Interpretation of Ten Medical Case Histories of Shi ji 105.2 (ca. 90 BC)* (Habilitationsschrift in Sinologie, Fakultät für Orientalistik und Altertumswissenschaft, Universität Heidelberg, 2001).

¹¹ Shigehisa Kuriyama, *The Expressiveness of the Body and the Divergence of Greek and Chinese Medicine* (New York: Zone Books, 1999), p.164.

Qiemō 切脈, palpating the *mō* 脈, outweighed the other three forms of examination (observation (*wang*), auscultation and olfaction (*wen*), interrogation (*wen*)) in the power of its insight into the body's confidences. Its importance as the foundational diagnostic technique in Chinese medicine is manifest in the scores of specialized treatises that have been written about it. As Kuriyama has pointed out, "Look at what [the Chinese] wrote: no monographs devoted to diagnostic listening or smelling; no essays on techniques of interrogation; over 150 works on the interpretation of haptic signs."¹² The degree of sophistication and discernment associated with palpating the *mō* far exceeded the development of pulse-taking in classical Greek medicine, which remained both singular in nature, i.e., the body has only one pulse consisting of the diastole and the systole, and irrespective of place, i.e., regardless of where one felt the pulse (the wrist, the neck, etc.), the pulse was one and the same. The immediacy, indeed intensity, with which we associate the pulse with the pulsing artery, the regular rhythmic alternation of the diastole and systole, is part the anatomical tradition grounding Western medicine.¹³ In contrast, Chinese pulse teachings identified twenty-four or twenty-eight basic distinctions, of which floating (*fu* 浮) or sunken (*chen* 沉), slippery (*hua* 滑) or rough (*se* 澀) are the four signs most commonly elaborated by the medical classics as "framing the most vital confidences."¹⁴ Moreover, the *mō* was not singular. What the physician's fingers felt depended upon where those fingers felt, and from at least the time of the *Huangdi neijing* (Inner Canon of the Yellow Lord), there were twelve different *mō*, each with its own distinctive dynamic.¹⁵

¹² Kuriyama, *The Expressiveness of the Body*, pp. 19-20.

¹³ In his exploration of how different perceptual styles articulated different forms of being, Kuriyama characterizes the language of the pulse as "an idiom of diastole and systole." Understanding both its syntax and semantics was a task deeply rooted in anatomy. "Beyond rooting the pulse in the heart and the arteries," Kuriyama writes, "anatomy defined what and how doctors trained their fingers to feel." Kuriyama, pp. 32-7.

¹⁴ Kuriyama, *The Expressiveness of the Body*, p. 49.

¹⁵ It seems that initially the physician palpated twelve separate sites on the limbs, the trunk, the neck, and the head in order to assess the corresponding state of the twelve different *mō*. By the latter Han dynasty, the twelve *mō* were no longer independent, but rather part of one great circulation, and the act of palpation was concentrated to the wrist. According to the *Nanjing* (*Canon of Problems*), "The twelve cardinal tracts [*mō*] all have their pulsating vessels, but we palpate solely the inch-mouth [*cun kou*] pulse as a technique for deciding between life and death, good and bad fortune, as they involve the visceral systems of function." Cited in Nathan Sivin,

Why early Chinese physicians should become interested in subtle changes that were not directly visible to the eye is unclear. Elisabeth Hsu has surmised that different modalities of perception have been systematically refined by different medical traditions, and for late pre-dynastic and early dynastic China, tactility, rather than primarily visual acuity, may have played a more critical role in grounding scientific inquiry. Hsu's close reading of texts dating from the Han dynasty (206 BCE – 220 CE) reveals a highly specialized and detailed conceptualization of the body as a topological space to be probed through tactile exploration.¹⁶ By focusing upon the *mo*, the Mawangdui “vessel texts” developed a rich vocabulary for the body's various places on the trunk and limbs and systematizes the knowledge of pain through its localization within specific bodily sites. The significance of place shaped the very essence and manifestation of pain, such that instead of an elaborate scheme of adjectival descriptions of the quality of pain (lacerating, burning, searing, nagging, pounding, throbbing, etc.), the “vessel texts” qualify all pain through their localization in a body part (shin, knee, thigh, stomach, intestines, heart, cheekbones, etc.).¹⁷ Hsu's work on tactility in early Chinese medicine suggests intriguing possibilities for how to understand the intertwining of visual and tactile modes of perception in the Chinese medical thought. Tactile insight gained through palpating the *mo* may not have been distinctly different from the visual insight gained from looking

Traditional Medicine in Contemporary China: A Partial Translation of Revised Outline of Chinese Medicine (1972) with an Introductory Study on Change in Present-Day and Early Medicine (Ann Arbor, MI: Center for Chinese Studies, University of Michigan, 1987), p. 138. Kuriyama summarizes the argument justifying the shift in technique as follows: “The *Nanjing* links [the twelve *mo*] together into one great circulation, and details how the *mo* moves three *cun* with each exhaling of breath, and three *cun* with each intake—six *cun* total with each respiratory cycle. A person takes 13,500 breaths in a day, and this translates into the *mo* making fifty circuits of the body. The *cunkou* inch-opening at the wrist represents the great confluence (*dahui*) of the *mo*, the site where circulation starts and ends—which is the reason, *Nanjing* 1 concludes, that doctors must inspect the *cunkou*.” Kuriyama, p. 45.

¹⁶ Elisabeth Hsu, “Tactility and the Body in Early Chinese Medicine,” *Science in Context* 18.1 (2005): 7-34.

¹⁷ Hsu also discusses the tactile exploration of *mo* in connection with the 105th chapter of Sima Qian's *Shi ji* and the theorization of “firmness and plasticity” (堅脆) of flesh and viscera in the *Neijing*, but the basic argument of function and sophistication to which early Chinese medicine applied tactility as the mode of perception for scientific inquiry is clearly evident in somatization of pain.

(*wang* 望). With an overlapping vocabulary of adjectives for describing both *se* 色¹⁸ and *mo* 脈, as well as diagnostic techniques—Hsu points out that although looking (*wang*) and touching (*qie*) were differentiated, palpating the *mo* could in specific cases be akin to discriminating the variance of *se*—looking and touching were compositional, inseparable, elements making up the penetrating insight of the Chinese physician.¹⁹

Examining the Chinese Child

Even without extensive treatises dedicated to exploring the multifaceted nature of gazing (*wang*), listening and smelling (*wen*), and questioning (*wen*), a physician's ability to discern truths about a particular condition depended upon an active calculus of all four methods. And although *qiemó* occupied a privileged position among the four methods for examining a person's condition, its practice was not meant to eclipse the other three completely. This prioritizing of the sense of touch did not render the other senses inconsequential, and we find that Chinese physicians were sensitive to the potential pitfalls attendant to an over-reliance of one sense for the diagnosis of all patients. While the skill and acumen of the physician depended upon his acuity of perception by palpation, not all patients could be conquered by touch alone. Concern over the potential fallibility of the physician's diagnostic skill was particularly evident when the patient was a child. Indeed, exceptional care and sensitivity was required when dealing with the infant or child patient, because in contrast to adult patients, the child body by its very nature muddled the clarity and precision of interpreting haptic signs.

¹⁸ Diagnostic looking was an act of contemplation of the significance of hue. In Chinese medicine, *wangse* 望色 refers to the act of gazing upon color, but as Kuriyama has shown, particularly for pre-dynastic texts, *se* 色 was not limited to color and just as often referred to facial expression. Kuriyama, pp. 172-85.

¹⁹ Kuriyama suggests as much when he writes, "To the five sounds, five smells, and five tastes, the *Neijing* and *Nanjing* generally give brief, perfunctory treatment. One gets the impression, sometimes, that they are mentioned simply as gestures toward comprehensiveness. Not so with sight. . . To know *se* and the *mo* was to know the essential, and it was through these two that the sages of the golden past attained divine clarity. . . 'The physician who can combine the *mo* and *se*,' proclaimed *Suwen* treatise 10, 'achieves perfection.' *Qiemó* may eventually have become the primary and most trusted means of diagnosis, but inspection of *se* always remained its necessary complement." Kuriyama, pp. 170-1.

Understanding the vital confidences of the child body was a difficult and often precarious venture of interpretive semiology. The four methods of diagnosis (*sizhen*) could not be exercised in the same manner for children as for adults. According to the pediatric section of the *Yizong jinjian* (Golden Mirror of Medical Teachings, 1742) compiled by Wu Qian, which had been the standard textbook for students in the Palace Medical Service during the Qing dynasty (1644-1811) and among the most popular books published by publishing houses across the empire,²⁰

Since ancient times, children's medicine (*erke* 兒科) has been difficult. To be off [in one's diagnosis] by even one tenth of a *li* can result in an error of a thousand *li*. The *qixue* 氣血 of a child is not yet full. It is difficult to rely upon the *mai* 脈. The child's general vitality and mental capacity (*shen shi* 神識) has not yet developed, and the child lacks the faculty of language. The main technique one can depend upon is an examination of the face and facial hue (*mian se* 面色) to determine the source of the disease. Following upon facial expression and hue, one has recourse to palpating the *sanguan* 三關 [finger veins], treating for chills and fevers, listening to the specific qualities of the child's emanations and sounds, and palpating the body for signs of repletion or depletion. In these ways, the physician can then determine the afflicting syndrome (*zheng* 證)²¹ and appropriate therapy.²²

The conviction that the child's body posed particular challenges for the physician was reiterated throughout the body of pediatric literature. Although the development of medicine for the young (*yu yi* 育醫) dated back to the end of the Tang dynasty (618-907), what Hsiung Ping-chen has characterized as “the lack of focused physiological knowledge and clinic skills” during this period

²⁰ Cynthia J. Brokaw, *Commerce in Culture: The Sibao Book Trade in the Qing and Republican Periods* (Cambridge, MA: Harvard University Asia Center, 2007), chap. 11. Brokaw conducts an intensive study of the Sibao book trade, which furnished much of the cheap educational texts, household guides, and medical handbooks to South China. Based in a cluster of villages in the mountains of western Fujian, the Sibao publishing houses built a vibrant publishing and bookselling network from the late seventeenth through the early twentieth centuries.

²¹ I use Judith Farquhar's distinction and translations of the three *zheng* (*zheng* 征, *zheng* 症, *zheng* 證) that appear through the course of the clinical encounter. *Zheng* is “a pattern of symptoms recognized as a recurrent form in medical experience.” Farquhar points out that in medical English, a syndrome need not have a known disease process as its causation, but rather can be used to characterize a group of symptoms typical of a particular condition or disturbance. “In Chinese medicine,” Farquhar continues, “the typicality of a group of manifestations is one of the conditions referred to whenever a *zheng* label is given to an illness. But this is not a typical expression of a known underlying body state; rather it is (as Hans Agren's translation of ‘manifestation type’ for the same term suggests) a recurrent form of illness manifestation known to doctors as recurrence because they have seen it often in the course of their medical experience. The reference of *zheng*, in other words, is more to patterns of history than to structures of the body and disease.” Judith Farquhar, *Knowing Practice: The Clinical Encounter of Chinese Medicine* (Boulder, CO: Westview Press, 1994), p. 57-9.

²² *Yizong jin jian*, juan 50 (Taipei: Taiwan shangwu yinshuguan, 1983), 781-357.

constrained effective medical practice to that of basic prognostication of life or death.²³ Medical texts by leading medical authors of the Tang, Song, and Yuan dynasties like Chao Yuanfang (巢元方 fl. 610) and Sun Simiao (孫思邈 581-682) included sections devoted to the subject of the care of children and their health. Special formulae were segmented off and directed towards the care of children; basic explanations for how to sever the umbilical cord and treat the placenta assumed a standard place within the sections devoted to infant and childcare; but in terms of efficacy of care, Chinese physicians were aware of their limitations.²⁴ In his etiological treatise, *Zhubing yuanhou binglun* (On the Cause and Course of All Illnesses) written at the beginning of the seventh century, Chao Yuanfang observed,

The Classics identify those six *sui* and above as children (*xiao'er* 小兒); those eighteen *sui* and above as youths (*shaonian* 少年); those twenty *sui* and older, adults (*zhuangnian* 壯年); and those fifty *sui* and older, old men (*laonian* 老年). [But] those who are six *sui* have already changed [i.e., their bodies have become less fragile; their health less precarious], and the Classics does not discuss those of nursing age and younger (*ru xia ying'er* 乳下嬰兒). In the case of those with severe children's diseases, which are difficult to treat, [the inevitable result] is death.²⁵

As Hsiung Ping-chen has remarked, "There was little assistance for the care of children under the age of six that made much practical sense. Whenever an infant or a young child contracted a serious ailment, there were few effective cures a practitioner could provide."²⁶ Awareness of the difficulties associated with treating young children did not, however, inhibit the intellectual effort to systematize and understand the main sources of distress and ill health, and these early examples flag the eventual

²³ For a discussion of the general development of Chinese pediatrics from ancient times up to the Song dynasty, Chen Bangxian, *Zhongguo yixue shi* [History of Chinese medicine] (Shanghai: Shangwu, 1937); Chen Ts'ung-jung, *Zhongyi erkexue* [Chinese pediatrics] (Taipei: Cheng-chung, 1987); and Shih Chung-hsu, *Zhongguo yixueshi* (Taipei: Cheng-chung, 1984).

²⁴ For a more detailed treatment of traditional Chinese childcare practices, see Liu Yongcong, *Zhongguo gudai yu'er* [Childcare in ancient China] (Taipei: Taiwan shangwu yinshuguan, 1998), pp. 31-82 and Hsiung Ping-chen, *Yoyou: chuantong Zhongguo de qiangbao zhi dao* [Yoyou: Infant care in traditional China] (Taipei: Lianjing chubanshi, 1995), pp. 53-136.

²⁵ Chao Yuanfang, "Yang xiao'er hou," *Zhubing yuanhou binglun*, juan 45.

²⁶ Ping-chen Hsiung, *A Tender Voyage: Children and Childhood in Late Imperial China* (Stanford, CA: Stanford University Press, 2005), p. 34.

specialization of pediatric knowledge as a distinct discipline. But while there was movement within scholastic medicine, Hsiung argues that the social environment, i.e., the possibility of being a specialist of children's diseases that directed satisfied a perceived need in the community, did not emerge until the time of the Song physician, Qian Yi (錢乙 1032-1113).²⁷ Qian Yi's three-chapter text, *Xiao'er yaozheng zhijue* (Proven Formulae of Pediatric Medicine), "defined the nature and direction of the [newly forged] profession, as [Qian Yi] won for himself reverence as the founding father of Chinese pediatrics."²⁸

Qian Yi's contribution to the development of a distinct medical sub-discipline was profound. His medical knowledge, theoretical deliberations, and pharmaceutical formulae designed specifically for children shaped both the practice and theory of medicine for children for centuries afterwards. He applied earlier understandings of the function of organs and circuits to pediatrics and argued that physicians should diagnosis and treat child patients according to the manifest symptoms of the five organs (*wuzang zhengzhi* 五臟證治). Qian Yi observed, children "because their internal organs are weak and fragile and can be weakened or strengthened easily, thus suffer more easily from cold and fever."²⁹ He adapted the four methods of diagnosis to the particular exigencies associated with the child patient and stressed the importance of reading facial signs (*mianshang zheng* 面上證) and "signs from the eye" (*munei zheng* 目內證), rather than the more commonly used pulse diagnostics and interrogation method for adults.³⁰

His emphasis upon reading the subtleties of expression became the bedrock of diagnostic practices for Chinese pediatrics, and his influence upon later medical writers is evidenced by their regular allusion to and incorporation of Qian Yi's thinking about child health and disease. Later

²⁷ Qian Yi was born into a medical family of Qiantang district (present-day Hangzhou), and as was typical of the period, he followed his father and adopted father, both medical men, into the vocation.

²⁸ Hsiung, *A Tender Voyage*, p. 34.

²⁹ Qian Yi, *Xiao'er yaozheng zhijue*, pp. 1-2, cited in Hsiung, *A Tender Voyage*, p. 36.

³⁰ Hsiung, *A Tender Voyage*, p. 36.

medical writers often began their texts by alluding to this absence of language as the foremost challenge when treating child patients. Zhang Jiebin (張介賓 1563-1640) in his *Xiao'er ze* (Principles [for the care] of young children) noted, “The people of old have called the [medicine for] children’s diseases a discipline of the mute (*yake* 啞科). [The reason for] this saying is that [children’s diseases] are such that it is neither easy to comprehend the extent of the disease [its causes, its trajectory of development, etc.] nor easy to predict the likelihood of death.”³¹ The Qing medical author, Shen Jin’ao, drew upon Qian Yi’s characterization—“Pediatrics (*erke* 兒科) is a discipline of the mute (*yake* 啞科)” —as the primary conceit justifying the intricate visual calculations a physician must make for the child patient. It is because the physician does not have recourse to a common verbal language, in which the child can clarify, qualify, and generally explain his forms of discomfort and distress that medical care of children is a dumb art. Referencing Qian Yi, Shen wrote,

The *mo* comes rapidly, making it difficult to palpate [accurately]. Thus it is necessary to inspect the *se*. If the physical appearance and the facial expression/hue do not conform with each other, then listening and palpating the *mo* should be employed [for the purpose of diagnosis].³²

Speech is absent, and pulse diagnostics, so dependable for its insights on adult patients, is equivocal and temperamental for the child.

Seeing

What did it mean to scrutinize the *se*? Examining the face (facial signs, expressions, and hues) was, as advised by the *Yizong jinjian*, a cartographic exercise of topological reading. The face consisted

³¹ Zhang Jiebin, *Xiao'er ze*, shang juan (Changsha: Yuelu shushe, 1994), p. 370. Zhang Jiebin, an unsuccessful military man who had turned to the pursuit of medicine, had been a follower of Zhu Zhenheng’s (珠丹溪 1280-1358) theory of *yangyin* 養陰 in which the deficiency of *yin* influences was the primary cause of illness and the appropriate treatment involved nourishing the *yin* component. Zhang’s own clinical experience led him to question the tenability of Zhu’s theory and argue instead that *yang* influences were of primary importance in the treatment and prevention of illness. Whereas the *yangyin* school considered the pathological surplus of *yang* influences to be an ever present problem upsetting the body’s equilibrium, Zhang advocated constant replenishment of the body with *yang* influences. For a more detailed treatment of the shifting contours of medical thought during the Ming and Qing periods, see Paul U. Unschuld, *Medicine in China: A History of Ideas* (Berkeley: University of California Press, 1985), pp. 197-204.

³² Shen Jin’ao, *Youke shimi* (Explanations of the mysteries of medicine of children), (1773; rpt. Shanghai: Shanghai weisheng chubanshe, 1957), p. 1.

of five quadrants, each of which entailed its own specific set of correspondences and physiological relationships with the five solid viscera (*wu zang* 五臟). For each of the five solid viscera, there was a corresponding color (*se* 色), which indicated which of the five phases ruled the illness. For the child, the forehead corresponded to the heart and was governed by the color red; the chin corresponded to the kidneys and was governed by the color black; the nose corresponded to the spleen and was governed by the color yellow; the left cheek corresponded to the liver and was governed by the color blue/green (*qing* 青); and the right cheek corresponded to the lungs and was governed by the color white.



Figure 1: Diagnostic Map of the Face³³

³³ *Yizong jin jian*, juan 50 (Taipei: Taiwan shangwu yinshuguan, 1983), 781-358. The image illustrates the facial site-organ correspondence.

Why should color be so fundamental to the Chinese medical gaze? Throughout Chinese medical writings, Kuriyama has argued, botanical metaphors abound and provide suggestive hints for how to understand ancient China's conception of the expressiveness of *se*. Imagery of flowering—the flowering visage, the luster of bloom, and the withering of decline—regularly accompanied explanations in the *Huangdi neijing* texts about how governing viscera were related to the governed parts. The microcosmic body, like the greater macrocosm, registered the interactions of the *wuxing*, or five phases, by the flourishing and fading of the *wuse*, or the five colors. These external manifestations comprised the expressive surface of the body. They were, in a manner, the leaves and blossoms. Understanding both how and why the leaves turn, flowers bloom and fade, etc., required assiduous care and attention to the roots and stem without which signs of decline would appear, and all parts of the plant would suffer. The body too had its vital inner core made up of vital energies (*qi* 氣), which may be generally understood as that which “maintains and renews the measured, orderly changes that comprise the body's normal processes.”³⁴ Thus, when the *Yizong jinjian* assigned primacy of the heart to the forehead, the relationship we are to derive from the specific viscera and that section of the face is like that in plants. Just as the dry, brittle edges of leaves may suggest poor hydration of the plant's root system, a visage stained green/blue should serve as a strong indication that the child is suffering from fright wind (*jing feng* 驚風). Vividness of hue signified a nascent, young disease, while darker, deeper tones suggested a more entrenched, perhaps implacable, state of disease. Kuriyama explains,

From the hue tingeing the face, doctors could know the phase that ruled the illness. A florid countenance bespoke ascendant fire; a visage with yellowish tints, the waxing of earth. Actual diagnosis naturally became more involved, as doctors balanced nuances of shade, differences in when and where various hues appeared, and the testimony of other senses. But the principle was elementary: healers eyed the five colors as manifestations of the fivefold forces of cosmic change.³⁵

³⁴ Please see Nathan Sivin for a lucid examination of *qi* and its place within medical theorizations of the body. Nathan Sivin, *Traditional Medicine in Contemporary China: A Partial Translation of Revised Outline of Chinese Medicine* (1972), with an *Introductory Study on Change in Present-Day and Early Medicine* (Ann Arbor: Center for Chinese Studies, University of Michigan, 1987), pp. 46-52.

³⁵ Kuriyama, *The Expressiveness of the Body*, p. 168. For the phase-color correspondence, please see Table I.

Listening

The poetics of color was not the sole avenue for exploring the complexities of a child's state of distress, and one finds a comparably sophisticated analysis of bodily sounds and voice in the diagnostic process. Just as there are five colors, there are five qualities of the voice (*wu sheng*), for which each has a five-phase ascription and associated viscous (see Table I). The *Yizong jinjian* instructed the reader, "Five-voice method for diagnosing a child entails listening [with discrimination] to the quality and tone of the voice and in this manner begin to elucidate the specific disease state of the five viscera."

Table 3: Correspondences

Phase	Wood	Fire	Earth	Metal	Water
Viscera	Liver	Heart	Spleen	Lung	Kidney
Color	Green	Red	Yellow	White	Black
Voice	Shouting	Laughing	Singing	Wailing	Groaning

Recognizing the structural correspondences was not enough, however. Citing Li Chan's *Yixue rumen* (An introduction to medicine, 1575),³⁶ Shen Jin'ao related a complex, nuanced schema of vocalizations. He wrote, "The voice that is light and clear indicates that the *qi* is weak. That which is deep and heavy indicates wind heteropathy (*feng* 風) and the presence of pain. High-pitched shouts suggest hot heteropathy (*re* 熱); a voice urgent and hurried, fright disorder." The vocal configurations the attending physician encountered did not end here. "If the sound seems stuffy or blocked (*sai* 塞),

³⁶ Li Chan's *Yixue rumen* was one of the most influential introductory textbooks on medicine available in Ming-Qing China. In her essay on medical instruction and popularization in Ming-Qing China, Angela Ki Che Leung argues that texts like Li Chan's *Yixue rumen* played a critical role—both through the format and language of such primers—in disseminating medical knowledge to the larger reading public. By simplifying the language, incorporating rhythmic devices to facilitate memorization and recollection, these primers advanced a more clinically-oriented medical practice that prized practical, as opposed to theoretical, expertise. In Li Chan's *Yixue rumen*, for example, the discussion of diagnostic methods is presented "in a lively manner." Leung continues, "During the 'interrogation,' the second of four steps of the diagnosis, the doctor should ask questions like, 'Do you have a headache?', 'Can you distinguish the taste of food?', 'Do you feel heat in your palms?', 'Any pain in your heart?', 'Do you have good appetite?' and so on, depending on the complaints of the patient. Each question was followed by different possible answers suggesting likely problems. The whole section was written in a simple, almost vernacular style and here one can almost hear Li's voice in a teaching session. Such clarity was a major strength of this textbook." Angela Ki Che Leung, "Medical Instruction and Popularization in Ming-Qing China," *Late Imperial China* 24.1 (June 2003): 134-5.

the source of the disorder is mucus (*tan* 痰); if the sound shivers and shakes, cold heteropathy (*han* 寒). If the sound is choked, then the *qi* is not free flowing. If the sound is like panting or gasping for air, then the *qi* is skipping/stagnate (*cu* 促) Sneezes indicated wind heteropathy damage disorder (*shang feng* 傷風).”³⁷

Diagnostic listening required sensitivity to both that which was expressed and that which was not. Frightened cries that sank and became swallowed into the body suggested a more pernicious heaviness of the body resulting from exposure to external dampness. Sounds that were deep and still indicated *gan* accumulation (*gan ji* 疳積),³⁸ and perhaps most devastatingly, those sounds that did not assume the form of cries and wails, but rather bird-like chirping, foretold only death of the very young. Wei Yilin (危亦林 1277-1347) simplified the cacophony into three distinct categories: “A child whose frightened cries in his sleep are of a floating quality is easy to treat; a child whose voice sinks heavily and does not resound is difficult to treat, and for a child whose voice is like a bird being plucked, there is no cure.”³⁹

³⁷ Shen Jin’ao, *Youke shimi*, p. 3.

³⁸ *Gan* accumulation is one type of *gan* disease commonly occurring in the spleen. Nigel Wiseman and Feng Ye, *A Practical Dictionary of Chinese Medicine*, 2nd ed. (Brookline, MA: Paradigm Publications, 1998), p. 236 defines *gan* as: “a disease of infancy or childhood characterized by emaciation, dry hair, heat effusion of varying degree, abdominal distention with visible superficial vein, yellow face and emaciated flesh, and loss of essence-spirit vitality. Pathomechanically, it essentially involves dryness of the fluids due to a damage to spleen and stomach owing to dietary factors, evils, and in particular, worms.” Even a cursory review of *gan* discussions in Chao Yuanfang’s *Zhubing yuanhou lun* and the Qing imperial textbook, *Yizong jinjian* suggests a rather more complicated formulation in terms of manifestation patterns and sites of manifestation. For the present purpose, however, Wiseman and Ye’s definition is sufficient as it communicates the temporal particularity of the disease (i.e., infancy and childhood) and includes most of the common signs associated with the disease category *gan*. For historical analyses of the pediatric disease category of *gan*, see Liu Shukui, “Xiao’er ganzheng yuanliu kao” [Research on the origins and development of pediatric malnutrition disorders], *Zhonghua yishi zazhi* [Chinese Journal of the History of Medicine] 27.4 (October 1997): 218-21 and Hsiung Ping-chen, “Gan: Zhongguo jinshi ertong de jibing yu jiankang yanjiu zhi er” [Gan: A study of the disease and health of children in Late Imperial China], *Bulletin of the Institute of Modern History* 24 (1995): 263-94.

³⁹ Shen Jin’ao, *Youke shimi*, p. 3.

Asking

The third diagnostic method for children involved obtaining specific, contextual information from the child's parents or guardians. When and what the child has eaten or drunk; the consistency of the child's urine and stool; details about the child's physical appearance at the onset of fever, etc.—this sort of information enabled the physician to determine the structural factors shaping the particular expression of the child's various symptoms. The purpose of diagnostic asking was to substantiate and organize partially-formed suspicions into a more comprehensive, and explanatory, rubric of manifestation types (*zheng* 證). “Characterization of a disorder as the basis for therapy requires that the case history, symptoms, physical signs, and other data from the examination be meticulously analyzed and integrated.”⁴⁰ “If,” as observed the *Yizong jinjian*, “the child develops fever without sweating, then the evil (*xie*) resides in the exterior (*biao* 表). If internal fire (*nei re* 內熱) [on account of the yin being vacuous] causes obstruction (*ying* 硬), then the evil (*xie* 邪) is lodged in the interior (*li* 里).”⁴¹ Exterior-interior (*biaoli* 表里) differentiation revealed the depth disease and directed the physician towards the proper routes for amelioration. Thus, ascertaining from the parent or guardian aspects of the case history was a key component in the physician's calculus of different concerns: the common characteristics of the disease versus the characteristics of the individual case; the local pathological changes versus the changes involving the child's whole body; the growth and diminution of heteropathy versus innate powers of resistance.

Touching

The fourth diagnostic method involved palpation supplemented by the visual inspection of the finger veins of small children. Pulse diagnostics as practiced on adults was compromised and constrained by the child's smallness of fingers, hands, and body as well as by the immaturity of the vital processes still taking shape. These challenges required the physician to reevaluate the forms of

⁴⁰ Nathan Sivin, *Traditional Medicine in Contemporary China*, p. 329.

⁴¹ *Yizong jin jian*, juan 50 (Taipei: Taiwan shangwu yinshuguan, 1983), 781-361.

signification and the techniques for interpreting such signs in a manner that fit with the exigencies of the infant or child. The infant finger examination (*xiao'er zhibizhen* 小兒指診) was first developed by Wang Chao in his text *Secret of success to the diagnosis of disease* and further refined by Chen Fuzheng (陳復正 1736-1796) in *Youyou jicheng* (A complete collection of works on pediatrics, 1750). Shen Jin'ao, for his part, found particular clarity and concision in Hua Boren's exposition of the technique, and though Shen also presented similar accounts from Qian Yi and Wang Kentang, it was towards Hua's directions he himself directed the reader. "For infants below the age of three *sui*, the *hukou sanguan* (虎口三關, lit. tiger's mouth and three passes) shall be inspected on the boy's left index finger and on the girl's right index finger.⁴² When veins appear vivid purple, the problem is heat (*re*); when red, cold damage heteropathy (*shang han* 傷寒); green-blue, fright wind (*jing feng* 驚風); white, *gan* disorder." Hua Boren's directions extended beyond color—and its various qualities of depth—to length as well. "If the veins are visible in the Wind pass (*feng guan* 風關), the condition is relatively mild. If visible in the Qi pass (*qi guan* 氣關), the condition is comparatively more serious. If visible in the Life pass (*ming guan* 命關), the condition is especially severe. If directly visible in all three passes, the condition is critical."⁴³

A Continuum of Change

The difficulties in diagnosing infants and children did not end once the physician had largely mastered the techniques of the eye, ear, and hand. Shen Jin'ao divided the general category of infants and children into two categories: those three *sui* or less and those between four and six *sui*.⁴⁴ The fate

⁴² The assignment of left and right to boys and girls, respectively, also dictated which side should be handled first in the manipulation of nursing. See Charlotte Furth, "Concepts of Pregnancy, Childbirth, and Infancy," *Journal of Asian Studies* 46.1 (February 1987): 19.

⁴³ Shen Jin'ao, *Youke shimi*, p. 5. The index finger is divided into three passes (*guan*): the first joint is called the Wind pass (*feng guan*); the second the Qi pass (*qi guan*), and the third the Life pass (*ming guan*). According to Chinese medical textbooks maintain that in the healthy infant, the veins are dimly visible, pale purple or reddish-brown in color, and generally visible in the Wind pass.

⁴⁴ Shen Jin'ao, *Youke shimi*, pp. 2-3.

and overall wellbeing of children three *sui* or younger was a matter outside of the physician's control. Indeed, Shen admitted the decision was entirely subject to the discretion of the heavens. Whatever pain or discomfort a child under the age of three *sui* may experience is completely out of their ability to control, temper, or placate. Knowing the *mo* cannot be relied upon, the physician approaches the child with alternate diagnostic techniques—inspection of the facial color and expression, the child's exterior form, and veins of the three passes—that facilitate the epistemic project of determining the source of the distress and the best course of action for redress. For the physician, the infant is an inchoate, unstable entity with immature organ systems and only rudimentary consciousness. Everything about the infant portended risk and uncertainty, and in important ways, the diagnostic techniques developed for infants and children reflected this formulation. Although ultimate control of the outcomes was denied to the physician, recognizing the limitation one's powers was nonetheless an important part of caring for and treating infant patients.

For children between four and six *sui*, the problem facing the physician was of a different character altogether. The repertoire of techniques devised to read the child body was compromised by the child itself. Whereas previously the problem centered upon indeterminate communications because of the child's lack of language, between the ages of four and six *sui*, language itself intervened to complicate, if not obscure, the sources of distress. Shen explained this development as a consequence of the child's newfound precocity that has opened the mind to a mild form of dissembling. Emotions, expressions, and states of being become inversely related to the outward statement. A child's insistence of a lack of hunger may not actually signify true lack. The claim of feeling pain may in fact be exaggerated. The child that suggested he was uncomfortable was rather more likely to be fine. Shen warned that parents, perhaps because of their affection, were liable to be unaware of this tendency and take seriously every complaint. Parental anxiety would mean the physician would be repeatedly prevailed upon to address any perceived problem, and unless the

physician took proper care to submit the child to the four methods of diagnosis, misunderstandings and resentment were likely to arise.⁴⁵

In sum, the ways in which classical Chinese medicine attempted to examine an infant or child suggest that the child was not considered to be a discrete, individuated entity, at least for the first several years of its life. Its body evidenced the complex process of ongoing transformation such that physical and physiological changes occurred as part of a continuum without sharply differentiated boundaries. The child's weak, intermittent pulse that could beguile the doctor's diagnostic prowess imparted the need for alternate means of detection, identification, and analysis—hence, the elaborate and sophisticated system for interpreting all the signs a child may emit. Medical diagnosis was, in some fundamental sense, akin to reading portents with parents and doctors scrutinizing each aspect of the infant's appearance or behavior as clues for what may be and that which will come.

This emphasis upon transience, indeterminacy, and the child's inherent propensity for disease was reaffirmed by the diligence Chinese doctors extended towards preventing, or at least diminishing, the child's exposure to noxious influences (*xie* 邪) from the outside world. Mindfulness of the child's vulnerability preceded the actual birth event, as is evident in medical and moral admonishments to pregnant women to guard against excessive emotions. As Charlotte Furth has explained, "To be moved by emotions, especially passion or anger, to give way to lust, or indulge in rich food or drink was to risk pathological fire within [which was believed to be the primary source of "fetal poison" (*tai du* 胎毒)], endangering the child's health and well-being in utero and making it susceptible to disease in infancy."⁴⁶ Fetal poison, which did not cause injury or distress in the female,

⁴⁵ Shen Jin'ao, *Youke shimi*, pp. 2-3.

⁴⁶ Charlotte Furth, "From Birth to Birth: The Growing Body in Chinese Medicine," in *Chinese Views of Childhood* (Honolulu: University of Hawai'i Press, 1995), p. 171. Furth points out that while Ming-Qing physicians no longer advised the ancient ritual doctrines of "fetal education (*taijiao*)," which maintained that the mother's moral and physical conduct could influence the sex, temperament, and moral status of the child, women's experiences of pregnancy continued to be shaped and structured by strictures concerning diet, daily regimen, and moral behavior. For an examination on how the concept of fetal education influenced Chinese thinking on

was, Furth argues, a medicalization of ancient ideas of birth pollution found in popular Buddhism. The child's susceptibility to fetal poison was understood and inevitable, but good maternal care could diminish its impact upon the child. Fetal poisoning was also considered to the primary cause of smallpox, a childhood illness that was endemic during the Ming and Qing periods.

Moreover, because the child nursed at the mother's breast through infancy, the birth event did not mark a crucial moment of separation and transformation. Mother's milk was commonly imagined in the medical literatures as "transformed" menstrual blood, which had previously nourished the fetus in utero and, after childbirth, became food for the infant.⁴⁷ The symbiotic ties that linked the mother and child through gestation were projected onto infancy, such that a child's chances of survival of beyond the sixth year depended upon good maternal care, e.g., in the form of spiritual self-cultivation (*xiu shen* 修身).

After the first six years from birth, children no longer occupied a distinctive place within the medical canon. Furth observes that because Chinese physicians' discussion of infant growth was shaped by their concerns with diagnosis and prescription, particular attention was paid to children under the age of six *sui*, because of their feeble pulse and heightened sensitivity to any prescription. Diagnostic methods like reading the facial expression and hue, scrutinizing the child's cries and sounds, examining the child's finger veins afforded alternate means for grappling with the complexity of childhood illness and disease. Recognition of the need to reduce both the quantity and potency of medical prescriptions had appeared early in the Chinese pediatric literature, but the general assumption prevalent in pediatric textbooks seems to have defined the purview of the field as limited to those under the age of six *sui*. That is not to suggest a complete disregard for children over the age of six *sui*, but rather a diminution of intellectual consternation once the child had passed through the critical early years.

children's education, see Limin Bai, *Shaping the Ideal Child: Children and Their Primers in Late Imperial China* (Hong Kong: Chinese University of Hong Kong, 2005).

⁴⁷ Charlotte Furth, "From Birth to Birth: The Growing Body in Chinese Medicine," p. 172.

Limin Bai has noted that the ancient Chinese debate on the appropriate age for children to begin schooling clearly demarcated children at the seventh year. Because the first six years were considered the most treacherous and life-threatening, the seventh year signaled the child's emergence from danger and initiation as an actual social being. According to Bai, "In the seventh year, the child started the transition from baby teeth to permanent teeth. The ancient Chinese also believed that in this year the child developed well not only in aspects of basic capacity, such as walking, eating and speaking, but also in its emotional progress, namely that it began to know shame and embarrassment."⁴⁸ The seventh year marked not only a transition in terms of intellectual, emotional, and physical development, it was also the point at which the child began being socialized differently according to gender. Boys and girls, who up until this age, commingled were to be separated and taught the rituals and responsibilities associated with their social gender.

Medical thinking recognized this social distinction and sexual acculturation. The *Inner Canon* described the shifts in sexual maturation as follows:

At seven *sui* a girl's Kidney *qi* is flourishing; her adult teeth come in and her grows long. At fourteen she comes into her reproductive capacities (*tiangui zhi*); her *ren* pulse moves and *chong* pulse is abundant; her menses flow regularly and she can bear young. At twenty-one her Kidney *qi* is even and clam, and so her wisdom teeth come in and her growth has reached its apogee. . . . At eight *sui* a boy's Kidney *qi* is replete; his adult teeth come in and his hair grows long. At sixteen his Kidney *qi* is abundant, and he comes into his reproductive capacities (*tiangui zhi*); his seminal essence overflows and drains; he can unite yin and yang and so beget young. At twenty-four his kidney *qi* is even and calm, and so his bones and sinews are strong, his wisdom teeth come in, and his growth has reached an apogee."⁴⁹

Chinese medicine did not treat girls of seven *sui* as reproductive females in the literal sense, but by emphasizing the bodily markers of sexual maturation (adult teeth and long hair), the *Inner Canon* established "seven or eight *sui* as the time when children could be regarded as sexualized beings by

⁴⁸ Limin Bai, *Shaping the Ideal Child: Children and Their Primers in Late Imperial China* (Hong Kong: Chinese University of Hong Kong, 2005), 17.

⁴⁹ Cited in Furth, "From Birth to Birth," p. 179. Sexual function was associated with the action of "Kidney" (*shen* 腎).

adults.”⁵⁰ Thus, in terms of medical perception, the stage succeeding infancy (*yinger* 嬰兒) was associated with sexual development. Diagnosis for the infant or young child had been predicated upon the general frailty and vulnerability of the child body. From seven *sui* onward, we can begin to see how reproductive vitalities developing in the child body came to govern the physician’s encounter with the young patient. The child body had become a sexed body: either male or female, and the attending physician would have adapted his diagnostic techniques to accord with this more stable, and socially resonant, human being.

Physical Examination in the Western Medical Context

The body at the center of health initiatives advanced by Protestant missionaries and Chinese Christians had little in common with that sustaining Chinese medical interest, but such differences were largely historical rather than ontological. The rise of the physical examination in the Western medical context marked a steady and distinct departure from older practices that involved little if any physical contact with the patient’s body. Roy Porter has observed that there has been curiously little written about the conduct of routine consultations between practitioners and patients. The silence speaks rather more loudly of the “preferences and prejudices of medical historians,” and in turning to an examination of the part played by the physical examination within clinical encounters, Porter shows how such technique—though now considered a cornerstone of modern clinical practice—traditionally had limited significance during the eighteenth- and nineteenth centuries.

For Porter, the history of the physical examination cannot be reduced to some kind of triumphalist tale about technology and medical progress, or, in his own words, “no mere narrow, technical matter of medical progress.” He sees it as a case of “profound ambiguities inherent in our culture concerning the sense of touch”—which can be both healing and restorative as well as violent and sexually dangerous or fraught. Moreover, how we understand the affective and semantic bounds

⁵⁰ Furth, “From Birth to Birth,” p. 179.

of the sense of touch relies upon conventions of the time, which as demonstrated by his examples from the Georgian period of English history, are subject to change.

At its simplest, the history of the physical examination details a transformation in the hierarchy of senses for ascertaining and producing medical knowledge. Prior to the nineteenth century, the attending physician did not routinely carry out extensive physical examination, and instead, depended upon the relating of the patient of his own ‘history.’⁵¹ Both for reasons of propriety and epistemic merit, the normal and approved practice of the day involved the careful inquisition of the patient’s own discernment of his or her pains and symptoms, extenuating circumstances, and periodicity. The physicians would inquire and listen to the patient’s “history;” make some kind of physical scrutiny mainly by the eye and not by touch; qualitatively assess the pulse (languid or racing, regular or erratic?); listen to coughs, wheezings, and eructations; and smell for signs of putrefaction. Physically going-over the patient was not considered a precondition for diagnosing the patient’s internal conditions, because as a technique for culling vital information about an ailment or affliction, it did not necessarily yield greater insight into an amorphous situation.⁵² Without diagnostic technology to aid and objectify the senses—stethoscopes, ophthalmoscopes, and the like were not introduced until the nineteenth century—the practitioner’s own systematic and

⁵¹ Roy Porter, “The Rise of Physical Examination,” in *Medicine and the Five Senses*, ed. W. F. Bynum and Roy Porter (Cambridge: Cambridge University Press, 1993), pp. 179-97.

⁵² Obtaining a patient’s “history” was and continues to be an important part of the four examinations making up the clinical examination in Chinese medicine. The “interrogation” (*wen* 問) method functioned in a manner similar to the pre-Victorian practice of “taking the history” of the patient as described by Porter. Although the conceptual understandings of the human body, disease manifestation and causation differed, the reliance upon verbal dialogue in both medical systems highlights both the generative role subjective experiences of illness assumed the production of medical knowledge and the degree of shared cultural learning with the physician that patient must have also acquired. Contrary to the objections levied by nineteenth century medical practitioners seeking ever-higher degrees of mechanical objectivity, subjective experience did not necessarily impair or imperil the production of medical knowledge as patients learned how to speak of their distress in a manner consonant with the aims of medical efficacy. Judith Farquhar interprets the Chinese clinical encounter (*kanbing* 看病) as cooperative and collaborative. She argues, “Just as *kanbing* names the clinical encounter from both the doctor’s and the patient’s point of view, so the material generated through the four examinations consists of both doctor’s and patient’s experiences and perceptions of the illness. They collaborate in looking at the illness.” Farquhar, *Knowing Practice*, p. 67.

trained use of his senses was fairly rudimentary.⁵³ Porter writes, “As late as 1800, [the practitioner] was probably still a rather advanced doctor who would tap the body with his finer (percussion), listening for tell-tale evidence as to whether the internal cavities were full of fluids or not (auscultation).”⁵⁴

In addition to the relatively lower epistemological value attributed to the physical examination, Porter suggest three other reasons inhibiting its performance during the clinical encounter. Firstly, the professional differentiation between physician and surgeon in which the physician was esteemed precisely because he did not traffic in the gross body—he worked by his head, not by his hand—assigned different professional values to the act of physical examination. Without necessarily disparaging the physical examination, a physician may have hesitated to perform a physical examination precisely because it was an act more fitting for a surgeon. Changing notions of social propriety, privacy, and bodily norms also shaped the social acceptability and public comprehension of the physical examination. A more strident code of decency may have looked down upon having one’s body seen or touched by other people, particularly in the case of a female patient and a male physician. And finally, Porter points out that the cultural assignments associated with the sense of touch were by no means clear. The power of touch could be healing and foreboding, suggestive of violence or sexual danger.

By the nineteenth century, however, the tide was shifting with respect to the development of the physical examination. Not only was its value in the production of medical knowledge rising, but because the conceptual schemes grounding medical practice had also shifted, the physical examination came to represent one of the foundational elements of the physician-patient encounter. Ascertaining the patient’s “history” did not disappear so much as become recalibrated as a sequence

⁵³ Other inventions include the thermometer, pulse counters, x-ray, and the electrocardiograph. Though diagnostic technology like the stethoscope may have improved a physician’s diagnostic skill, its acceptance by both practitioner and patient alike was by no means assured. See, for example, Malcolm Nicolson, “The Introduction of Percussion and Stethoscopy to Early Nineteenth-century Edinburgh,” in *Medicine and the Five Senses*, ed. W. F. Bynum and Roy Porter (Cambridge: Cambridge University Press, 1993), pp. 134–53.

⁵⁴ Porter, “The Rise of Physical Examination,” p. 183.

of highly stylized acts performed by the physician emerged during the nineteenth century. According to the French internist Charles Achard (1860-1944),

At the beginning of the nineteenth century, the clinician observed studiously the ‘facies,’ the general aspect, and the constitutional habitus (of the patient); he examined the tongue, the mirror of the stomach; he palpated the pulse (*tatait le pouls*), gaged the temperature of the skin with his hand, and observed the gross characteristics of the urine, of the excreta (*des Selles*), and of the expectorants. He practiced palpation—‘*et le toucher*.’”⁵⁵

By the early twentieth century, the sequence of acts described by Achard had become more technically precise and mediated by instruments that enabled the physician to augment his own sensory organs. The patient would likely be asked to lie on a couch with clothing loosened or removed. Body zones that had previously been shrouded in propriety and prudery were touched and inspected. Moreover the manner in which a physician inspected, percussed, and auscultated, relied not solely upon his own senses, but rather mechanical means that isolated and focused upon the disease in contradistinction to the individual who happened to be its carrier. The sequence of acts performed by a young American internist Lewellys F. Barker in 1916, for example, included

“[making] a bacterial culture or a Wasserman test, [measuring] the systolic and diastolic blood pressure, [passing] a stomach tube, [doing] a phenolphthalein test, [making] a differential count of the white blood corpuscles, [studying] roentgenograms [e.g., x-rays], [examining] eyegrounds, [testing] reflexes, [doing] lumbar punctures, [titrating] glucose—and the like.”⁵⁶

The consequence of such a shift in clinical routine was twofold. The development of the physical examination, which occurred in conjunction with the emergence of medical science grounded as it was in the hospital and the laboratory, marked a perspectival shift in the

⁵⁵ Cited in Iago Gladstone, “Diagnosis in Historical Perspective,” *Bulletin of the History of Medicine* 9 (1941): 371.

⁵⁶ Lewellys F. Barker, “The Development of the Science of Diagnosis,” cited by Gladstone, “Diagnosis in Historical Perspective,” p. 371. The Wassermann test was an antibody test for syphilis. The phenolphthalein test, more commonly known as the Kastle-Meyer test, is a forensic presumptive blood test, which was first described in 1903. Roentgenogram refers to medical imaging involving radiation and was coined from Wilhelm Conrad Röntgen (English spelling Roentgen), who first discovered x-radiation on 8 November 1895. A lumbar puncture, commonly known as a spinal tap is a diagnostic procedure for obtaining a sample of cerebrospinal fluid for biochemical, microbiological, and cytological analysis.

epistemological construction of disease.⁵⁷ Porter has observed, “The laboratory and the hospital created and confirmed a viewpoint disposed to think of disease as an objective, physical entity, and so contributed to a shift from ‘dis-ease’ to diseases, or from ‘physiological’ to ‘ontological’ conceptions of disease.”⁵⁸ Disease as a distinct entity with its own past progressions and forward-marking trajectories became the primary target of investigation, while the individual with his or her idiosyncrasies and habits the lesser of concerns. In addition to reifying disease as an object of scientific inquiry, the physical examination rendered the individual patient body into an abstracted, generalizable phenomenon whose attributes could be quantified according to objective laws. In each case, the apprehension of the specific nature of the individual patient with her own history, preoccupations, desires, and tendencies becomes secondary to the scientific elucidation of a disease and its diseases and the human body as distinct from any particular personality inherent therein.

The physical examination with its increased dependency upon forms of physical engagement, touching, otherwise foreign to the clinical encounters prior to the nineteenth century marshaled alongside itself new models for investigating disease and apprehending the human body. An

⁵⁷ For a good overview of how medicine became medical science, see Roy Porter, “Medical Science,” in *The Cambridge History of Medicine*, ed. Roy Porter (Cambridge: Cambridge University Press, 2006), pp. 136-75. The epistemic foundation for such a transformation emerged with the erosion of the humoral pathology and the rise of its replacement, pathological anatomy, in which disease was primarily associated with lesions, during the late eighteenth and into the nineteenth centuries. The hospital became the locus of medical teaching and research, as well as the arbiter of medical knowledge. Classic treatises on the topic include Erwin H. Ackerknecht, *Medicine at the Paris Hospital 1794-1848* (Baltimore: John Hopkins Press, 1967), and Michel Foucault, *The Birth of the Clinic: An Archaeology of Medical Perception*, trans. A. M. Sheridan (New York: Vintage Books, 1994). Andrew Cunningham and Perry Williams have suggested that by the late nineteenth century, laboratory medicine had revolutionized medical thought and practice. Ushering in the formation of new medical disciplines (bacteriology, chemical physiology or biochemistry, tropical disease) and propagating new models for investigating living bodies, laboratory medicine represented not simply an accentuation of former ideas and practices by more sophisticated means, but rather a transformation of medicine’s clinical, investigatory, institutional, and technological situation. See Andrew Cunningham and Perry Williams, *The Laboratory Revolution in Medicine* (Cambridge: Cambridge University Press, 1992).

⁵⁸ Roy Porter, “What is Disease?,” in *The Cambridge History of Medicine*, ed. Roy Porter (Cambridge: Cambridge University Press, 2006), p. 83. Iago Gladston identified the physiological-ontological dialectic as one of the mainstays of medical diagnosis over the centuries, from Hippocrates forward. From his vantage point in the 1940s, Gladston suggested that the pendulum had actually swung back towards a more physiological-biochemical understanding of disease, i.e., contemporary medical practice prized diagnosis as the process by which to determine “the summation of all that deviates from the normal, in a sick individual of definite psychological and physical endowments living under particular circumstances in a given milieu,” as opposed to “the art of distinguishing one disease from another.” Gladston, “Diagnosis in Historical Perspective,” *Bulletin of the History of Medicine* 9.4 (April 1941): 373.

ontological, as opposed to physiological, approach dominated medical thinking and led to a de-emphasis of the language-based, patient-generated format of diagnosis common among Georgian physicians. New technologies resulted in the increased acuity of the physician's senses for the purposes of discernment, but by permitting the physician to more directly access a locus of complaint, they also diminished the degree to which the patient's own subjectivity cooperated in the diagnosis process. The patient-physician relationship was refracted by the introduction of the patient's body as somehow distinct from the patient herself.⁵⁹

It would be simplistic to suggest that henceforth with the development of the physical examination, physicians stopped attending to patients and began treating bodies, but the extent to which the physician through a physical examination could elicit information from the patient without deferring to the patient's own account was dramatic.⁶⁰ Not only did the physician traffic in a different language of signs and symptoms, the patient too had to learn a new language of her body's subtle and not so subtle expressions.⁶¹ Aspects and qualities of the human body—height, weight,

⁵⁹ The objectification of the human body through the physical examination yielded positive and negative ramifications. Edward Shorter has argued that the development of the physical examination added a hands-on dimension to the doctor-patient relationship. For many patients, past and present, this sensorial dimension conveyed an impression of *giving* care. It fortified the psychological bond between the physician and patient and demonstrated the physician's authority and credibility to treat and cure the patient. On the other hand, the objectification of the body—in entirety or by parts—as the locus of organic disease displaces the individual, and collective, experiences of being ill. The main complaint so often heard of contemporary medicine is its apparent disregard for the patient and her subjective experiences. See Edward Shorter, *Bedside Manners: The Troubled History of Doctors and Patients* (Harmondsworth, GB: Viking, 1986), pp. 211-40.

⁶⁰ For a fascinating treatment of how Chinese medical practice during the 1920s and 1930s attempted to “modernize” by adapting the *yi'an* (case statement, case record, or case history) in a fashion commensurate with the western case history model of describing disease, see Bridie Andrews, “From Case Records to Case Histories: the Modernization of a Chinese Medical Genre, 1912-1949,” in *Innovation in Chinese Medicine*, ed. Elisabeth Hsu (Cambridge: Cambridge University Press, 2001), pp. 324-36.

⁶¹ Shorter argues that the modern patient is distinguished by two defining characteristics: “a greater sensitivity to the body's internal state and an implicit confidence in the doctor, not just as a conduit of drugs but as a healer.” To suggest that Shorter's characterization could be directly applied to Chinese patients of the late nineteenth and early twentieth centuries is to willfully ignore the different historical contexts making something such as the “modern patient” possible. We can nonetheless pay heed to Shorter's suggestion about the increased sensitivity of the modern patient to her internal body's state by observing that such sensitivity and alertness is learned through the physician-patient exchanges and through popular media and institutional venues like schools, which, as we shall see, were essential vehicles for the dissemination of physical examination techniques in Republican China. Edward Shorter, *Bedside Manners*, pp. 107-39. For an analysis of the formation of modern hygienic consciousness, see Nancy Tomes, *The Gospel of Germs: Men, Women, and the Microbe in American Life* (Cambridge, MA: Harvard University Press, 1998).

blood pressure, etc.—emerged as finite and demonstrative. A person's height and weight, as single data points, may mean very little for the observing physician, but when juxtaposed against the heights and weights of others in the community, region, or country, they became indicators whose adherence to mathematical laws of regularity opened up distinct paths along which normality could be constructed. Indeed, as physicians began pursuing diseases as ontological objects in and of themselves, the physical examination became a composite tool for understanding not just the specific constitution of one individual, but also the health projection for groups of people. Once its relevance can be extricated from the dis-ease of any single individual, the physical examination can be appreciated for its efficacy as a set of techniques that help produce the kind of subject it seeks to examine. This conjunction as a process of subject formation and governmental control becomes clearer when we consider the role played by the physical examination in settings adjacent to medical science: public health and the health of populations.

The physical examination described by Charles Achard or Lewellys F. Barker above found no precedent in classical Chinese medicine, and its introduction into the fabric of Chinese everyday life traversed a circuitous path through the activities of Western medical missionaries during the early twentieth century. Although Western physicians began setting up dispensaries and hospitals in China throughout the second half of the nineteenth century—the period of greatest activity and expansion was between 1880 and 1910 when the number soared from 178 hospitals in 1873 to some 4,359 in 1909—these early missionary hospitals organized the structure of the clinical encounters between the physicians and their Chinese patients to accommodate local contingencies, and for this reason, did not impose examinations of the form described by Achard or Barker.⁶² In her examination of American missionary efforts to introduce hospitals into China, Michelle Renshaw has argued that the efforts of Protestant medical missionaries became indigenized. They adopted the dispensary format on account of its economic and practical nature. Through the dispensary, the physician could see a

⁶² Michelle Renshaw, *Accommodating the Chinese: the American Hospital in China, 1880-1920* (New York and London: Routledge, 2005), p. 11.

large number of patients at little cost and with little delay. Renshaw noted, “Once the physician had acquired sufficient of the local language, the only physical necessities were a room (or sometimes a courtyard) in which patients could congregate, a supply of the most basic drugs, a table, and a stool.”⁶³

According to Renshaw, Western physicians played an active role in building their own hospitals by personally arranging the local contracts, sourcing the materials, and supervising the building by Chinese labor. The hospitals they constructed were often segregated for the two sexes, each with its own waiting room or railed-off section of a single room. Visibility was of primary importance and employed to reassure the Chinese patients and prevent rumors from arising. When a patient rose to be examined by the physician, the clinical encounter transpired in full view “so that [the] Chinese who were waiting, and any friends or relatives who had accompanied the patient, could see what the doctor was doing.”⁶⁴ Established missionary physicians advised their colleagues to adopt “a Chinese approach and ‘always listen to both pulses.’” Elizabeth Reifsnyder of the Women’s Union Missionary Society of America at Shanghai urged, “questions must be asked, answers must be gotten, the tongue ought to be looked at, and to ease the mind of the patient, as well as for one’s own gratification, the pulses must be felt.”⁶⁵ This preoccupation with Chinese sensibilities, Renshaw argues, assumed a variety of forms ranging from adopting interpersonal techniques resonant with traditional Chinese medicine (e.g., feeling for the pulses on both the right and left hands) to orienting the room and its furniture in a fashion consonant with Chinese tastes. Renshaw’s example of Dr. Charles Roy who operated a hospital in Weixian, Shandong illustrates the extent to which Western medical missionaries adapted their efforts fit into their Chinese surroundings. Renshaw writes,

In his dispensary at Weixian (in Shandong) he had made the consulting room, in orientation and furnishing, as close as possible to a Chinese guest room with “an entrance door in the centre of the southern side, table and two chairs opposite the

⁶³ Renshaw, *Accommodating the Chinese*, p. 142.

⁶⁴ Renshaw, *Accommodating the Chinese*, p. 146.

⁶⁵ Cited in Renshaw, *Accommodating the Chinese*, pp. 146-7.

door on the northern side of the room.” The patient, who had been given a “tally-card” by the evangelist in the waiting room, should be met at the door by the physician and shown to the “seat of honor” on the doctor’s left. He should then be politely asked questions as to “honorable name, venerable age and exalted residence” followed by a standard set of questions about his disease in such a way as to elicit yes/no answers. The physician should spend at least five minutes with a new patient and an assistant, furnished with a copy of the questions, should take down the answers unobtrusively. For this purpose, Roy had a list “cut upon a wooden type-block of a size to fit the heading of the pages of an ordinary Chinese account-book, ruled with red lines.”⁶⁶

Missionary hospitals of the late nineteenth- and early twentieth centuries did not provide the venue within which Chinese patients became exposed to biomedical physical examination techniques—at least not initially. Because missionary physicians faced different challenges—placating fears or suspicions on the part of their Chinese patients, attracting and maintaining patient relations, and integrating evangelism into the structure of patient visits—they applied a degree of flexibility in their transportation and transplantation of medical techniques.⁶⁷ Moreover, missionary physicians often confronted limitations in financial and material support. Medical technology and equipment required funds and infrastructural supports most missionary hospitals tended to lack. Thus, while missionary hospitals did serve as conduits for the introduction of Western medicine, the transfer of medical epistemes was qualified by the various ways in which medical missionaries sought to

⁶⁶ Renshaw, *Accommodating the Chinese*, pp. 146-7.

⁶⁷ It may be that we credit rather more technological sophistication to late nineteenth century Western physicians working in China than we ought to. Government regulation of physicians in the United States occurred quite late as the beginning of state licensing was not until the 1880s. Although medical schools—generally 2-year programs in which students repeated their first year courses during their second year—had emerged onto the professional landscape in the mid-eighteenth century, most physicians learned their trade through an apprenticeship program. Modern medical education can be dated to the Flexner Report for the Carnegie Foundation of 1910, in which Abraham Flexner detailed at length the substandard state of medical education in the country. His report, which recommended the introduction of a four-year medical school curriculum—two years of basic science followed by two years of clinical training—and the formalization of admission requirements (e.g., high school diploma and at least two years of college science), served as a catalyst for reforming American medical education along more scientific lines. American medical missionaries arriving in China between the 1880 and 1910 may have felt more comfortable with older, less physical, diagnostic techniques, which had been a part of their own medical training. In contrast, physicians who were the products of post-Flexner medical education—or more rigorous programs modeled after European counterparts—were likely to have displayed greater attachment and conviction about the physical examination. Accommodation of Chinese sensibilities may have been an unintended, if beneficial, consequence of social transformations shaping medical practice in the United States and Europe. A good overview of the emergence of scientific medicine and its relationship to medical education, see John Duffy, *From Humors to Medical Science: A History of American Medicine* (Urbana, IL: University of Illinois Press, 1993) and Vivian Nutton and Roy Porter, eds., *The History of Medical Education in Britain* (Amsterdam: Rodopi, 1995).

accommodate perceived differences in social and cultural modes of engagement by adapting their own actions to Chinese customs.⁶⁸

But as the involvement of Western physicians and medical missionaries in public health initiatives grew during the early twentieth century, the manner in which they came into contact and interacted with Chinese physical bodies shifted. The physical examination as a hospital-based diagnostic had been constrained by differences in social and cultural norms, ill-equipped facilities, and limited budgets, but the physical examination as a fundamental tool for implementing public health measures recognized fewer boundaries and became regularly implemented in schools and clinics and as part of community health campaigns.⁶⁹ Organized attempts to promote public health education in the mission field took off during the 1910s and the early 1920s. As a natural extension of the evangelistic desire to bring about the redemption of the Chinese people, public health education, or simply “health education,” functioned as an important platform for shaping and imbuing the everyday life of Chinese people with the promise of hygienic modernity.⁷⁰ As James L.

⁶⁸ Adopting a more sociological approach, Yuet-Wah Cheung and Peter Kong-Ming New argue that missionary medicine achieved credibility amongst Chinese patients as a viable health alternative, because it did not eliminate existing options and instead offered an additional health care pathway for patients to pursue. Cheung and New suggest that the functional complementarity of Western missionary medicine (i.e., Western medicine address problems that indigenous medical practice was unable to solve) to the pluralistic Chinese medical structure enabled Western medicine to develop a foothold even if such credibility constrained its potential for supplant existing medical options. Yuet-Wah Cheung and Peter Kong-Ming New, “Missionary Doctors vs. Chinese Patients: Credibility of Missionary Health Care in Early Twentieth Century China,” *Social Science & Medicine* 21.3 (1985): 309-17.

⁶⁹ For an analysis of the public health work by two Canadian Protestant missions, and the specific strategies employed by missionaries to serve as “change agents” in the modernization of China’s health care system, see Yuet-Wah Cheung, *Missionary Medicine in China: A Study of Two Canadian Protestant Missions in China before 1937* (Lanham, MD: University Press of America, 1988).

⁷⁰ Zhang Sumeng 張蘇萌 and Zhang Danhong 張丹洪, “20 shiji qianye woguo weisheng (jiankang) jiaoyu jigou fazhan gaikuang” 20世紀前葉我國衛生（健康）教育機構發展概況 [Introduction to health education institutions in China in the first half of the 20th century], *Zhonghua yishi zazhi* 中華醫史雜誌 [*Chinese Journal of Medical History*] 31.4 (October 2001): 242-47. Based on their examination of published sources from the late Qing through the early Republican period, Zhang and Zhang argue that the terms *weisheng* 衛生, *jiankang* 健康, and *baojian* 保健 were all used interchangeably as semantic references to “health.” For a detailed examination for how *weisheng* emerged as “a hegemonic vision of health as defined by modernizing elites and the state,” see Ruth Rogaski, *Hygienic Modernity: Meanings of Health and Disease in Treaty-Port China* (Berkeley: University of California Press, 2004).

Maxwell remarked in his foreword to W. W. Peter's report on the public health work of the Council for Health Education, "That 'no man liveth to himself and no man dieth to himself' is a principle that has been slow in gaining acceptance. The apostle who enunciated this applied the words, as we know, to spiritual conditions, but they are equally true as regards our physical well-being."⁷¹ Echoing Maxwell's point, another missionary observed, "people can't clean up spiritually very successfully and live in filthy surrounds of home, street, and city, physically."⁷²

Council on Health Education and the Elaboration of School Health

The Council on Health Education (Zhonghua weisheng jiaoyuhui 中華衛生教育會) under the directorship of W. W. Peter, which was originally formed as the Joint Council on Public Health in 1916 with the support of the YMCA, the Chinese Medical Missionary Association, and the National Medical Association, spearheaded the health education initiative within the mission field. Pre-school child welfare, school hygiene, and student health education ranked especially high on the Council's list of targets, and the Council worked hard to promote public knowledge of each endeavor through a combination of education and propaganda.⁷³ The Council promoted health education by producing and distributing health materials, conducting surveys of health conditions in Christian schools, launching special health campaigns, and organizing health conferences for missionaries and teachers. Peter estimated that the Council had published 60 different kinds of health literature (including bulletins, books, plays, school series pamphlets, and picture-text booklets), produced 41 reels of film,

⁷¹ James L. Maxwell (senior) co-authored *The Diseases of China, including Formosa and Korea* (1910) with W. Hamilton Jeffreys and was a well-respected medical missionary in Taiwan. His son, James L. Maxwell (junior), the author of the above foreword, taught at the Peking Union Medical College and later served as librarian for the Henry Lester Institute of Medical Research. James L. Maxwell, "Foreword," in W. W. Peter, *Broadcasting Health in China: The Field and Methods of Public Health Work in the Missionary Enterprise* (Shanghai: Presbyterian Mission Press, 1926).

⁷² Cited in Ka-che Yip, "Health and Society in China: Public Health Education for the Community, 1912-1937," *Social Science & Medicine* 16 (1982): 1199.

⁷³ The Joint Council on Public Health became the Council of Health Education in 1920 when three other organizations signed on in cooperation: the China Christian Educational Association, the Nurses' Association of China, and the YWCA. For an analysis of the failure of missionary public health education work to supply practical solutions for the creation of a modern health care system in China, see Ka-che Yip, "Health and Society in China: Public Health Education for the Community, 1912-1937," *Social Science & Medicine* 16 (1982): 1197-1205.

and created 541 lantern slides on health education topics in 1923. Two years later, the kinds of health literature had risen to 99. The Council produced twice as many health films (89 reels) and six times as many lantern slides (3177 slides).⁷⁴ All of the Council's health education materials were printed in Chinese, and Peter reported that between 1 January 1922 and 31 December 1923, the Council supplied material 1172 missionaries and Chinese in 94 difference Christian organizations located in nearly every province in China as well as eight foreign countries with sizable Chinese communities.⁷⁵

The Council's health education work garnered strong support among the Western physicians staffing Christian schools throughout China. Religious salvation certainly motivated the Council and its members to advocate for health education, but in addition to any spiritual advantages tangentially accrued, Christian educational organizations battled the threat of profligacy should their attempts to uplift the Chinese people through the education of its children also fail to prevent the premature deaths of those same children.

The [Chinese Education] Commission has been painfully impressed by the large proportion of graduates and former students of Christian school who have died soon after completing their education. Years have been given to preparing them for service among their people, but their work has been little more than begun before they had to lay it down. Many other are doing their work under the handicap of frequent illness and lack of vitality. In too many cases, this is due, in part at least, to the lack of proper attention to the health of students on the part of school authorities.⁷⁶

To prevent such unnecessary loss or abridgement, the Chinese Education Commission recommended that "every Christian school consider it of fundamental importance to guard the health of its students in every possible way, to instruct them in the laws of health, and to develop in

⁷⁴ W. W. Peter, *Broadcasting Health in China: The Field and Methods of Public Health Work in the Missionary Enterprise* (Shanghai: Presbyterian Mission Press, 1926), p. 12.

⁷⁵ Peter's insistence upon use of the Chinese language led him to also decry the practice of having foreigners, however proficient, author the materials in Chinese. According to Peter, "Native writers must be used. Some foreigners think they can write Chinese acceptably, or having a sufficient command of the spoken language, they attempt the literary language with a mediocre writer. All such contributions which we have received have had to pass through the minds of experienced writers in order to secure smoothness, accuracy, and general acceptability." Peter, *Broadcasting Health in China*, p. 13.

⁷⁶ Chinese Educational Commission, *Christian Education in China: A Study Made by an Educational Commission Representing the Mission Boards and Societies Conducting Work in China* (New York City: Committee of Reference and Counsel of the Foreign Missions Conference of North America, 1922), p. 304.

them the habits which will make for physical efficiency.” Health measures included mandatory physical examinations of all incoming students and regular, yearly physical examinations thereafter during enrollment. School environments should be properly outfitted to ensure “ventilation of class and sleeping rooms, adequate cubic capacity of dormitories, the light of study rooms, the protection of students from cold and dampness, and the provision of correct diet and pure water.”⁷⁷ The health of individual students was to be achieved through close monitoring and preventive measures: vaccination and inoculation; the isolation of those with infectious or contagious diseases; and regular bodily inspection for “adenoids, disease tonsils, and the like.” Missionary physicians were urged to accept the responsibility of assisting in the planning and implementation of a “strong program of health education.”⁷⁸ By upholding the Christian school as the locus of hygienic modernity, the Chinese Educational Commission expected the benefits of health education to diffuse outwards to the broader community. Civic-mindedness represented one of the primary attainments secured through proper attention to the student health. As the Commission explained,

Every student in a Christian school should be prepared to give the most effective possible service in the community to which he goes upon leaving school. In view of the almost universal ignorance in China regarding even the simplest laws of sanitation, hygiene, and health, every Christian school should plan definitely to train its students to give education along these lines. Some schools are teaching students to make simple but vivid health posters and charts, to prepare easily understood speeches on health subjects, and to talk with individual on such subjects as the dangers of flies, the value of fresh air, and the care of children.⁷⁹

⁷⁷ Chinese Educational Commission, *Christian Education in China*, p. 304.

⁷⁸ Ibid., p. 305.

⁷⁹ Ibid., pp. 305-6.



Figure 2: "Taking an Inventory of Health"⁸⁰

⁸⁰ The photo accompanied a brief description of the visit by Dr. Vivia B. Appleton of the Council of Health Education to Jiangsu Province No. 2 Normal School (Jiangsu shengli di'er shifan xuexiao 江蘇省立第二師範學校). Appleton, it may be recalled, was an early and active contributor to medical anthropometry in China (see Chapter 1 of this dissertation). During Appleton's visit, she conducted a "systematic inventory of [the students] health." Seated at the far left of the photo, Appleton can be seen using a stethoscope on a boy's chest. "Jiankang jilu" 健康記錄 [Taking an Inventory of Health], *Weisheng* 衛生 [Health] 1.1 (March 1924): 11.

The efficacy of the Chinese Educational Commission's recommendation was not lost upon the Western medical practitioners working in China. In the words of John H. Foster, a practicing physician in Changsha, Hunan, "The importance of the physical welfare of the student is more and more emphasized, and is at least recognized by all."⁸¹ Christian mission schools were the first to implement regular and systematic physical examination of the student population. Such examinations served multiple purposes in addition to guarding the health of the students. For the research-minded clinical physician and the medical missionary alike, the physical examination articulated aspects of individual and collective health needing redress as well as the parameters by which to construct normative definitions of modern health and hygiene. It is perhaps not surprising then to find physicians at Christian mission schools among the first to compile the results of school physical examinations into research reports on disease incidence, patterns of physiological development, and the somatic measurements of Chinese school children.

How did western practitioners conduct physical examinations of students? Although the possibility of generalizing for all cases is constrained by the paucity of primary source material, there are a handful of examples that can serve as guides for delineating the most common forms of physical examination practiced. In his article for the *China Medical Journal*, John H. Foster, physician and Hunan Secretary of the Council of Health Education, described the standard protocol for the physical examination of mission and municipal school students between 1920 and 1922.⁸² Approximately 812 students were examined: 387 from Yale in China (including the Medical and Nursing Schools); 285 from the Changsha Middle School; and 140 from Fuh Siang Girl's School.⁸³

⁸¹ John H. Foster, "Physical Examination of Chinese Students," *CMJ* 36 (1922): 643.

⁸² Foster, "Physical Examination of Chinese Students," *CMJ* 36 (1922): 643-49.

⁸³ The "812" was derived from Foster's chart, "Showing the Percentage of Defects by Different Examiners in China and America." As best as can be determined, Foster actually examined more than 812 students. He also lists numerical totals for physical examinations conducted with students from the Changsha 1st Middle School and the Changsha Chang Chuen School, but based on his reporting, his comparative analysis of Changsha examination results against other surveys conducted in China and abroad excludes these students. Roughly speaking, Foster and his assistants conducted 1,876 physical examinations from 1921 to 1922. How many of these examinations were incomplete or repeat occurrences on the same students is unclear.

For one afternoon each week, students arrived in groups at the local hospital at half-hour intervals. Each student filled out a registration form and then received a medical history card, which an on-site nurse or medical student would assist him in completing and which should be retained through the course of the examination. Once inside the medical examination room, the student was stripped to his waist, and the presiding physician began the inspection moving in a somewhat mid to top down fashion. He measured the student's height, weight, and sitting height, from these measurements he then calculated the student's lung capacity. He examined the student's general state of nutrition, then skin, heart, lungs, and abdomen. He took the student's blood pressure and then examined the eyes, ears, nose, throat, and teeth.⁸⁴ Additional, more specialized examinations (e.g., surgical, orthopedic, and urological examinations) were also performed as needed, Foster suggests, at this point in the sequence. Finally, each student contributed a urine sample.

The physical examination employed by Foster and his medical colleagues in Changsha was based on a modified version of the US Army system and accompanied by rigorous note keeping. Each part of the body under consideration was matched by its own entry on the medical history card, and before the student left the building, an attendant (nurse or medical student) sat with the student and went over the card to ensure there were no omissions. The students turned in their history cards upon departure. Foster estimated that with a staff comprised of one or two doctors and (an unspecified number of) medical students and nurses on hand, approximately 100 to 150 students could be examined in this manner in a single afternoon.

Like his missionary counterparts, Foster reaffirmed the need to enact surveillance measures like the physical examination in order to decrease or eliminate health deficiencies that result in “a

⁸⁴ The sample medical history card appended to Foster's article manages to capture the canny uncanniness of the examination encounter. At the top of the form are listed a series of questions that range from the descriptive (i.e., for purposes of identification) to the suggestive. Name, date of birth (English and Chinese), age, birthplace, and province fall under the category of classificatory. The question about possible family experience with tuberculosis and those regarding past episodes of small pox, typhoid, and dysentery help establish the student's personal history of illness. But the remaining questions—Can you swim? Are you married? Do you have a chronic cough? Ever spit blood? Eyes every examined? Do you wear glasses? Is your health good?—jump spastically as if in heightened anticipation of the student's answer and likely state of health. Foster, “Physical Examination of Chinese Students,” *CMJ* 36 (1922): 648.

physical handicap to the student.”⁸⁵ He argued, “What affects his body will affect his capacity to study and to live a normal life. Most of the defects can be remedied. We are not doing our full duty unless we try to fit the student physically, as well as mentally and spiritually, for everyday life.” The most common “defects” afflicting Changsha students included defective vision (20/40, 6/10 or less), sinus disease, adenoids, and tuberculosis. In Foster’s estimation, forty percent of the students examined should be wearing glasses.⁸⁶

By characterizing their responsibility as one that encompassed the mental, spiritual, and physical welfare of the students, Foster had situated student health as a public pursuit whose attainment upheld social value of modern personhood. Interestingly, he does not mention what role the home and family ought to play in the formation of such personhood. Only a healthy student possessed the necessary means to live normally and contribute socially to the betterment of those around him. Foster advocated for increased communication among “those who have supervision of the health of students in China,” and recommended, “the teaching and application of hygiene in the schools should be standardized equally with the other phases of the curriculum.”⁸⁷ His insistence upon systematization reflected a broader expectation that with increased administrative cooperation

⁸⁵ Foster, “Physical Examination of Chinese Students,” p. 647.

⁸⁶ Frank Dikötter notes that eyeglasses, or spectacles, were available by import in China as early as the eighteenth century. By the early twentieth century, spectacles were being manufactured domestically. More traditional frames consisted of copper, hawksbill turtle, or horn rims, while modern spectacles, which were referred to as *huaxue yanjing* or chemical glasses, ranged from gold filagree to plain iron. The cultural assignations of spectacles generally pointed towards higher social standing—a scholar in Qing China or modernizing elites during the Republican period—and even wealthy ornamentation. Although Dikötter suggests that the cost of spectacles became increasingly affordable such that by 1942, a glasses stand could be found on market days in a small town in Sichuan province, the price must have still been sufficiently high to preclude middle schools students in the 1920s from owning their own pair—a point reaffirmed by Dr. E. J. Stuckey in Tianjin (“A Plea for the Routine Examination of the Vision of School Children in China,” *China Medical Journal* 36 (1922): 650-56). The allure of the modern associated with spectacles does not, however, clarify how a medical practice like the eye exam became integrated into Chinese daily life, or if it ever was. Still, one cannot help but wonder whether the popularity of spectacles as a sign of modern refinement ever rubbed against the more deliberate attempts by Western and Chinese biomedical physicians to medicalize vision as normal or abnormal. Frank Dikötter, *Things Modern: Material Culture and Everyday Life in China* (London: Hurst & Co., 2007), pp. 214-16.

⁸⁷ Foster, “Physical Examination of Chinese Students,” p. 647, 649.

and planning, the more common remedial defects would be corrected and the method of accountability (e.g., standards of diagnosis employed in a physical examination) more reliable.

That school officials should intervene in the health of its student population was an unstated assumption of Foster and his colleagues. Indeed, much of the material produced by the Council on Health Education perpetuated this idea and sought to routinize through regular exposure the sense that child and student bodies were best controlled for health deficiencies when examined and measured. Indeed, the purpose of the physical examination was less the diagnosis of any particular ailment than the regularized reconnaissance of bodily information. Diagnosis of disease was by means eliminated as an objective, but because the focus of health education was prevention, the importance of the physical examination exceeded its capacity to reveal disease alone. Bodily metrics provided empirical evidence of positive or negative health, and the physical examination functioned as the most direct method for obtaining such information. Medical physicians like Foster played a vital role in popularizing the physical examination in schools, but even his support paled in comparison to that of Charles Harold McCloy.⁸⁸

The Primacy of Measuring

One of the strongest proponents for the general institution of the student physical examination was Charles Harold McCloy (1886-1959), who wrote and achieved widespread fame writing under the Chinese name of Mai Kele (麥克樂).⁸⁹ A graduate of John Hopkins Medical

⁸⁸ The prominence medical physicians exhibited in both the conduct and propagation of the physical examination underscored the extent to which the physical examination remained primarily a set of medical techniques for diagnosis. Although Chinese educators like Zhou Shang and Zhu Youting recommended that aspects, particularly the portions involving measurement, of the physical examination be adapted for non-medical personnel, they nonetheless upheld the view that the medical physician was the most knowledgeable and authoritative figure to govern the health of students. I will return to this issue later in the chapter.

⁸⁹ Andrew D. Morris has given sustained treatment of McCloy and his adopted Chinese persona as Mai Kele in his *Marrow of the Nation: A History of Sports and Physical Culture in Republican China* (Berkeley: University of California Press, 2004). Other scholarship on McCloy's importance to the formation of modern *tiyu* in China include Luo Hui, Liu Yuzhao, and Su Miao, "Mai Kele de minzhuzhuyi tiyu sixiang tansi" [The exploration and analysis of McCloy's theory of democratic sports], *Jilin tiyu xueyuan xuebao* [Journal of Jilin Institute of Physical Education] 23.1 (January 2007): 3-4; Zhou Weiliang, "Jindai wushushi shang de yizhuang 'piaoqie an,'" *Tiyan wenhua daokan* 10 (2004): 65-7; and Gael Graham, "Exercising Control: Sports and Physical Education in American Protestant Mission Schools in China, 1880-1930," *Signs: Journal of Women in Culture and Society* 20.1 (1994): 23-48; For a gender-conscious analysis, please see Denise Gimpel, "Freeing the Mind through the Body:

College, McCloy arrived in China in 1913 in the employ of the National Council of the YMCA of China. He went on to teach at the National Southeastern University in Nanjing, where he served as the director of the School of Physical Education from 1921-1926.⁹⁰

Andrew D. Morris has argued that McCloy actively operated within an intercultural zone that permitted the free flow of sympathetic mimesis between otherwise constrained and unequal parties within the cultural imperialist project in China.⁹¹ Because McCloy wrote in Chinese and under the name of Mai Kele, the average Chinese reader need not have necessarily assigned foreign status to McCloy's counsel and guidance in matters of physical education. Morris writes,

Mai's readers would have found themselves in a fascinating, not gray but swirling black and white, zone between China and the West. This zone was opened up to all by an American writing, under a Chinese name, for a Chinese audience about Chinese progress (in Western-defined terms as read by Chinese reformers) in both *tìyù* physical culture (Western in origin but capable of expressing the strength and vitality of the Chinese nation) and martial arts (a "sport" Chinese in origin and thus lacking the modern rational and educational values that China desperately needed).⁹²

Thus, when he began publishing a series of nineteen essays in the Council for Health Education-sponsored journal, *Weisheng* (*Health*), his meticulous and extensive rumination upon the mechanics and methodologies of physical examination melded the seemingly separate worlds of Western and Chinese physical health.

Women's Thoughts on Physical Education in Late Qing and Early Republican China," *Nan Nü* 8.2 (2006): 316-58.

⁹⁰ Biographical details have been taken from Morris, *Marrow of the Nation*, pp. 55-61.

⁹¹ By "intercultural zone," Morris draws from Michael Taussig's notion of mimesis as one of the defining features of and produced by the modern condition—in contradistinction to the modernist discourse of mimesis as a characteristic of primitivism. Morris applies the idea of mimesis as that operative space in which "all [Chinese and Western folk] were finally free to engage with, and even become, their Others as a way to escape confining imperialist and nationalist narratives." Morris, *Marrow of the Nation*, p. 60.

⁹² Morris, *Marrow of a Nation*, pp. 57-8.

For Mai Kele, physical examination was an exercise in rational measurement.⁹³ In a 1926 essay entitled, “Di ba zhang: Yanjiu shenti de yaodian” (Studying the body’s essential points), Mai pointed out,

When examining the body, one cannot focus exclusively upon one measurement (*chicun* 尺寸) alone; neither can one consider various measurements by turn. Based on my previous explanation of methodology [i.e., how to take measurements during a physical examination], [one should] determine the relationship between measurements, because we need measurements to function as standards [for comparison].⁹⁴

After all, the fundamental point Mai sought to convey to his readers was not the importance of studying measurements per se. “We don’t want to study a single measurement,” Mai argued. “We want to study is the person.” But by person, Mai was guiding his reader’s towards a conception constructed upon standardized units and rationalized, if nonetheless abstract, parts: height, weight, chest girth, sitting height, and the length of both arms. Why did height, weight, chest girth, etc., matter? When juxtaposed and compared, these measurements enabled both the child and concerned adult to perceive the gap between is and ought in an incontrovertible, numerical language. Visually assessing a child without performing bodily measurements was acceptable practice, but ultimately unreliable, because, Mai contended, “individual norms (*geren biao zhun* 個人標準) vary, and only an examination [that incorporates] measurement is dependable.”⁹⁵

The significance of each measurement—height, weight, chest girth, etc.—lay in its relationship to the other, but of the various measurements one could obtain from the body, the most important ones were height and weight. “Height,” Mai explained, “set the norm for the entire body (*quanti biao zhun de chicun* 全體標準地尺寸).” Weight measured the body’s volume and when against

⁹³ Because McCloy’s Chinese persona became his de facto writing persona in China, it seems reasonable to refer directly to his writing self as “Mai Kele” rather than McCloy—at the very least, we can preserve some continuity with how a Chinese readership apprehended the form of his writing through his Chinese name.

⁹⁴ Mai Kele, “Di ba zhang: Yanjiu shenti de yaodian” 第八章研究身體的要點 [Studying the body’s essential points], *Weisheng* 衛生 [Health] 3.1 (1926): 1.

⁹⁵ Mai, “Yanjiu shenti de yaodian,” p. 1.

height articulated the body's "health ratio" (*jiankangli* 健康率). Mai laid great emphasis upon how weight played a constituent role in determining one's "health rate." He argued,

If a child's weight seldom increases, then the child is certainly unhealthy. If a child or an adult is unhealthy (*bu kangjian* 不康健) or ill (*you bing* 有病), his height does not decrease, nor does it stop growing or slow down. [On the other hand], his weight will quickly reduce. Within a school, the best [kind of] physician to identify illness is, it seems, a scale (*cheng*). All boys and girls should grow regularly; the speed [of growth], whether fast or slow, being basically the same. For example, from age six to seven, a child should gain about 2000 grams (4.4 pounds) at a monthly average of 167 grams (.367 pounds); from age fifteen to sixteen, 6000 grams (13 pounds) at a monthly average of 500 grams or basically a pound a month. In this way, if a child is weighed each month, one can determine whether or not his growth is correct (*hedu* 合度). If one finds a lack of weight increase for one or two months, one should pay especial attention [to this child's health].⁹⁶

Mai's high estimation of the diagnostic value of the scale did not eliminate the importance for medical physicians. Mai assured the reader that medical experts, particularly pediatric specialists, were agreed: each and every school ought to introduce regular, monthly weighings of the student population. Without addressing the practical difficulties of creating a formal position like "school physician" (*xiao yi*), Mai nonetheless described a method for defining and maintaining institutional oversight of student health. The scale, however meager in appearance, was nonetheless possessed of the physician's diagnostic eye, because if used properly and with regularity, it yielded insight otherwise inaccessible. It enabled non-medical personnel to participate in the physical examination by delineating the objective, brute "facts" of health: bodily metrics.

Mai Kele, like John H. Foster the physician in Changsha, conceived of the physical examination as the primary vehicle by which to implement a program of prevention. Although certainly a diagnostic in scope, the physical examination, especially one emphasizing measurement, also functioned as predictive technology. Mai explained, "If every school can utilize this method, then it will be easy to avoid and decrease (*mian diao* 免掉) chronic disease (*manxingbing* 慢性病), because when ailments first appear, they are easy to treat."⁹⁷ By generating data, e.g., statistical data

⁹⁶ Ibid., pp. 3, 4.

⁹⁷ Ibid., p. 6.

on the prevalency of trachoma, dental caries, or goiter, the physical examination revealed not only the present state, but also the likely outcome to a coterie of physicians and teachers. Armed with health information, they could devise specific strategies for combating ill health. After all, the logic of prevention, as Mai makes clear, entailed a willingness to operate primarily on a plane of that which may or is yet to come; that which was already was already too late.

Chinese Health Education

Missionary efforts to popularize health education through the institution of regular physical examinations, improved curriculum, and civic campaigns did not go unheeded by the Chinese. Chinese Christians played a critical role in helping to build a viable health education program within the mission field. As intermediaries, local organizers, and representatives of a modern conception of Chineseness that seemingly melded Chinese and Western ways, Chinese Christians performed their modern aspirations through their bodies.⁹⁸ Whether as participants to physical examinations or as students sharing the lessons of a modern health education in community health campaigns, Chinese Christian students became the first focal point upon which energies for creating a modern China rested. But the viability of health education—the extent to which Chinese, Christian or not, accepted the cognitive associations of health, nation, and modernity—extended beyond the efforts and energies of Chinese Christians alone.

Zhang Danhong and Zhang Sumeng have identified hints of a nascent awareness of the importance of health education in new-style schools from the mid-1800s forward. The Tianjin Naval Academy (Tianjin shuishi xuetang 天津水師學堂) was the first to staff a position akin to the school physician in 1881. Responsibilities included treating sickness and preparing medicines for the

⁹⁸ The place held by Christianity and Chinese Christians in modern Chinese history has long been a contested site upon which different political interests sparred for dominancy, often at the expense of any recognition of communities of Chinese Christians speckling the country's population. Recent scholarship has exposed a complex set of Chinese Christian experiences, all integral to the formation of a modern Chinese consciousness and a modern Chinese nation. A particularly fascinating treatment is Ryan Dunch's *Fuzhou Protestants and the Making of a Modern China, 1857-1927* (New Haven: Yale University Press, 2001).

students.⁹⁹ As more new-style schools were established, measures for address student sickness—sick leave, reduction or exemption of medical fees, strategies for isolation or quarantine, etc.—began appearing with greater regularity in the bylaws and regulations governing said schools. Many of the new-style school adopted a three-meal inclusive feeding program, provided facilities for bathes during the summer months, as well as imposed rules on room cleanliness and inspections. These examples of health education efforts were, however, localized to the specific school. Each new-style school applied their own interpretation and conceived of their own program of health education. By 1902, Zhang and Zhang argue, what had previously been isolated measures undertaken at individual new-style schools was adopted by the Qing government as part of a more systematic initiative, “Imperial Rules for Middle Schools” (Qinding zhongxuetang zhangcheng 欽定中學堂章程), to modernize the country’s educational system. Influenced by currents in Western thinking on school health, the “Imperial Rules for Middle Schools” required that schools be equipped with cafeterias (*shitang* 食堂), bathrooms (*yusuo* 浴所), and infirmaries (*yangbingsuo* 養病所) at a ratio of 1 per every 100 students. It also included provisions concerning school furniture—“all tables, chairs, and stools used by students must be match the students bodies” (*xuesheng suoyong ji an yi deng, wu yu xuesheng zhi shenti xiangpei* 學生所用几案椅凳，務與學生身體相配)—and sick leave.¹⁰⁰ The post-Boxer education reforms of 1902-1904, which included the abolishment of the imperial examination system in 1904, officiated the transformation of Chinese education.

The importance of health education to the project of making modern Chinese citizens also impressed the minds of Chinese social elites. Zhang and Zhang indicate that by the early 20th century, student health and health education received wide-spread support from Chinese intellectuals and trained scientists, who for their part formed local committees to address the issue of student health

⁹⁹ Zhang Danhong 張丹紅 and Zhang Sumeng 張蘇萌, “19 Shiji houye 20 shiji qianye Zhongguo de xuexiao jiankang jiaoyu,” 19世紀後葉20世紀前葉中國的學校健康教育 [Health Education in Chinese Schools during the late 19th century and early 20th century], *Zhonghua yishi zazhi* 中華醫史雜誌 [*Chinese Journal of Medical History*] 29.3 (July 1999): 168.

¹⁰⁰ Cited in Zhang and Zhang, “19 Shiji houye 20 shiji qianye Zhongguo de xuexiao jiankang jiaoyu,” p. 168.

and advocate for institutional changes from the bottom up. Chinese intellectuals pursued a variety of activities. Ge Laibo established the first school health summer camp at Lushan in 1922. His compatriots energetically authored, translated, and compiled publications on school health through the 1920s and 1930s. The Chinese Association for the Advancement of Education (Zhonghua jiaoyu gaijin she 中華教育改進社) convened its first general meeting in 1922, and among the topics addressed at the conference was the question of how to improve school health curriculum by involving local physicians.¹⁰¹ Did “local physicians” include practitioners of Chinese medicine?¹⁰² One suspects not, if only because the manner in which Chinese social elites discussed school health, which overlapped with modern *tǐyù* discourse, tended to involved what Andrew D. Morris has called “the invasive regimes of measurement and normalization.”¹⁰³ Western-style biomedical physicians, for their part, recognized the social importance of school health. Echoing missionary exhortations to prevent unnecessary illness or even premature death from stealing the lives of young Chinese from their calls of service, western-style physicians diluted the religious overtones, but retained the basic message. Members of the Chinese Medical Association formed a Council on Public Health (*weisheng zǔ* 衛生組) in the spring of 1928 to investigate how to increase the health knowledge of teaching personnel and systematize school health programs.

¹⁰¹ Zhang and Zhang, “19 Shiji houye 20 shiji qianye Zhongguo de xuexiao jiankang jiaoyu,” p. 169.

¹⁰² More work remains to be done about the integration of Chinese medical practitioners in new-style schools. Zhang and Zhang mention only one case in 1904 in which a Chinese medical practitioner served on the staff of a new-style school and looked after the health of the students. At the Jiangnan Shiye Xuetang (Jiangnan Business School), Wen Bingwen 溫秉文 provided Western medical expertise, while Duan Chunhui 段春輝 Chinese medical expertise. Unfortunately, Zhang and Zhang are recondite as to whether there were other instances in addition to the Jiangnan Shiye Xuetang, although one suspects there must have been as more and varied social groups and individual Chinese established school, particularly during the first two decades of the twentieth century. Ibid., p. 168.

¹⁰³ Modern *tǐyù* or physical culture, which was introduced into China in the late nineteenth century, was grounded in a language of analogic significance, and because it seemed to offer a clear-cut path by which Chinese elites could interject China into the international narrative of history and progress without necessarily capitulating moral or physical integrity, *tǐyù* offered a key for the transformation, in Morris’ words, “[of] the hoary Chinese imperium into a modern and fit nation-state.” Andrew D. Morris, *Marrow of the Nation: A History of Sport and Physical Culture in Republican China* (Berkeley: University of California Press, 2004), pp. 3, 63.

For the literate public, health-related literature was plentiful and varied, particularly from the late nineteenth and into the early twentieth centuries when Chinese social elite began taking a more prominent role in the selection and translation; the compilation and synthesis of health guides for the general public and students. Missionary presses in south China had dominated the market on Western medical tracts and popular health texts since the 1840s. Benjamin Hobson (1816-1873), a British surgeon who served as a medical missionary in China from 1839 to 1859, pioneered the translation of Western medical and scientific knowledge. Working with his two coauthors Guan Maocai and Chen Xiutang, Hobson produced four medical texts, which distilled those aspects of British medical science he esteemed most: *Outline of Anatomy and Physiology* (*Quanti xin lun*, 1850), *First Lines of the Practice of Surgery in the West* (*Xi yi luelun*, 1857), *Practice of Medicine and Materia Medica* (*Neike xinshuo*, 1858), *Treatise on Midwifery and Diseases of Children* (*Fuying xinshuo*, 1858).¹⁰⁴ By the 1860s, Chinese who as translators had worked alongside Protestant missionaries like John Fryer (British) and John Macgowan (American) were themselves at the behest of the Qing government and directing the dynasty's arsenals and new schools.¹⁰⁵

The era of self-strengthening that followed the successful defeat of the Taipings witnessed an energetic and wide-reaching commitment to restore order to the Qing Empire by selectively adopting and adapting elements of Western scientific and technological learning to China's needs. Although a fair amount of disparagement has been lavished upon late Qing arsenals and scientific translation projects, particularly in light of China's defeat in the Sino-Japanese War of 1895, such

¹⁰⁴ For further discussion of missionary publishing and its relationship to modern science in nineteenth century China, see Benjamin Elman, *On Their Own Terms: Science in China, 1550-1900* (Cambridge, MA: Harvard University Press, 2005), pp. 283-345. For a more detailed discussion of Hobson's works, which also included a book on Western science entitled *Bowu xinbian* (*Natural Philosophy and Natural History*, 1855), see Wong K. Chimin and Wu Lien-Teh, *History of Chinese Medicine* (Tianjin: Tianjin Press, 1932), pp. 220-23 and Ma Boying et al., *Zhongwai yixue wenhua jiaoliu shi* (Shanghai: Wen hui chubanshe, 1993), pp. 377-78.

¹⁰⁵ Elman notes that talented Chinese literati who had worked as translators on missionary translations projects for science and medicine were not the only ones seeking and gaining employment with the Qing government in the 1860s. In a curious reversal of strategy that echoed early Jesuit ambitions to gain access and influence with the imperial court, many leading Protestant missionaries, including Alexander Wylie and John Fryer, reoriented their work during the 1860s and 1870s to serve the reform ambitions of the Qing government. According to Elman, "They remained committed to the gospel of science in China because they also thought its success in the precincts of the Qing government would redound to Christianity." Elman, *On Their Own Terms*, p. 356.

criticism has often overlooked the crucial role played by those reforms in creating the foundation for Chinese industrialization and scientific development during the twentieth century.¹⁰⁶ When combined with an increasing number of mission schools in treaty port and inland cities, the regional matrix of arsenals, factories, and technical schools proved vital breeding grounds for the next generation of Chinese talent. As Benjamin Elman has explained, “A new group of artisans, technicians, and engineers emerged between 1865 and 1895 whose expertise no longer depended the fields of classical learning monopolized by the customary scholar-officials.”¹⁰⁷

Zhang Zhongmin has argued that a crucial shift in the authorship and tone of health-related books occurred after 1894.¹⁰⁸ Whereas prior to the 1880s, Protestant missionaries had exerted considerable influence on the shape and content of scientific and medical translation projects, by the end of the nineteenth century, Chinese authors—many of who had benefited educationally from study at Qing arsenals or Christian missionary schools—assumed a more prominent role in the translation and compilation of books on medical and scientific knowledge. Synthesizing the diverse, and sometimes divergent, health discourses emerging from Europe, United States, and Japan, Chinese authors like Ding Fubao, Zhou Jianren, Zhou Shang, and Zhu Youting were quick to highlight and explore the organic relationship linking the health an individual to that of a country/nation (*guojia* 國家) and or race (*zhongzu* 種族).

¹⁰⁶ Benjamin Elman has played an especially important role in the scholastic reassessment of development of Chinese science under the Qing. See his *On Their Own Terms*.

¹⁰⁷ Elman, *On Their Own Terms*, pp. 398-90.

¹⁰⁸ Zhang Zhongmin 張仲民, “Wan Qing chuban de shengli weisheng shuji ji qi duzhe” 晚清出版的生理衛生書籍及其讀者 [Books of physiology published in late Qing Dynasty and their readers], *Shilin* 史林 [Historical Review] 4 (2009): 20-36. Zhang’s focus is on the category of books labeled *shengli weisheng*, which in some literal if blunt fashion can be translated as “physiology health.” Given the semantic flexibility and verbal slippage characteristic of the time period, he could have also have added *jiankang*, or as Zhang Sumeng and Zhang Danhong have pointed out, *baojian* to his list. Although *weisheng* emerged as the definite arbiter of a modern socio-political relationship between the individual and the state, its various synonyms are worth keeping in mind, if only to identify the junctures at which divergences in meaning and practice may have taken place.

Although many of the Chinese works drew both inspiration and form from Western sources, by the turn of the century Japan quickly emerged as the leading, as well as mediating, nation for medical and scientific instruction.¹⁰⁹ Between 1900 and 1950, approximately 200 books on medical topics ranging from pediatrics to experimental surgery were translated from Japanese into Chinese.¹¹⁰ The bulk of these (sixty-four books between 1911 and 1937; thirty-five books between 1938-1950) appeared on the market as textbooks for middle schools and teacher's colleges after the formation of the Chinese republic in 1911. In addition to monographic works, Chinese translations of Japanese source materials on health, measurement, and the physical examination appeared in popular and specialist journals, and newspapers.

Much of the translated literature during the first two decades of the twentieth century reflected a deep anxiety about racial integrity and its impact upon the formation of the nation. Identifying the physically and mentally weak elements of society, it was argued, fortified the broader

¹⁰⁹ The influence of Japan upon the modern Chinese psyche has been profound. Chinese translations of Japanese texts reintroduced classical Chinese terminology with new and varied resonances into the Chinese vernacular. This linguistic remapping certainly occurred in medicine and the sciences, but it also operated in other socio-cultural, political-economic spheres of relations. See, for example, Wolfgang Lippert, "The Formation and Development of the Term 'Political Economy' in Japanese and Chinese," in *Mapping Meanings: The Field of New Learning in Late Qing China*, ed. Michael Lackner and Natasha Vittinghoff (Leiden: Brill, 204), pp. 119-28.

¹¹⁰ Tan Ruqian, ed., *Zhongguo yi Riben shu zonghe mulu* (Xianggang: Zhongwen daxue chubanshe, 1980), pp. 130-80. Based on my survey of the texts catalogued in the *Zhongguo yi Riben shu zonghe mulu*, the organizing categories are fairly straightforward. Books listed under "Yi yao" (醫藥, "medical sciences") pursued medical themes roughly according to disciplinary divisions (pediatrics, internal medicine, surgery, ophthalmology, etc), and although the editor was careful not to repeat selections under multiple headings (e.g., under both "medical sciences" and "education & physical education"), the content of some of the books suggest overlap. We see the vestige of overlap mostly clearly with books that claim to address *weisheng*, which in execution meant coverage of basic principles of human physiology and genetics as well as issues of education, physical education, and social customs. Thus, it is worth noting that the popularity of Japanese sources extended beyond the realm of medicine alone. During the same period (1900-1950), approximately 150 translations on topics concerning popular education (e.g., women's education, civic education, patriotism, and school governance) and physical education (*tiyu* 體育) also appeared in the market for the general readership. For an extended consideration of Japan's role in the transformation through differentiation of Chinese natural studies into modern science, see Elman, *On Their Own Terms*, pp. 396-421.

community and ensured the survival of a healthier, racially fit population.¹¹¹ Drawing on the work of the famed Japanese physician Yoshida Yukinobu (吉田章信, 1884-1956), Ge Yuncong wrote,

If a child's mind and body is healthy, he will certainly become the treasured darling of his family or his country. Conversely, [if he is unhealthy], he will be unable to endure the intense competition for survival of his later years (*buneng jingshou jianglai ben qianglie de shengcun jingzheng* 不能經受很強烈的生存競爭) or, even before reaching the prime of his life, be subject to persistent illness and die a premature death (*budao zhuangnian bian changchang huanbing er yaozhe* 不到壯年便常常患病而夭折).¹¹²

Premature death threatened the very foundation of the family and the nation, and with this idea in mind, Ge wrote, “a child's health constitutes a huge problem that cannot be ignored by either the family or the nation (*shi wei yijia yiguo zhi buneng husbi de zhongda wenti* 實為一家一國之不能忽視的重大問題).”¹¹³ These strains of eugenic, Social Darwinist ideas resonated within a Chinese society struggling to define itself and its place within the world. As the country's cultural foundations fissured under the pressure of social and intellectual critiques by May fourth thinkers, Chinese social elites grappled with a wide-range of issues—patriarchy, the “traditional” family, “romantic love,” and the value of labor, to name only a few—in their quest to explain China's apparent fall from grace and prevent its imminent disintegration. Health education with its strong emphasis upon disease prevention and reforming everyday behavior so as to inculcate healthy habits provided the ideal vehicle for identifying individual and collective health deficiencies. Moreover, its focus upon the child transformed the latter into one of the contested sites of modernity.

It was within this matrix of competing anxieties that we find growing attention in the health education literature allotted to the physical examination as the quintessential test for identifying

¹¹¹ For a more detailed consideration of the role of eugenics in the development of nutritional science in China, see chapter four of this dissertation.

¹¹² Ge Yuncong 葛雲從, *Ertong jiankang zhinan* 兒童健康指南 [A guide to children's health] (Shanghai: Shengsheng muchang, 1935), p. 1, which appears to be a translation of Yoshida's 1932 monograph, *Jidou taiiku undon eisei* 兒童体育運動衛生 [*Children's physical hygiene*] (Tokyo: Doubun shuyin, 1932).

¹¹³ Ge Yuncong 葛雲從, *Ertong jiankang zhinan* 兒童健康指南 [A guide to children's health] (Shanghai: Shengsheng muchang, 1935), p. 2.

society's weaknesses and deficiencies. Although the physical examination could be used as direct means for confronting the idiosyncrasies of an individual child's state of health, in general the physical examination was touted for its ability to enable the examiner to glean vital information about the broader community and the country as a whole through the body of the individual child. The kind of information available for discernment and analysis, however, differed in degree.

In 1914, a translation by Zhang Jiehough of Taixing appeared in *Zhongxi Yixue Bao* (*Journal of Chinese and Western Medicine*).¹¹⁴ Entitled “Key points to pay attention to when making a physical examination of a no-good youth,” Zhang’s Chinese translation defined a “no-good youth” (*buliang shaonian* 不良少年) as someone whose mind (*jingshen* 精神) was abnormal (*yichang* 異常) and degenerate (*bianzhi* 變質). Whether on account of obstructed mental development (*jingshen fayu zhi zhang’ai* 精神發育之障礙) or a premature bout of disease, the cumulative result was degeneracy—a hardly desirable quality, but one that nonetheless rendered itself transparent, and therefore correctible, through the body’s topography. Perhaps echoing an older tradition in which physical deformity represented overt signs of a correspondingly depraved nature, degeneracy was characterized by physical asymmetry (humped back, dove chest, extra digits on the hands and feet, etc.) and persistent maladies like anemia (*pinxue zheng*). Boy or girl, a “no-good youth” tended to have a sallow complexion and move as if caught in lethargy. But the fundamental issue, Zhang suggested, consisted of impeded, obstructed, and abnormal physical growth and development, and in this respect, the most important details to observe when examining a “no-good youth” involved specific measurements, particularly craniometric. Zhang listed thirteen distinct measurements one required of the head, including the circumference of the cranium; the length of the frontal bone from ear to ear; the diameter of the ear hole; and the length from the base of the nose, along the center of the parietal

¹¹⁴ Zhang Jiehough 張介候, “Buliang shaonian tige jiancha shang zhi zhuyidian” 不良少年體格檢查上之注意點 [Key points to pay attention to when making a physical examination of a no-good youth], *Zhongxi yixue bao* 中西醫學報 [*Journal of Chinese and Western Medicine*] 4.9 (April 1914): 1-5.

bone, to the base of the skull. In addition, he included average figures (one set for boys; another for girls) as references for the enterprising examiner.¹¹⁵

Physical Examination and the Making of the Citizen-subject

Zhang's somewhat tortured attention for all the various craniometric measurements one ought to take to understand the full nature of the "no-good youth's" degeneracy stood on the outskirts of standardized physical examination promoted by the Nationalist government. As part of its broader initiative to introduce a modern public health system, the Ministries of Education (Jiaoyu bu 教育部) and Health (Weisheng bu 衛生部) of the Nationalist government jointly formed the Committee on School Health (Xuexiao weisheng weiyuanhui) in February 1929, which sought to define and delegate administrative responsibilities between the two agencies.¹¹⁶ The Ministry of Education assumed responsibility for designing the objectives in matters of life guidance (*shenghuo zhidao* 生活指導), while the Ministry of Health preoccupied itself with the treatment of disease (*jibing zhenzhi* 疾病診治). In May 1929, the Ministry of Education forwarded a directive, "Plan for implementing school health" ("Xuexiao weisheng shishi fang'an" 學校衛生實施方案), by the Ministry of Health to provincial and municipal schools for administrative action.

Five months later, the Ministry of Education directed all schools to adopt the Ministry of Health's "Plan for implementing health education" ("Weisheng jiaoyu shishi fang'an" 衛生教育實施方案). The Ministry of Health's proposal included measures to promote health awareness and

¹¹⁵ Ibid., pp. 2-3.

¹¹⁶ The Ministry of Health was inaugurated on 30 October 1928 with the expressed purpose of improving the health administration of the country. Ka-che Yip has argued that from its inception, the Ministry of Health as an administrative organ of the Nationalist government explicitly claimed modern "scientific medicine" as a public function of the state. Health planning represented one of the main goals of national reconstruction. See Ka-che Yip, *Health and National Reconstruction in Nationalist China: The Development of Modern Health Services, 1928-1937* (Ann Arbor: Association for Asian Studies, 1995), pp. 26-43. Administrative streamlining in 1931 shifted the formal and independent status of the Ministry of Health to one of semiautonomous service within the Ministry of the Interior. The new agency was called the National Health Administration (*Weisheng shu*), which retained much of its former Ministry of Health staff.

comprehension among school administrative and teaching staff; investigate the present health conditions of classrooms, school playgrounds, dormitories, furniture, light exposures, etc.; initiate regular physical examinations; standardize protocols for combating infectious diseases; and activate plans for correcting health deficiencies (*quexian jiaozheng* 缺陷矯正) and instill positive health habits among the student population. In addition, the Ministry of Health recommended that each school create a post of health education officer (*weisheng jiaoyu zhuananyuan* 衛生教育專員) to coordinate activities and reporting between the school and local health organizations.¹¹⁷

In November 1929, the Ministries jointly promulgated the “Regulations for Student Health Examination in School” (“*Xuexiao xuesheng jiankang jiancha guize*” 學校學生健康檢查規則), which stipulated the regular institution of physical examinations at the beginning of each academic year, the forms of medical supervision required to conduct said examinations, and the methods for reporting the examination findings to the appropriate government agencies.¹¹⁸ How the Nationalist government envisioned the physical examination can be discerned from the specific definitions found in the promulgation itself and the points of interest codified on the standardized examination report form, which accompanied the directive. Zhang Jiehous’s litany of craniometric measurements were likely to have been impractical and even useless for wide-scale implementation in schools, but though the techniques differed, the main objective of identifying those with physical ailments, deformities, and deficiencies echoed Zhang’s concern about the “no-good youth.” The primary result garnered from the examination was encapsulated by the law’s differentiation between four possible outcomes: the student was free of any deformity or disease (*wu jixing huo jibing* 無畸形或疾病); the student suffered from a mild case of deformity or disease (*jiqing jixing huo jibing* 極輕畸形或疾病);

¹¹⁷ Jiaoyu bu, “*Xuexiao weisheng shishi fang’an*,” *Jiaoyu bu gongbao* 1.6 (1929): 87-111; and Jiaoyu bu, “*Weisheng jiaoyu shishi fang’an*,” *Jiaoyu bu gongbao* 1.11 (1929): 102-9. See also Zhang Sumeng and Zhang Danhong, “20 shiji qianye woguo weisheng (jiankang) jiaoyu jigou fazhan gaikuang,” *Zhonghua yishi xazhi* [*Chinese Journal of Medical History*] 31.4 (October 2001): 242-46.

¹¹⁸ “*Xuexiao xuesheng jiankang jiancha guize*” 學校學生健康檢查規則 (November 1929), SMA Q235-1-333

the student's state of deformity or disease could be remedied and thus was not especially serious (*jixing buo jibing zhi yin jiaozhi dan bu shifen jiyao zhe* 畸形或疾病之應矯治但不十分急要者); and the student's state of deformity or disease was so serious as to warrant immediate attention and correction (*zhongyao jixing buo jibing ying liji jiaozhi zhe* 重要畸形或疾病應立即矯治者).¹¹⁹

Anxiety over deformity and disease required sustained and regulated vigilance. Height and weight; vision and hearing tests, including color blindness; dental inspections and chest examinations—all played a constituent role in the elaboration of the physical examination, but their power for revelation depended upon the consistent and repeated submission of the students to regular physicals, hence the emphasis upon yearly examinations. In addition to timely repetition, the physical examination needed precise parameters of execution so ensure some modicum of consistency. The “Regulations for Student Health Examination in School” defined how examiners should identify and measure student bodies. Age proved a delicate matter, largely because there remained a degree of confusion about a student's real age as opposed to his reported age. “When conducting the examination, if the real age [of the student] is unclear, then [the examiner] can fill in the reported age for the time. After the examination has been completed, [the examiner] can calculate the real age or use the appended table to fix the real age and month.” Weight had to be calculated in kilos, and students must have shed their outer clothing including hats and shoes so as to be weighed standing in their undergarments. The rules set the meter as the unit of measurement for height and dictated that the student—upright, tall, and without shoes—should stand with his shoulders against the wall. Height was measured from the crown of the head to the base of the feet. Measured chest girth required a level of delicacy, particularly if the student in question was female and near puberty. Although the “Regulations for Student Health Examination in School” did not mandate a separation of the sexes or the presence of a female examiner for female students, it did suggest that the

¹¹⁹ Ibid., pp. 5-6, SMA Q235-1-333.

examiner place the measuring tape at the level of the fourth rib to determine the female student's chest girth.¹²⁰

Biometric Data

Ideally, the accumulation of biometric data furnished local school officials and teachers with objective measures by which to craft and target their health work of amelioration, but the historical records fails to show either the extent or the efficacy of any such attempt. The 1929 promulgation of the "Regulations for Student Health Examination in School" included stipulations about how examination results were to be presented to parents alongside a description of the corrective measures to be undertaken by the school for the sake of the student's health.¹²¹ But one suspects that for reasons of personnel, funding, and indeed special training, most local schools lacked the necessary resources to conduct remedial or corrective campaigns to address the health problems revealed through physical examination. In April 1936, the Central Field Health Station (Zhongyang weisheng zhan) and the National Health Administration (Weisheng shu) jointly convened a National School Health Conference. The conference brought together thirty-one field workers in school health, representing fourteen localities and over twenty health educational organizations throughout the country, as well as representatives from both the Central Field Health Station and the National Health Administration. Together they crafted four sets of standards guiding the creation of a school health service for urban primary schools; for rural primary schools; for secondary schools; and for universities.¹²² In addition, the conference attendees agreed upon five immediate objectives of school health work:

- 1) To train children in the proper habits regarding nutrition, exercise, rest, and sleep;
- 2) To eradicate smallpox;
- 3) To reduce to a minimum the incidence of common skin diseases;

¹²⁰ Ibid., p. 7, SMA Q235-1-333.

¹²¹ "Xuexiao xuesheng jiankang jiancha guize," p. 4, SMA Q235-1-333.

¹²² "Quanguo jingji weiyuanhui Zhongyang weisheng zhan 1933-1936 weisheng gongzuo baogao" 全國經濟委員會中央衛生站1933-1936衛生工作報告, NJ 44-2303.

- 4) To carry out proper measures for the prevention and treatment of trachoma in so far as is practical and economically possible; and
- 5) To train teachers in health education for primary and secondary schools.¹²³

The following month witnessed the adoption by senior civil and education administrators of a plan by the Central Field Health Station to create a nation-wide school health service in which the Station offered either personnel or financial assistance to various local school health services in provinces and municipalities throughout China. By yearend, the National School Health Program for Urban Primary Schools covered a student population of 250,334 students in 712 schools in the provinces of Anhui, Zhejiang, Fujian, Henan, Hunan, Hebei, Gansu, Jiangxi, Ningxia, Shanxi, and Qinghai, as well as in the municipalities of Beiping and Shanghai. The active personnel for this nation-wide service consisted of 38 physicians, 67 nurses, and eight assistants.¹²⁴ Compared with the scope of operations for the school health service in Nanjing alone, which consisted of twelve physicians, 25 nurses, and five assistants serving 181 schools with a student population of 67,797, one cannot help but suspect that the national service suffered under considerable strain as the limited number of personnel faced the additional challenges of distance to their already complex work.¹²⁵

Thus, the implementation of regular physical examinations served at least two purposes for the Nationalist government other than the direct amelioration of health “deficiencies.” As previously demonstrated by the handful of missionary and Chinese physicians who had relied upon the systematic examination of child and student bodies to generate biometric data about the quality of life and physical being in different parts of China, integrating and standardizing the physical examination as a fundamental part of school life enabled school administrators, teachers, and by extension local and national officials to “scientifically” evaluate the student body. Whether for the purpose of producing scientific knowledge or demonstrating the scope of modern governance—the

¹²³ “Annual Report of the Central Field Health Station for the Year Ending 31 December 1936,” p. 31, NJ 44-2303.

¹²⁴ “Annual Report of the Central Field Health Station for the Year Ending 31 December 1936,” p. 32, NJ 44-2303.

¹²⁵ *Ibid.*, p. 32, NJ 44-2303.

case of the Shanghai Municipal Health Bureau's height-weight study of 9,426 students in 1932, which opened this chapter, can be understood in either light—the physical examination stood as one of the foundational pillars of the Nationalist campaign to forge a modern, healthy nation. As J. Heng Liu, the Director of the National Health Administration proudly reported about the collection of the measurements and health records of school children from various provinces of the country,

By the end of 1936 a total of 80,000 records had been received and analyzed by means of the newly-installed Electric Tabulating Machine. The results of this nation-wide statistical study on the height and weight of school children will be published sometime in 1937.¹²⁶

As a means for generating biometric data, the physical examination satisfied the exhibitionist impulse of a state needing to prove its legitimacy. The upward-flowing paper trail of charts and tables from local, regional, and provincial schools revealed isolated moments in the progression of student health for the country's student population. At times, listing the age, the number examined of each sex, the average height, and the average weight sufficed. Alternately, tables organized around the qualitative categories of supreme (*chao* 超), excellent (*you* 優), normal (*zhong* 中), passing (*ke* 可), and poor (*lie* 劣) health or a precise delineation of the original examination categories (e.g., height, weight, chest girth, vision, hearing, trachoma, dental caries, malnutrition, anemia, etc.) emerged as documentary evidence of the sustained scholastic and governmental interest in the physical wellbeing of student bodies. The archival evidence of school health charts and tables—sometimes so specific as to list students by name, age, and parental occupation—suggest an earnest if haphazard attempt to institutionalize health in discrete, quantifiable units. For example, we learn that according to a 4 November 1938 report from the local administrators at the Xining Normal School for Mongolian and Tibetan affairs in Qinghai province (Qinghai shengli Xining mengzang jianyi shifan xuexiao 青海省立西寧蒙藏簡易師範學校), out of 261 students ages twelve through twenty-three, nine were found with deficiencies of the following type: lung disease (*fei bing* 肺病), anemia (*pinxuebing* 貧血病),

¹²⁶ Ibid., p. 2, NJ 44-2303. Unfortunately, I was unable to identify more details about the “electric tabulating machine.”

leg disease (*tui bing* 腿病), trachoma (*shayan* 沙眼), repeat illness (*fu bing* 複病), ear disease (*er bing* 耳病), or back distress (*beibing* 背病).¹²⁷ In contrast, of the 4,392 students examined in Huangyuan country, Qinghai province nearly a decade later, the 185 found to be without deficiencies (*wu quedian* 無缺點) stood in the shadow of the thousands plagued by trachoma (916 in the city; 2340 in the countryside), skin disease (*pifubing* 皮膚病; 612; 1100), tonsillitis (*biantaoxian* 扁桃腺; 234; 765), and poor nutrition (215; 623).¹²⁸

Embodied Practice

In addition to furnishing biometric data, the physical examination was itself a form of pedagogy. Its importance to the formation of the model citizen derived from the performative aspects of the examination in which both the examiner and the examinee—but especially the examinee—learned the composition of the modern, healthy body. The thought that a child or student being examined nonetheless participates within the active construction of the modern, healthy body may seem counterintuitive, but the very points of interest, which constituted the physical examination—the varieties of measurement, and the visual and tangible inspection—also directed the child or student towards the proper foundation of health.

The Chinese educator Zhou Shang characterized health as the primary criterion of being a good citizen, but positive health required the inculcation of good health habits (*weisheng xiguan* 衛生習慣) and a strong health consciousness (*weisheng* or *jiankang yishi* 生健康意識).¹²⁹ Health instructional materials in the form of books, periodicals, and pamphlets; classroom posters and charts; postcards; plasticine models; radio health talks; and lantern-slides and moving pictures were all

¹²⁷ NJ 5-15065. Reports of the results of school physical examinations were sent to the Ministry of Education, and the preserved record shows a wide-geographic range of origin. Schools in Sichuan, Qingdao, Qinghai, Gansu, Hebei, Sha'an xi, Hunan as well the major municipalities of Shanghai, Hankou, and Nanjing all sent reports of local examinations, even during periods of Japanese occupation.

¹²⁸ NJ 5-15062.

¹²⁹ Zhou Shang 周尚, *Ertong baojian yu jiaoshi* 兒童保健與教師 [Teachers and child health] (Shanghai: Shangwu yin shuguan, 1939).

employed for the purposes of instilling and developing a sense of good health among students. The Council on Health Education had pioneered the creation of such materials during the 1920s for a Chinese audience by insisting that all materials be in the Chinese language.¹³⁰ During the 1930s, the Central Field Health Station played a prominent role in the production and distribution of these health educational materials. Between 1931 and 1936, the Station distributed 1,275,000 books and pamphlets to local school and health organizations throughout the country.¹³¹

These sorts of pedagogic tools—the books, the pamphlets, and the posters—represented the mainstay of Chinese health education, and while certainly important, they were, critics argued, also constrained by their subsumption to the predominant textual tradition of *jiao* (教). Ni Xiying contended,

For most schools, they consider their responsibility for the children only in terms of instruction (*jiao* 教) such that even if schools possess hygienic facilities (*weisheng de shebei* 衛生的設備), they only hide behind the pretext of new learning (*ti xin jiaoyu zhuangzhuang huangzi eryl* 替新教育裝裝幌子而已). Because teachers still conform to the traditional notion of “teaching” (*jiaoshu* 教書) and stuff children’s heads with dead knowledge (*si zhishi* 死知識), the best student for most teachers remains the student strong in character and scholarship (*pinxue jianyou* 品學兼優) or like a “learned gentleman” (*wenzhi binbin* 文質彬彬).¹³²

¹³⁰ W. W. Peter was adamant that health educational materials be straightforward and as jargon-free as possible. He rejected the use of technical medical terms in preference for simple, comprehensible Chinese, and he insisted that “native writers” be used rather than foreigners with Chinese language skills. Peter argued, “Some foreigners think they can write Chinese acceptably, or having a sufficient command of the spoken language, they attempt the literary language with a mediocre writer. All such contributions which we have received have had to pass through the minds of experienced writers in order to secure smoothness, accuracy, and general acceptability.” *Broadcasting Health in China: The Field and Methods of Public Health Work in the Missionary Enterprise* (Shanghai: Presbyterian Mission Press, 1926), p. 15.

¹³¹ In conjunction with the Nationalist government’s decree that August 1935 through July 1936 be recognized as National Child Welfare Year, a slew of child health-oriented materials accompanied the increased number of public festivities mounted by local governments and health agencies to promote awareness of child health. The topics covered shifted somewhat from year to year, but it is worth noting that between 1935 and 1936, the most popular topics distributed included books on “lectures on health education” and “health tales;” pamphlets on “health and economy,” “care of infants,” “communicable diseases;” postcards on “health habits;” posters on “fly extermination,” malaria, diphtheria, hookworm, “harm of foot binding,” and “care of mothers and infants.” “Annual Report of the Central Field Health Station for the Year Ending 31 December 1936,” p. 34, NJ 44-2303.

¹³² Ni Xiying 倪錫英, “Jinri zhi ertong shengli weisheng shishi” 今日之兒童生理衛生實施 [A health plan for today’s children], in *Jinri zhi ertong* 今日之兒童 [*Today’s child*] (Shanghai: Shenghuo shudian, 1936), p. 198.

What good, Ni Xiying queried, was achieved if learning about health and physical wellness resulted in dead knowledge neatly captured in the student's mind but not practiced through the body? The child constituted by such stilted pedagogy was sure to be refined and cultured (*siwen* 斯文) but also weak (*shuairuo* 衰弱). Ni reproved, "Today, most school curricula include health education (*weisheng jiaoyu* 衛生教育), but in name only. One need not scruple to say that in reality [i.e., in practice] there is no health education."¹³³

The main difficulty confronting an effective implementation and integration of health education involved translation and habituation, i.e., the process by which book learning assumed the shape of everyday practice and habit. Ni's main criticism of health education as book knowledge lay not in its veracity or thoroughness of presentation, but in its failure to consider the question of physicality and the necessarily embodied state that health knowledge ought to assume. Zhou Shang characterized this failure of recognition as a deception and a kind of betrayal of the teacher's duty. How different was it from a violin teacher (*jiao fan yaling jiaoshi* 教梵啞鈴教師) withholding instruction of the instrument's unique structure or the principles behind tuning the violin?¹³⁴

At its most basic level, the critique levied by the likes of Ni Xiying and Zhou Shang concerned the scholastic importance of doing (action) and experience in modern education, and in this respect, the physical examination represented the vital link between health education in name alone and health education embodied. From the perspective of the would-be examiner—generally a physician, but, in the opinion of health education proponents, just as likely a teacher—the physical examination cultivated the examiner's observational skills (*guanchali* 觀察力). Instead of relying upon other people's abstractions, the examiner refined his powers of perception and observation and directly engaged with the health of the child. For the child, the physical examination reproduced the ideal relationship one ought to have with one's body. Having been weighed and measured, indeed

¹³³ Ibid.

¹³⁴ Zhou Shang 周尚, *Ertong baojian yu jiaoshi* 兒童保健與教師 (Shanghai: Shangwu, 1939), p. 4.

poked and prodded, the child gradually became aware of the proportions of his physical being—his physical aptitude, his carriage and bearing, his propensity for disease, etc. Moreover, the child acquired conceptual units by which to evaluate the pattern of his growth and development, and in turn, assess those around him. If health was, as Zhou Shang claimed, a criterion of the model citizen, then civic duty lay both in the inculcation of health habits in children and the mutual reinforcement of such habits through a heightened sense of observation and inspection.

Consider, for example, how Zhou Shang explained the function of the physical examination through an analogy of common habits.

In practice, we like to appraise (*guliang* 估量) people's general physique (*yiban tige qingxing* 一般體格情形), particularly, when meeting a person for the first time—for example, reflecting upon the person's age, whether he's tall or short, nimble or slow, or strong or weak. [We wonder about] whether he looks well or poorly nourished, if his skin looks healthy or bears the tinge of illness. Whether or not a person has received specific training [in making a physical examination], this kind of common assessment is basically the same in all cases.¹³⁵

Rather than positing an ontological difference between these activities, Zhou aligned the physical examination along a spectrum that began with the everyday tendency to “look a person up and down.” Measuring height and weight were simply extensions of the natural inclination that dealt in qualitative terms: tall, short, heavy-set, thin, robust, frail, etc. The one crucial difference that existed between these acts of perception—the everyday and the scientific—rested upon the identity of the teacher as a teacher. Zhou explained, “But when a teacher makes a judgment about a student, there should be acuity, because a child who is unhealthy or who has stopped growing will need a teacher to devise a plan for fixing the problem—this is something a teacher should keep in mind.”¹³⁶

Zhou's insistence that the physical examination, though necessarily precise in ways unattainable for the rough visual overhaul we practice on an everyday basis, nonetheless operated alongside our more common impulses of curiosity and comparison set the stage for his next claim, which came in the form of an unattributed quote: “If you go and measure a child's height, then you'll

¹³⁵ Zhou Shang, *Ertong baojian yu jiaoshi*, p. 7.

¹³⁶ Ibid.

easily become the child's lifelong friend (*Jiashi ni qu celiang yige ertong de gaodu, na ni hen rongyi chengle ta de zhongshende pengyou* 假使你去測量一個兒童的高度，那你很容易成了他的終身的朋友).¹³⁷ The reasoning behind his assertion of devotion and platonic tenderness lay in the ways that the physical examination promoted the formation of relationship bonds between the examiner and examinee, the teacher and the child. “[By taking the child’s height,” Zhou emphasized, “you have expressed interest in the child’s body and in this way begun to pave the road by which to care for the child’s body and ensure the child’s good health. But more importantly, [by taking his height], you have stoked the flames of his own interest in the mechanics of his own body.”¹³⁸ This sense of assurance gained from the teacher’s interest became the bedrock of improved health and, even increased weight and height. “Although a child may discern that his weight cannot rival that of another child of the same age,” Zhou argued, “he will nonetheless continue to think he is growing (*fa yu*) [i.e., because the act of measurement implies there is something worth measuring] and [by this thinking] will increase and improve his height and weight.”¹³⁹

By emphasizing the intimate and social qualities of physical examination, Zhou sought to denude the examination of its foreign connotations. Measuring height and weight; poking and prodding the contours of the child’s body to check posture, skin condition, and overall nutrition; testing vision and hearing; and examining teeth—all these maneuvers finessed an exacting truth of one’s real state of health, and although one would be hard pressed to locate temporal or cultural antecedents, the physical examination was best understood for its elaboration of common, basic tendencies that every Chinese person understood and recognized.

¹³⁷ Ibid., p. 8.

¹³⁸ Zhou Shang, *Ertong baojian yu jiaoshi*, p. 8.

¹³⁹ Ibid.

Conclusion

A comparison of the process of “examining the body” in Chinese and Western medical systems lends itself to a study of contrasts. The intellectual foundation of classical Chinese medicine was grounded in theories of cosmic harmony that posited a unity of microcosm and macrocosm. Emphasis was placed upon achieving harmony and balance, be it within the individual human body or society more generally. When faced with signs of distress or disorder, the Chinese physicians relied upon the four methods of diagnosis (*sizhen* 四診) to sort through and determine a pattern of coherency from the multiplicity of signs emitted from the child patient. From the many and diffuse types of illness manifestation, the astute and skilled physician ordered and assessed the signs by degrees of importance and in this way transformed the bodily signs into a specific syndrome (*zheng* 證).¹⁴⁰ To accomplish such a task, the attending physician had to cultivate his clinical sensitivities to develop a high-degree of discernment. Although in theory, the four examinations were the same regardless of patient, in practice, the composition of specific techniques varied according to certain broad outlines. Children and pregnant women, in particular, could be especially difficult subjects to diagnosis. The adjustments recommended for examining an infant or child—inspecting haptic signs in the forefinger, discriminating facial hues, discerning differences of cries—indicate a broader perception of the infant or child under the age of six as yet unformed and subject to ongoing physical and physiological transformation. Most importantly, there is no differentiation between the likely disease and the child performed by the four examinations. As inchoate and unstable as the child’s body was, the physician’s duty lay not in disregarding the embodied states of distress made manifest through high-pitched screams or rainbow hues throughout the face, but rather in interpreting and assigning each sign its proper place within the deeper order of organ systems.

¹⁴⁰ The skills needed to transform signs to syndrome, for which the four examinations (*sizhen*) are vital, remains the bedrock of contemporary clinical practice in Chinese medicine. As Judith Farquhar as observed, “The four examinations are heavily emphasized in textbooks and in clinic teaching. This is partly because the process by which diffuse signs (*zheng* 征) are transformed into medically significant and organizable symptoms (*zheng* 症) is considered to be basic medical perception and action. The four examinations, taught in classrooms as a protocol but practiced more like a checklist, should constrain the doctor to remain alert to every evidence that could influence his perception of an actionable pattern.” Farquhar, *Knowing Practice*, p. 63.

In contrast, the physical examination that arose within the western medical tradition from the mid-nineteenth century onward produced a rather different conception of examining physician and examined patient. Clinical sensitivities continued to play a critical role in the physician's diagnostic prowess, but in material terms, the modern physical examination ushered forth a more mediated deployment of one's sensory organs. Listening was amplified by the introduction of the stethoscope. Seeing was not only magnified by the microscope, it was also reoriented towards a world of minutia utterly unavailable to the naked eye. Touching continued in the form of percussion, but it also assumed alternate forms as the body itself became abstracted into analytic units amenable to measurement.

The modern physical examination paved a more direct path from the physician to the disease itself. The patient undergoing examination became in many respects the receptacle or carrier of disease. This shift from a physiological to an ontological understanding of disease has meant that in general the patient's biochemistry and physiology superseded in importance his feelings and thus ensured a kind of alienation of the patient's own experience. But what was lost in terms of interpersonal relations and cognition of the social matrices of medicine has nonetheless generated increasing technical sophistication in biomedical understanding of disease. Moreover, the abstraction of individual experience for conceptual markers of bodiness (e.g., height, weight, blood pressure, cholesterol levels, etc.) yielded easily to statistical analyses whose significance could be transplanted into other spheres of human relations. Particularly once medical attention moved from the complexities of disease to the parameters of health, the modern physical examination represented the most practical method for classifying and assessing a population of bodies whose real importance lay not in its individuated state but rather as a manifestation of the nation.

Writing under the nom de plum of Gu Cheng 顧誠 (lit. "Ernest concern"), one Chinese commentator characterized the problem as follows:

The child health problem is the basis of all other problems concerning children. If this problem [i.e., child health] is not resolved, any other problem can hardly be broached. How, may I ask, can we look to children who are weak (*shuairuo* 衰弱)

and developmentally incomplete (*fayu bu jianquan* 發育不健全) to shoulder the responsibility of national reconstruction (*fuxing minzu* 復興民族)?¹⁴¹

The purpose of the physical examination was not simply the diagnosis of disease; it was the excavation of specific states of being: weakness, frailty, physical immaturity, or feebleness. Gu Cheng's admonition resonated with the main aims espoused by the health education movement. Health, of which nutrition served as one of its primary pillars, required individual and collective action to achieve proper form and dimension, because its primary significance rested not within any single person, but within the nation. As a barometer for assessing the degree to which the Chinese could free themselves from their identity as the "Sick Man of Asia," the modern physical examination translated the discordance of individual traits into a national language of social, economic, and political uplift.

¹⁴¹ Gu Cheng 顧誠, "Zhenyang zengjin ertong de jiankang" 怎樣增進兒童的健康 [How to promote child health], *Jiating xingqi* 家庭星期 [*Family Weekly*] 2.7 (1935).

Chapter 3: Local Opportunities: Institution-building from Shanghai to the Southwest, 1932-1950

Introduction

The purpose of this chapter will be to parse out the major themes motivating Chinese nutritional research and then situate it within the larger international context in order to better appreciate how the formation of a modern Chinese biomedical corps and practice negotiated its relationship with international science. The development of scientific research institutes in China provided great opportunities for young Chinese intellectuals to pursue careers in advanced research. Moreover, the creation of institutional spaces that integrated clinical with experimental laboratory objectives enabled Chinese biomedical researchers to initiate research that could be appreciated, evaluated, and critiqued within domestic and international spheres.¹ The history of Chinese nutritional science is not a history dominated by individuals and their “discoveries.” And to understand how the discipline emerged and the kinds of professional stakes deemed important to Chinese nutritional researchers—sometimes in contradistinction to their international, Western colleagues—we need begin by considering the institutional structures facilitating the definition and execution of nutritional work. Thus, in the first part of this chapter, I will consider the international public health context in which the Shanghai based Henry Lester Institute of Medical Research emerged and how its nutritional researchers shaped scientific nutritional discourse in China during the 1930s.

Embedded as they were within a larger, multinational network of organizational interests, Chinese nutritional scientists had to nonetheless balance dual commitments to universal science—often represented by new, internationally-oriented, institutional forces like the League of Nations Health Organization—and the Chinese nation. Biomedical nutritional research developed

¹ For an overview of the institutional landscape of scientific organizations during the 1920s and 1930s, see chapter one.

institutionally in Republican China by directly grappling with the specific dimensions of locality. Although one can decry biomedical nutrition as one of many imperialist projects invested in cooption of indigenous production of knowledge, such generalizations fail to appreciate the complexities of interactions shaping scientific transactions. Chinese nutrition scientists possessed a strong inclination to articulate biomedical nutrition in terms they deemed fitting to the realities of Chinese everyday life. The brokering of this new scientific language with its attendant reconceptualizations and redefinitions of existing social and cultural understandings of food and health could not succeed as plain mimicry, and from the beginning, there was a strong inclination and expectation that biomedical nutrition reflect the needs and concerns of local communities. Rather than broach the institutional development of biomedical nutrition as an imperial science, we would be better served clarifying how Chinese nutrition scientists and the institutions sponsoring their work sought to localize and differentiate themselves and their work within the internationalist framework. How they articulated intellectual and analytical differences with their international counterparts played a critical role in the formation of a nationally-inflected professional identity for Chinese nutritional scientists.

From the 1940s onwards, economic and political exigencies reconfigured the health priorities of nutritional scientists. Research at the Henry Lester Institute of Medical Research was severely compromised after 1941 when the Japanese assumed direct authority of Shanghai's foreign concessions, and the institute's former prominence in setting the academic tone and tenor of the national nutrition debate subsided. Chinese nutritional researchers who had relocated inland after the Japanese invasion in 1937 found themselves struggling to continue their scientific work without proper funding or resources, and yet, they managed. By resituating their work directly within the institutional structures available to them, like children's homes organized by National Chinese Women's Association for War Relief (Zhongguo Funü Weilao Ziwei Kangzhan Jiangshi Zonghui 中國婦女慰勞自衛抗戰將士總會), inland Chinese nutrition scientists advanced a national nutrition

discourse grounded in the question of minimums rather than optimality.² The forces of localization proved even more compelling as the nature of the research—the resources on disposal and methodologies employed—shifted to reflect a nation at war.

International Public Health and the Window to Global Science

Throughout the 1920s and 1930s, international organizations like the League of Nations Health Organization (henceforth “LN Health Organization”) began playing a critical role in pressing for and developing nutritional standards. Exigencies associated with World War I and the global Depression had precipitated the formation of international health and welfare organizations operating with permanent staffs, and as Paul Weindling has observed, the primary focus of such organizations was directed towards preventing the spread of epidemic disease through cooperative implementation of international quarantines.³ The Pan-American Sanitary Bureau created in 1902 and located in Washington DC was “concerned in maintaining and improving the health of all the people of these 21 American republics and also in preventing the occurrence and spread of transmissible diseases in international commerce, particularly the international commerce of the republics concerned.”⁴ The Office International d’Hygiène Publique (OIHP) founded on 9 December 1907 in

² I will discuss the contours of a Chinese discourse of nutritional standards in more detail in the following chapter, “Nutrition for a Chinese Body.” For a detailed account of the formation of children’s homes and the emergence of a discourse of the war orphan, please see M. Collette Plum, “Unlikely Heirs: War Orphans During the Sino-Japanese War, 1937-45” (Ph.D. dissertation, Stanford University, 2006), pp. 61-83.

³ Early twentieth century intergovernmental organizations and international non-governmental organizations like the League of Nations represented a distinct step towards the construction of a global community, which Akira Iriye has argued “would arise only if nations and their people recognized that some issues affected them equally and that to cope with them, institutions had to be created to establish common rules and to protect their shared interests.” He takes efforts during the nineteenth century “to standardize weights and measures, to adopt uniform postal and telegraphic rates, and to cope with the danger of communicable diseases” that culminated in the formation of the Universal Postal Union, the International Telegraph Union, and the International Sanitary Council as the earliest intergovernmental organizations presaging the emergence of a global community. Akira Iriye, *Global Community: The Role of International Organizations in the Making of the Contemporary World* (Berkeley: University of California Press, 2002), p. 10.

⁴ Bolivar J. Lloyd, “The Pan American Sanitary Bureau,” *American Journal of Public Health* and *The Nation’s Health* 12.9 (September 1930): 925. Originally named the Inter-American Sanitary Bureau, the Bureau changed its name to the Pan-American Sanitary Bureau in 1923. According to Martin David Dublin, the Bureau was “little more than a paper organization until after the First World War.” *International Health Organizations and Movements, 1918-1939*, ed. Paul Weindling (Cambridge: Cambridge University Press, 1995), fn. 5. A general description of

Paris was the first globally-oriented health organization.⁵ It coordinated the administration of international conventions for 23 European member States, facilitated the gathering of epidemiological intelligence, and disseminated information of general public health importance to member States.⁶ Initially, the principal focus was on cholera, plague, and yellow fever.

While the Office International d'Hygiène Publique and LN Health Organization overlapped in many functions, the LN Health Organization endeavored to carve a distinctive role for itself in contradistinction to its immediate predecessors. The LN Health Organization had originally been established in 1922 to combat epidemics in Eastern Europe.⁷ During the early years of its operations, the LN Health Organization adopted a narrowly technical approach to health questions affecting various parts of the globe. It concentrated upon collecting mortality statistics, standardizing the specific categories entailed in mortality statistics, and determining provisions for a quantifiable basis for chemotherapeutic drugs and vaccines. The LN Health Organization also played a critical role in developing standard testing procedures like the diagnostic Wasserman test and standard regimes for the treatment of syphilis with salvarsan.⁸

the Bureau's work can be found in Yves Beigbeder, *The World Health Organization* (Geneva: Martinus Nijhoff, 1998), p. 3; a more detailed account in Norman Howard-Jones, *The Pan-American Health Organization: Origins and Evolution* (Geneva: World Health Organization, 1981).

⁵ Martin David Dublin has characterized the sanitary work of the Pan-American Sanitary Bureau and the Office International d'Hygiène Publique as "a narrow, defensive arrangement intended to protect European and American enclaves from epidemics of plague and cholera endemic in other regions. It was embodied in diplomatic agreements conceived in the national security interests of the signatories." Martin David Dublin, "The League of Nations Health Organization," in *International Health Organizations and Movements, 1918-1939*, ed. Paul Weindling (Cambridge: Cambridge University Press, 1995), p. 73.

⁶ Imperial rivalries complicated the work of international health organizations. For example, Germany refused to participate in the work of the Office of International d'Hygiène Publique, whose official language was French and accordingly strongly influenced by the French state.

⁷ Paul Weindling, "The Role of International Organizations in Setting Nutritional Standards in the 1920s and the 1930s," in *The Science and Culture of Nutrition, 1840-1940*, ed. Harmke Kamminga and Andrew Cunningham (Amsterdam: Rodopi, 1995), 319-32. Theodore M. Brown kindly directed me to the work of Iris Borowy, whose history of the League of Nations Health Organization is due to be published by University of Rochester Press.

⁸ Martin David Dublin, "The League of Nations Health Organization," in *International Health Organizations and Movements, 1918-1939*, ed. Paul Weindling (Cambridge: Cambridge University Press, 1995), pp. 56-80.

The diffuse and pervasive effects of global depression helped reconfigure the general scope and orientation of international health endeavors. Weindling writes, “It was hoped that international peace could be underpinned by alleviation of social deprivation and injustice: effective health and welfare services were intended to stabilize the existence of new states and modernize administrative structures.”⁹ The LN Health Organization’s narrowly technical approach that prioritized the standardization of mortality statistics and such would likely have confined its political and intellectual role to that of a clearing-house for the world’s quantitative epidemiological data—a role distinctly favored by the governments of member nations—but instead, the LN Health Organization began to expand its horizons and pursue more intently policies that construed health in terms of social and economic welfare. As Martin David Dublin has argued, the LN Health Organization operated within the “biomedical/public health episteme” that believed that “scientific research and preventive measures organized on an international basis would reduce or eradicate many diseases and socio-economic causes of human illness.”¹⁰ Rather than marshaling forces to combat, for example, typhus, an infectious disease caused by the obligate parasite *Rickettsia*, the LN Health Organization pushed tuberculosis to the center of the table and, in particular, highlighted the importance of improved social conditions (e.g., higher earnings, shorter working hours, better diet, improvements in living standards, etc.) in accounting for the decline of decline.¹¹ It organized conferences on vitamin standards in London in June 1931 and June 1934 and recommended for international adoption standards and units for vitamins A, B₁, C, and D.¹²

The broadening, social medical approach pushed by the LN Health Organization is best personified in the energetic figure of Ludwik Rajchman, Director of the organization from 1921 to

⁹ Paul Weindling, “Social Medicine in the League of Nations Health Organization and the International Labor Office Compared,” in *International Health Organizations and Movements, 1918-1939*, ed. Paul Weindling (Cambridge: Cambridge University Press, 1995), pp. 134-51.

¹⁰ Dublin, “The League of Nations Health Organization,” p. 73.

¹¹ Weindling, “Social Medicine in the League of Nations Health Organization and the International Labor Office Compared,” p. 141.

¹² “International Vitamin Standards,” *Nature* 135 (30 March 1935): 516-17.

1939. He established expert committees for school health services, medical care administration, health insurance, and medical and public health administration. Rajchman's vocal and vigorous support of social medicine led him to push the LN Health Organization to tackle nutrition, housing, and rural hygiene by organizing conferences and study tours of local situations in different national contexts. He even directly assisted some countries—Greece, Bolivia, and China—in reorganizing their public health services.¹³

A Chinese Window

In his book, *Hunger: A Modern History*, James Vernon observes that histories of nutrition have tended to focus on individuals and their “discoveries” rather than the infrastructures making the work of such individuals possible.¹⁴ To this end, he sets out a fairly elaborate description of the Rowett Research Institute at Aberdeen (1921) as counterpoint to how the work of nutritional science—with its deliberate and steadfast interest in universality, standardization, and communicability—enabled the production of a new social grammar for the government of hunger. The nexus of relations he identifies can take as one possible beginning point the laboratory, but the nature of the work and the professional identity of its researchers depended a laboratory whose intellectual fruits extended far beyond its immediate walls. The example of Rowett, Britain's first nutritional laboratory, provides a good example of dual commitment of social-separateness and international exchange. Located in Aberdeen, Rowett consisted of a forty-acre experimental farm in

¹³ Marta A. Balinska, *For the Good of Humanity: Ludwik Rajchman Medical Statesman* (Budapest: Central European University Press, 1998), chap. 5 and 6; and Socrates Litsios, “Selskar Gunn and China: The Rockefeller Foundation's ‘Other’ Approach to Public Health,” *Bulletin of the History of Medicine* 79 (2005): 295-318.

¹⁴ H. G. Earle, the Director of the Henry Lester Institute of Medical Research, would probably have agreed with Vernon's assessment. In his attempt to explain the importance of research institutes for scientific discoveries and provide a retort to the exclamation that the world “does not ask for researchers; it asks for discoveries: not for the incomplete, but for the complete article,” he wrote,

I think the answer to these opinions is that discovery by genius will occur from time to time whatever you do, but that organized research institutes are necessary in order that the main body of investigation may be advanced all the time, and that there may be accumulated a mass of accurate knowledge which will lie ready to the mind of genius for its interpretation: so, as Ronald Ross says, let every budding Pasteur have his chance and pray for a Rockefeller—and, I would say, a Lester!

H. G. Earle, “The Organization of Medical Research,” in *Henry Lester Institute of Medical Research* (Shanghai: N. C. D. N., 1934), p. 26.

which laboratories, workshops, and metabolic rooms were all closely nestled together in a manner consonant with “an ideal image of the research process, with its focus on the biochemical investigations of foodstuffs and the chemical isolation and synthesis of their different elements, which led directly to the preparation of synthetic diets and the testing of their physiological effects on farm animals.”¹⁵ Though the researchers at Rowett were secluded from the interferences of urban society, they were by no means isolated. Vernon points out that both the construction of a library, which benefited from assistance by the Carnegie Corporation in 1924, and the publication of *Nutrition Abstracts and Views*, which began in 1931, were intended to encourage and facilitate a global forum for nutritional research. For Vernon, the fact that the fifth volume of *Nutrition Abstracts and Views* (1936) included a “staggering 4,726 abstracts of papers and books in the field” indicates that through such a publication, “Rowett provided a window onto the world of nutritional science and connected a global network of laboratories and researchers in a vibrant professional community.”¹⁶

Vernon's emphasis upon infrastructural conditions enabling a “quest for a universal technical form of hunger” becomes particularly acute when he identifies how the Rowett Research Institute was linked up with colonial laboratories and the British empire more broadly. Vernon writes,

Nutritional science did not simply emanate from the metropolitan Britain to the colonies, where it was tropicalized. As we shall see, research in the colonial laboratory was to transform British conceptions of nutrition and the science of hunger between the wars, but to talk of the colonial formation of nutrition is to miss the complexity of a process that was inherently transnational and irreducible to the imperial relationship, however marked it was to become by it.¹⁷

The transnational production of nutritional science was exemplified by the diverse backgrounds of the researchers as well as the diverse locations to which the researchers traveled. Vernon notes that Rowett received funding support from American, British, and Scottish sources (105), and he draws upon the life of Institute's director, who traveled through the British empire

¹⁵ James Vernon, *Hunger: A Modern History* (Cambridge, MA: Belknap Press of Harvard University Press, 2007), p. 100.

¹⁶ Vernon, *Hunger*, p. 98.

¹⁷ Vernon, *Hunger*, pp. 104-5.

from Palestine to New Zealand and helped to transplant several of the Institute's researchers in places like Rhodesia's Department of Agriculture and the Nutritional Laboratory at Coonor in India. Vernon could also have added the Henry Lester Institute of Medical Research (Leishide yixue yanjiuyuan 雷氏德醫學研究院; henceforth "Lester Institute") in Shanghai to this highly specialized and esteemed international circuit.

As a window at the other end of the world of nutritional science, the Lester Institute paralleled the investigative spirit and interlinking research communities of the Rowett Research Institute. Though more broadly conceived as a medical research institute with substantive commitments to clinical research, physiological, and the pathological sciences, the Lester Institute was nonetheless one of the primary engines of nutritional research in China during the 1930s and the early 1940s. Through its outreach to the broader scientific community, both domestically and internationally, and its basic commitment to developing Chinese science in light of international exchange, the Lester Institute played a critical role in setting the orientation and thematic focus of nutritional work during the 1930s. Its importance to a national debate about nutrition diminished in the 1940s on account of Shanghai's general isolation from inland, southwesterly China to which the Nationalist government, and many Chinese scientists, had retreated in 1937. Moreover, persistent fighting, sustained depravation of basic commodities, and hyper-inflation in Nationalist-occupied areas reconfigured the parameters and priorities of nutritional discourse and research, but for nearly a decade, the Lester Institute and its associated researchers helped set the main interpretative framework for understanding the social good to be accomplished through nutritional research.

Henry Lester Institute for Medical Research

The Henry Lester Institute for Medical Research was formally established in Shanghai at the end of 1932. Recently settled into its own, newly built building on Avenue Road (present-day 1320

Beijing Xi Lu),¹⁸ the Institute was comprised of three divisions—clinical research, physiological sciences, and the pathological sciences—whose united purpose was to bring together chemists, physiologists, pathologists, surgeons, and physicians to advance medical science in China.¹⁹ The Institute’s namesake, Henry Lester, had originally bequeathed his substantial legacy for the creation of a Lester School with a proposed 300 plus scholars for the study of medical science, surgery, civil engineering, architecture, and other technical fields.²⁰ Dr. H. G. Earle of the University of Hong Kong had been invited by the Lester Trustees to visit Shanghai in September 1927 and investigate the possible strategies for implementing Lester’s wishes. Earle traveled to Europe in 1928 to study similar institutes and their local operations, and based on his report, the Trustees decided to create two separate institutes, one devoted to postgraduate training and medical research and the other focused upon the technical training of young boys in engineering and allied skills.

In operational terms however, 1932 was not the date of inception for the Institute, as temporary headquarters for the clinical research division were established at 11 Hankow Road in 1929 and then two years later moved to the fifth floor of the Lester Chinese Hospital (formerly called the Shantung Road Hospital).²¹ The death in March 1931 of an esteemed member of the organizational team, Dr. John Anderson, who had laid the foundations for a department of medicine and parasitology in connection with the Lester Hospital and the Japanese attack on Shanghai

¹⁸ Jiang’an district’s preservation initiative for historical buildings, see <http://www.jafed.gov.cn/doc/bhjjz/jzdetails.asp?id=84> (10 February 2009).

¹⁹ *Henry Lester Institute of Medical Research* (Shanghai: N. C. D. N., 1934).

²⁰ Henry Lester (1840-1926) was born the youngest of three brothers in Southampton, England. He arrived in Shanghai in 1867 and served as one of the few specially trained architects in the city. His company, Lester, John & Morris, became one of the best known architect offices in Shanghai and played a crucial role in the creation of such buildings as Sincere Department Store (留下先施公司, 1917), Nissin Building (日清汽船公司, 1921), Puyi building (普益大楼, 1922), and the Bank of Taiwan building (台湾銀行, 1926).

²¹ The Lester Chinese Hospital was originally founded by Dr. William. H. Medhurst of the London Mission in 1844. It was one of the three major missionary hospitals in Shanghai. It assumed the name of “Shandong Road Hospital for Chinese” in 1861 when the hospital, which had originally been located near Shanghai’s South Gate, was built anew on Shandong Road. Henry Lester bequeathed 2 million taels of silver to the hospital in 1926, whereupon it became known as the Lester Hospital. During the Republican period, the Lester Hospital, occupying a seven-story building with 270 beds, was by far the largest and best hospital in Shanghai. Ruan Renze and Gao Zhenhong, eds., *Shanghai zongjiao shi* (Shanghai: Shanghai renmin chubanshe, 1992), p. 899.

beginning on 28 January 1932 further complicated the Institute's plans to move into its new home on Avenue Road.

But despite all this, 1932 was the moment of physical celebration. Housed in a magnificent, reinforced concrete structure that was three stories tall and shaped like an E with a long axis running east west and the wings and central block pointing in a northerly direction, the Lester Institute that opened its doors at the end of 1932 represented the culmination of six years of planning and a bright future of path-breaking scientific work. We see this intellectual and organizational aspiration manifest in the physical proportions of the site and buildings. The E-shaped main building included a small and large lecture hall equipped with the latest projection apparatus, a library, and a series of unit and double-unit rooms for laboratory work. Accommodation was made in the basement for boilers, workshops (machine, carpenter, extraction, etc.), and storage while roof space provided an additional six laboratory units, an aquarium, insectarium, and a large common room for the use of technicians. In addition to the main building, there was also an animal house in which the main architectural feature was a central courtyard around which an arrangement of rooms was found. All the rooms faced outward from the courtyard to ensure proper ventilation and the elimination of "the unpleasant smells so often characteristic of animal houses."²² Animals kept on the premises included cattle, dogs, monkey, birds, and rodents.

The meticulous care and attention paid to the Lester Institute's facilities and equipment was matched by an equally conscientious concern for the institute's intellectual and social contribution to China and the world. As an institution dedicated to the advanced study and research of the medical sciences without any comparable investment in the undergraduate education of its researchers, the Henry Lester Institute for Medical Research occupied a rarefied position in Chinese scientific life. Like the Academia Sinica (Zhongyang yanjiuyuan 中央研究院), the Lester Institute was primarily a

²² *Henry Lester Institute of Medical Research* (Shanghai: N. C. D. N., 1934), p. 24. For a filmic tour of the Institute's premises, see *Henry Lester Institute of Medical Research* (Shanghai, 1933) stored at the Wellcome Library, London.

research organ, although opportunities for postgraduate training were available.²³ As a non-state actor in the institutionalization and professionalization of the sciences in China, the Lester Institute operated largely free from the direct influence or intervention of specific governments. Its funding derived entirely from the Lester Trust, and although its administrative structure drew upon the professional expertise of British subjects in East Asia, the actual formulation and implementation of research plans reflected not British imperial interests, but rather local Chinese ones albeit refracted through the prism of global science.

A Counterforce to the Hegemony of the Rockefeller Foundation?

That is not to suggest that British imperial interests played no role in the operations of the Lester Institute. As one of a handful of British sponsored research institutes scattered throughout the British empire, the Lester Institute—particularly in the eyes of H. G. Earle, its Director—was often cast as the British counterpoint to the growing American hegemony in science in China as epitomized by the Rockefeller Foundation’s investment in the Peking Union Medical College. From the perspective of the China Medical Board, Inc., which had assumed direct administration of the Peking Union Medical College in 1928, the formation of another medical research institute was benignly welcomed. In a 28 February 1929 letter from H. Berglund to Roger S. Greene, who was then serving as both the Directory of the China Medical Board and the Peking Union Medical College, the organization of the new Henry Lester Institute of Medical Research would ensure that, particularly in the field of biochemistry, disciplinary competition and thus stronger research overall within China. Berglund wrote, “Earle was anxious to have a bio-chemist, and I felt that it was very important to get a second bio-chemical center in China so that Hsien Wu would not feel all alone and isolated,—you understand—for stimulus and competition.” Despite his statement of encouragement for the creation of a “second bio-chemical center,” Berglund’s general enthusiasm for

²³ The Academia Sinica was formed in 1927 by the Nationalist government and was composed of thirteen research institutes concentrated in the natural and social sciences. For a detailed treatment of the interplay of science and politics in Republican China, see Shiwei Chen, “Government and Academy in Republican China: History of Academia Sinica, 1927-1949” (Ph.D. dissertation, Harvard University, 1998).

Earle's endeavor was rather tempered. The two exchanged ideas about possible biochemistry candidates—Barger in Edinburgh, Parsons the Bolshevik who had recently returned to England from Montreal and of whom Earle expressed faint apprehension—but without much success. Berglund concluded,

Anyway, I am sure that in one way or another he is going to make a serious effort to get a good bio-chemical division in Shanghai. I understand he approached C. E. Lim in regard to public health or bacteriology, but without very much success. This all means that though Earle is a very nice man, and a clear thinking physiologist with sufficient training, it will probably take him sometime to get anything of importance going in the Lester Institute, and still longer before they get the Institute to fit into the Chinese situation.”²⁴

Berglund's mild dismissal of the Lester Institute's future importance was entangled with his reservations about the Institute fitting into “the Chinese situation.” What exactly he meant by such a statement is difficult to determine precisely, but in all likelihood, it pertained to the Lester Institute's administrative structure, which insisted upon reserving organization authority to the British alone. Whether as part of an original stipulation in Henry Lester's will or a reflection of British imperial prerogative, the Lester Institute administrative authority rested solely in the hands of its British staff. The highest positions—Director and Divisional Heads—were occupied by British subjects, and during its decade and half tenure, this delegation of responsibility and authority did not change. Moreover, there is some suggestion that during the initial planning stages of the Lester Institute, Chinese scientists were unlikely to have assumed positions higher than research fellows. Berglund recalled with amusement that he and C. E. Lim, a bacteriologist at the Peking Union Medical College, whom Earle had at one point attempted to persuade to join the Lester Institute, asked Earle in their separate interviews the same question. Berglund wrote, “It gave me great pleasure to see Earle in Shanghai and hear his plans. I asked him the same question, I found after my return, that C. E. Lim had made, and that was, ‘Well, where do the Chinese come in?’ Then he [Earle] said he had thought

²⁴ H. Berglund to Roger S. Greene (PUMC, NYC), February 28, 1929, folder 568, box 80, China Medical Board, Inc., Rockefeller Archives.

of that, and that they should come in as fellows for three years.”²⁵ Lim must have found the answer far from persuasive, because Earle’s recruitment attempt was “without very much success.”²⁶

Despite Berglund’s reservations, the Lester Institute not only got “something of importance going,” it did so within a relatively short period of time. Two years after the Lester Institute had opened, it boasted a research faculty of 31 spread over three Divisions. It had completed a comprehensive survey of the hospitals in the Shanghai-area and issued reports on the age, sex, and monthly patient distribution of hospital patients. It commenced a series of investigations on the menstrual cycle of Chinese girls, birth weights, and infant growth as part of the Institute’s broader goal of contributing to the formation of anatomical and physiological standards of the Chinese. Research publications on soybean substitutes for infant feeding, vitamin a deficiency, sugar metabolism, and leprosy quickly began appearing in domestic and international journals, as well as international congresses.²⁷ It is perhaps not so surprising to then find Sir Edward Mellanby, Director of the British Medical Research Council, describing the Lester Institute as “a well-known center of medical research, with a good record of scientific work.”²⁸

Dynamics of Professional Exchange

As a medical research institute without direct ties to any specific educational organization, the Lester Institute relied upon a nexus of active exchanges between individuals and institutions to build up its own scientific research teams. Attracting young talent with strong promise and distinguished faculty with proven track records to set the fundamental tenor of the institution from its first opening days required social finesse and political acumen. Domestic and international

²⁵ Ibid.

²⁶ Ibid. The Lester Institute did not, it would seem, retain this strategy, but for more discussion of the hiring practices associated with the Lester Institute, please see below.

²⁷ Domestic journals included the *Chinese Medical Journal*, *Chinese Journal of Physiology*, *Peking Natural History Bulletin*, *Journal of Chinese Chemistry Society*; international journals included the *Journal of the American Chemical Society*, *South African Medical Journal*, *Archives of Diseases in Childhood*, *Biochemical Journal*, *Journal of the American Pharmaceutical Association*, and *Kitasato Archives of Experimental Medicine*; and the 9th Congress of the Far Eastern Association of Tropical Medicine.

²⁸ The National Archives of the UK, Medical Research Council, FD1/2451: Lester Institute, Shanghai, 1932-47.

networks of scientists were tapped, and through steady, reciprocal gestures of social exchange, the Lester Institute performed a delicate balance of building up its own reserves of scientific legitimacy within a climate of increased nationalism that linked scientific work with national reconstruction.

How did the Lester Institute attract and retain scientific talent? Although early deliberations about the Institute's professional ladder had implied the relegation of Chinese scientists to the level of three-year fellows, when the Lester Institute opened in 1932, its assignment of scientific positions had undergone some revision. Although it remained the case the Chinese national were unable to occupy the highest levels of the administration with the Institute, in terms of research faculty, Chinese nationals were and did represent the majority of research scientists working at the Lester Institute.²⁹ Research scientists were ranked as followed in descending order: Associate, Assistant, and Fellow. In addition to the cohort of research scientists were a group of technicians and librarians, all Chinese, who were university educated, but lacking sufficient scientific credentials to enter directly into the stream of research scientist. Technicians generally resided on-site in special accommodations as their laboratory training required unusual hours.³⁰

²⁹ For non-Chinese recruitment, H. G. Earle and the various Divisional heads often contacted colleagues in Britain directly. When Dr. Eric Reid had passed on and Read found that his "senior Chinese colleague [was] leaving [him]," he wrote Sir Edward Mellanby with an announcement for a replacement. He wrote, "The new man from Britain need not be confined to the field of nutrition. A good biochemist might fill the bill. Dr. Earle prefers a young, unmarried man. Our salary scale, reckoned approximately, at the present rate of exchange for a man 35 years old, is about £1,000." Bernard and Katherine Read Papers, 1902-1964, Yale University Divinity School Library, Record Group 157.

³⁰ As evidence by an internal memo sent from Bernard Read to H. G. Earle, accommodations for technicians were in 1934 still somewhat embryonic. As the research activities of the Lester Institute grew, securing proper housing for its growing numbers of technicians, cleaners, and servants also became more pressing. Read wrote, "In reply to your letter concerning accommodations in the new Technicians' Quarters, I should like to submit for your consideration the housing of: Paul H. S. Chou, Dr. Hou's technician, who has a very full program of animal feeding experiments, involving work on Saturdays and Sundays. Mao Meng-chueh, Dr. Pak's technician, who in the regular course of events has to inject animals at 7 a.m. preparatory to operations later in the day. Sung Kuo-pin, Dr. Reid's technician responsible for the general work of laboratory No. 110, including some dog feeding. Y. T. Wu, apprentice technician in my own laboratory, a northern man who has no other quarters at present. In the apprentice technicians' room, Dr. Hou's food preparation, Wu Ching-hsun ought to be housed on the premises. In the servants' room, Dr. Tsai's servant, Hsi Ah-bing, who is at present living on the roof, will need quarters. I think it is open to discussion whether we should find quarters for the three cleaners in the Animal House, also the servants in the Surgical Division, the arrangements for whom I will leave in your hands."

Bernard and Katherine Read Papers, 1902-1964, Yale University Divinity School Library, Record Group 157.

To build up the ranks of its research scientists class, the Lester Institute engaged in the dynamics of professional exchange, by which I refer to the series of letters being sent back and forth that introduced working scientists to each other (within and without China, including both Chinese and non-Chinese professionals, i.e., letter of introduction); letters of self-introduction by former students, friends of acquaintances, etc. for the purposes of gainful employment; and letters of invitation seeking to attract or “steal” scientists from other institutions or agencies inside and outside China.³¹ Letters of introductions tended to be written for Chinese researchers, who were spending time away from the Lester Institute on stints in the United States, Britain, or Europe. These letters, which were addressed to scientific colleagues of the British staff, often detailed the purpose and function of the Chinese scientist’s upcoming visit (e.g., learning more about the techniques involved in the international standardization of drugs), particularly commendable qualities, and a request that the Chinese scientists be introduced “to some of the finer Christian families in Britain,” for example.³²

Letters of self-introduction written by aspiring candidates (or related family members) for employment often included personal details, descriptions of the writer’s intellectual or academic training, associational memberships or ties, and a general expression of interest in possible professional opportunities at the Lester Institute. The bulk of these letters appearing in the files of Bernard E. Read, Head of the Division of the Physiological Sciences were written by young Chinese

³¹ The preservation of Bernard E. Read’s various correspondences while serving as Head of the Division of the Physiological Sciences has been invaluable to detailing the internal dynamics of professionalism shaping the scientific practice of the Lester Institute. Read graduated from the London College of Pharmacy in 1908. A devout Christian, he served on the faculty of the Union Medical College before it was purchased and redeveloped by the Rockefeller Foundation as the Peking Union Medical College. The Union Medical College was founded in 1906 by a consortium of Christian missionary organizations including the American Board of Commissioners for Foreign Missions and the London Missionary Society. Read’s qualifications were not quite sufficient to immediately join the faculty of the Peking Union Medical College, so in the early 1920s, he worked with Walter Jones, professor of physiological chemistry at John Hopkins University to raise his qualifications to do research. He later attended Yale and received a Masters and doctorate from Yale University.

³² See, for example, H. G. Earle’s 30 September 1935 letter to Sir Edward Mellanby, thanking the latter for the Medical Research Council’s recent acceptance of Dr. F. F. Tang, a member of the staff at the Lester Institute, as a visiting worker. The National Archives of the UK, Medical Research Council, FD1/2451: Lester Institute, Shanghai, 1932-47.

men who by one form or another had some personal relationship that led him to inquire with the Lester Institute. In a 23 June 1934 letter from Choeh Ping-Lieu of the Commercial Press, Import Department, who was writing on behalf of his brother, Choeh Ping-gee, aged 25, Choeh Ping-Lieu described his brother as having finished ten years of study under Dr. Dun Sing-pao, a “very famous Chinese medical doctor in Wusih.” As his brother was interested “research work of Chinese medicine,” Choeh Ping-Lieu suggested his brother as a good candidate for gainful employment with the Division of Physiological Sciences at the Lester Institute. On another occasion, Bernard Read received a letter from on B. de Gorter, Esq., staying the Imperial College Hostel, England. de Gorter had inquired about possible openings at the Lester Institute, and in 27 October 1934 response letter to de Gorter, Read suggested a number of other possible routes he should explore including the “numerous medical schools in Asia in one of which you might find a suitable opening” and the Colonial Office, London for placement in India, although such a plan “may take a year or two to mature.”³³

The third type of correspondence constituting an important part of the dynamics of professional exchange was letters of invitation. These letters were not limited to matters of employment, and as tokens of professional allegiance, these letters often communicated questions about local flora and fauna, submitted botanical samples for Read to analyze, and described nutritional problems for which the writer required additional information.³⁴ As the scientific institutional infrastructure was still developing in China, informal exchanges between private parties afforded direct paths for building up professional allegiances and reaffirming scientific identities.

Private physicians scattered in the farthest recesses of China could nonetheless participate within the

³³ Bernard and Katherine Read Papers, 1902-1964, Yale University Divinity School Library, Record Group 157, Box 3.

³⁴ In a 16 October 1934 letter from Walter S. Hsueh of Australian Christian Mission, Hui-li Hsien, South Sichuan to Bernard Read, Hsueh included a few seeds, “what people here call *Pi-sao-kuo*, from a kind of trees with long leaves. It is very cheap and common here, used for washing, but quite strange to me. I wonder whether there is any valuable chemical substance in it good for medical purposes.” Such submissions were fairly common to Read as his interests in Chinese *materia medica* had been well established by the time he took up the post of head of the Division of Physiological Sciences. Bernard and Katherine Read Papers, 1902-1964, Yale University Divinity School Library, Record Group 157, Box 3.

scientific life of the modern medical research institute through their written exchanges and inquiries. A series of letters between Dr. C. E. Bousfield of the American Baptist Mission in Chaoyang and Bernard Read in 1933 and 1934 debated with samples the scientific identification of “Blackweed” (*niao cai* 烏菜), a plant distinctive of Anhui and used locally as an effective treatment of ascariasis, a disease caused by a parasitic roundworm. The pharmaceutical company Merck had developed a treatment of ascariasis using a seaweed known in Chinese as *hair en cao* (海人草) and marketed it under the name of “Helminal.” Bousfield argued, “That which Merck’s people put out is far too expensive for us to use,” and suggested Read investigate the local plant *niao cai*. Read responded, “If you think that you have a different kind of drug to deal with, send me that Chinese name and I will, first of all, see if I can trace it in Chinese literature and later if of particular interest we might think it worth while to investigate it.”³⁵

The exchange and circulation of botanical matter among British naturalists and their Chinese correspondents began a good century before local Christian physicians offered their own contributions to Bernard Read. Fa-ti Fan has presented a detailed analysis of the diversity of relations shaping the British scientific enterprise of natural history in China. He argues that to understand the nature of the exchanges foundational to the production of scientific knowledge about the flora, fauna, and geography of China from the late eighteenth century onward, we may be well advised to consider the space in which encounters between naturalists and the Chinese took place as “contact zones” or “borderlands”. Such a heuristic device helps break down presuppositions of rigid, inflexible, cultural boundaries and, in turn, focus attention upon the networks of individuals, institutions, and information being developed. Even well into the twentieth century, these scientific pathways of an informal empire that encouraged the long-distance sharing of local botanical or the gentle cross-examination of standardized descriptions of disease symptomology played a critical role in the

³⁵ Bernard and Katherine Read Papers, 1902-1964, Yale University Divinity School Library, Record Group 157, Box 3.

composition of the life of biomedical research institutes.³⁶ What might be identified as older, more descriptive practices were not inherently oppositional to the workings of a modern research institute, and indeed, the Lester Institute relied upon these sorts of exchanges in cultural “contact zones” to build up its own repository of viable information or data about China.

Letters of invitation written with employment in mind had to maneuver more politically sensitive waters, particularly after the formation of the Nationalist government in 1927 and when its own recruitment of Chinese scientists collapsed distinctions between working the greater good of science and the nation. On 18 May 1933, Dr. J. Heng Liu, Vice-Minister of the Ministry of Health (*weisheng shu*), addressed a letter to Bernard Read regarding one C. T. Feng. Liu wrote with his annoyance barely in check,

Mr. C. T. Feng has been telling me about your offer to him to join you at the Lester Institute. In spite of the attractive and tempting features, which you are able to offer, he has decided to remain with me in our efforts to accomplish something in National Reconstruction. His decision is final, so please refrain from bothering him again and thereby disturb [sic] him from the important work he is doing.³⁷

Had the matter involved only C. T. Feng, Liu perhaps would have overlooked the affair, but Liu’s sense of indignation had been sparked. He continued,

I have been annoyed at the way in which members of my staff have been bought over by the Lester Institute. In some instances they were men who were recommended for fellowships abroad with the explicit understanding they would return to work for me. You can understand why I regard the Lester Institute as one of these imperialistic institutions with men in charge who have no consideration for others and who do not even know the elementary rules of ethics and courtesy when it comes to robbing some other institution of men under appointment.”³⁸

Liu’s charge of imperialism was hardly flippant, and Read’s 22 May 1933 response could hardly have proved satisfactory. Half conciliatory and half defiant, Read sought to mildly disabuse

³⁶ By “informal empire,” I am referring to the supplemental effects associated with imperial power that is exercised beyond its formal territories. Although China was never formally or systematically colonized, its relationship—economically, politically, and scientifically—to Western imperialisms often assumed material form in tertiary entities like missionary organizations.

³⁷ Bernard and Katherine Read Papers, 1902-1964, Yale University Divinity School Library, Record Group 157, Box 3.

³⁸ Bernard and Katherine Read Papers, 1902-1964, Yale University Divinity School Library, Record Group 157, Box 3.

Liu of his mistaken impression that Read's overtures to C. T. Feng were predatory. He reassured Liu that any decision by C. T. Feng would be respected to the fullest degree and, indeed, should Feng's decision to remain at the Ministry of Health be final, he would naturally support him in his endeavors. Read, however, took exception to Liu's accusation of poaching. He wrote,

It is only right that I should point out the peculiar relationship that Mr. Feng, in particular, holds to my work. After many years of excellent service with me in Peking you invited him to Nanking. I allowed him as a perfectly free agent to make his decision in the matter with the definite understanding that this invitation to him to join the Lester Institute, would be made when I join the Institute.

Invoking scholastic prerogative and prior ties of teacher loyalty, Read emphasized that he was merely extending a natural invitation borne of former commitments. He had already allowed Feng to decide by his own accord whether or not to join the Ministry of Health—and such a gesture was certainly a testament of Read's genuine concern for what was best for Feng. An invitation to join Read at the Lester Institute was not unusual and indeed only natural given the two men's former teacher-student relationship. Read insisted,

If he as a free agent has decided to put his whole effort into accomplishing something in National Reconstruction under your Ministry it should give me the highest pleasure; but as far as I see it, on no account whatever can you reproach me for discussing with him at this time appointment in the Lester Institute.³⁹

Despite his protestations, Read's explanations for seeking to recruit C. T. Feng must have sounded rather disingenuous. In essence, Read turned a blind eye to how the bounds of loyalty were likely to have been a rather fraught and complex issue for his former student. Read could claim a disinterested privilege to simply upholding his obligations for sharing the wealth of scientific opportunities now available through the Lester Institute, but such a claim ignored the larger context within which the production of scientific knowledge represented not simply individual creativity and ingenuity, but institutional prestige at the expense of national pride.

The Lester Institute's verbal pronouncements to aiding the development of biomedicine matched the Chinese political desire to modernize fully and comprehensively, but by insisting upon

³⁹ Ibid.

maintaining British managerial authority, the Lester Institute found itself embroiled in a contest of scientific ownership. Intellectual talent was not necessarily within the dominion of the individual, and if anything it represented another form of national capital whose allocation could be wrongly determined or, more disastrously, stolen from its rightful owner. Liu's charge of imperialism directly targeted the Lester Institute's claims of impartiality and science for science's sake. Within a landscape of fierce competition for resources and self-determination permeated all manner of relationships, what were claims of scientific purity and impartiality, but subterfuges for variant forms of Western imperialism?

Engaging within the dynamics of professional exchange satisfied a number of different objectives. Information was generated, exchanged, circulated, and codified; professional ties were built and reaffirmed; and intellectual capital—especially, the young Chinese men and women who emerged as the beacons of the nation's reconstruction—was nurtured at a price.

Socially-minded and Outward-Looking

From its inception, the Lester Institute prided itself for being mindful of its social setting and not losing contact with outside organizations. It sought to prevent an ivory-tower effect—the fallacy of being “too academic”—by building relationships with other health-related organs inside and outside of China. In this regard, the Lester Institute was aided by its informal ties to the British empire. The senior levels of administration were composed largely of British nationals like H. G. Earle, the Director of the Lester Institute from 1932-40, who maintained and nurtured their professional connections with the British Medical Research Council. In practice, these professional ties translated into lively correspondence and exchange with researchers working in the Strait Settlements, Ceylon, Indian colonies, and the Federal Malay States.⁴⁰ Depending upon resources, arrangements could also be undertaken to permit visiting researchers to work at the Lester Institute

⁴⁰ See, for example, the correspondence in 1935 between Bernard E. Read and W. R. Aykroyd, Nutrition Research Laboratories, Indian Research Fund Association about pooling research results on the vitamin A content of local foods and drugs. Bernard and Katherine Read Papers, 1902-1964, RG 157, Box 4, Yale University Divinity School Library.

or for Lester researchers to travel to Great Britain. At both an individual and institutional level, such ties ensured disciplinary recognition and reward for work undertaken outside the imperial metropole—a key point for successful recruitment. As Earle himself noted to Mellanby in 1940 when informing the latter of the Lester Institute’s interests in “picking up a good Experimental pathologist with a wide outlook as soon as possible,

This is the only Research Institute of its kind in the world with complete freedom of administration and endless opportunities in the way of material for research. As you know Platt did good work out here and obtained international recognition so that there is no question of being buried and forgotten.⁴¹

Domestically, the Lester Institute also actively built up a nexus of relations with state and non-state agencies. As the Lester Institute lacked its own hospital, it established a “mutual obligation of active cooperation” with the Lester Chinese Hospital, whose benefactor had also been Henry Lester.⁴² The Lester Institute also officially requested and obtained the cooperation of governmental agencies, like the National Quarantine Service and the Public Health Department under the aegis of the Shanghai Municipal Council, the primary governing body of the International Settlement.⁴³ These working relationships served more than just the cause of efficacy and access. Hospitals were chiefly concerned with curative medicine as it affects individuals; governmental bodies had assumed greater involvement in public health projects (e.g., road works, water distribution and plumbing systems, vaccination programs, etc.) throughout the 19th and into the 20th centuries, but their interest in public health was largely mediated by the desire to ensure sustained governance.⁴⁴ The Lester Institute, by

⁴¹ B. S. Platt, who left the Lester Institute to assume a professorship of human nutrition at the London School of Hygiene and Tropical Medicine as well directorship of the Medical Research Council’s Research Unit of Human Nutrition at the National Hospital, Queen Square, London. Interestingly, Mellanby’s reply was less than enthusiastic on account of the difficulties the Medical Research Council had been experiencing in their own attempts to secure good pathologists and bacteriologists for war work. The National Archives of the UK, Medical Research Council, FD1/2451: Lester Institute, Shanghai, 1932-47.

⁴² *Henry Lester Institute of Medical Research*, p. 26.

⁴³ The Health Committee and members of the Shanghai Municipal Council uniformly approved the established of official cooperation between the two bodies in April 1928. SMA U1-3-3455.

⁴⁴ Kerrie L. Macpherson, *A Wilderness of Marshes: The Origins of Public Health in Shanghai, 1843-1898* (Hong Kong: Oxford University Press, 1987). Chapters from Ruth Rogaski, *Hygienic Modernity: Meanings of Health and Disease in Treaty-port China* (Berkeley: University of California Press, 2004)?

its own reckoning, functioned as an intellectual arbiter balancing the pursuit of research for research's sake with vigilant awareness for clinical applications, i.e., the practical means for preventing and curing disease.

This balancing act between the goals of pure and applied science was descriptive of much of the Lester Institute's work.⁴⁵ Indeed, as a self-consciously Western institution attempting to root itself in Chinese soil, the Lester Institute described its work as a kind of intellectual excavation of the particular manifestations of universal scientific knowledge.

It may be that we know the life history of *schistosoma japonicum*, but it is necessary that the details of this life history should be worked out again and again in the areas where it occurs, so that advice can be given with regard to the prevention of disease in known localities. The same, of course, applies to cholera, malaria and many other diseases, the cause of which has already been proved, though much work still requires to be done here in field research and epidemiology. On the physiological side it is also necessary that we should accumulate information in regard to what may be termed physiological anthropology. It is necessary to make racial health surveys as well as disease surveys, and it is especially important that we should have a scientific knowledge of diets, which have been chosen by the Chinese people.⁴⁶

In each of the diseases mentioned: schistosomiasis,⁴⁷ cholera, and malaria, the purpose of medical research was to clarify how local circumstances and regional differences contributed to topics of universal knowledge. The epistemic project of understanding how, for example, the life history of *schistosoma japonicum* developed differently in each of the areas of occurrence was essential for crafting effective public health policies and programs. The Lester Institute's program for nutrition research, which fell under the divisional supervision of Bernard E. Read (1887-1949) but incorporated researchers from all three divisions, invoked this same emphasis on foundational studies. Grappling with the biochemical side of nutrition was itself insufficient if researched without due regard to the

⁴⁵ The debate over pure versus applied science played a critical role in the formulation of academic policy of the Academia Sinica. See Shiwei Chen, "Government and Academy in Republican China: History of Academia Sinica, 1927-1949" (Ph.D. dissertation, Harvard University, 1998), esp. ch. 5.

⁴⁶ *Henry Lester Institute of Medical Research*, pp. 27-8.

⁴⁷ *Schistosoma japonicum* is a parasite and one of main parasitical agents that causes schistosomiasis, a potentially fatal disease, also known as Katayama disease, that is characterized by the enlargement of the liver and spleen, abnormal feelings of hunger, bloody diarrhea, and occasionally fever. *Schistosoma japonicum* was identified by Fijiro Katsurada, Professor of Medicine at Okayama Medical School, in 1904.

specific physiological anthropology of the Chinese people. As Read himself noted, “[W]ith the broad interpretation of physiology as the response of living organisms to their environment, emphasis at the outset has been placed upon studies of Chinese environmental factors, especially as they concern diet and nutritional diseases, and ancient medicine, with its possible contributions to toxicology, therapeutics, and vitamin research.”⁴⁸ Such research may be termed applied research—a not wholly misjudged characterization, according to H. G. Earle, “in a country where Western medicine is so new and little developed”—but in large part, the researchers—chemists, physiologists, pathologists, surgeons, and physicians—working for the Lester Institute avoided this particular debate that had so gripped their other scientific colleagues.

To do foundational studies, Lester Institute researchers had to work all avenues, whether in terms of procurement of needed supplies or viable spaces for the conduct of clinical studies. The fifth floor of the Lester Chinese Hospital with its two large wards of 16 beds each and two smaller wards provided a clinical setting in which the research gaze honed in the laboratory could continue. H. Gordon Thompson, head of the Clinical Research Division, observed, “The modern conception of a hospital is not simply a place where a certain number of sick people are admitted and relieved. It is in addition a centre for ‘Clinical Science,’ that is a place where cases are investigated with a view to ascertaining the cause, the course, and the means of curing and preventing disease.”⁴⁹ Laboratory work was a partner to bedside observation, and by securing collaborative and consultative rights with areas hospitals, Lester Institute researchers obtained more opportunities for mapping the specific contours of the Chinese medical context.

The working arrangement with the Lester Chinese Hospital ensured uncomplicated, direct flow of communication and research between the two places. The formal establishment of

⁴⁸ *Henry Lester Institute of Medical Research*, p. 41. Bernard Read had been trained in pharmacy, and unlike many of his Western and Chinese colleagues, he believed that there was something valuable to be salvaged from at least the pharmacological side of Chinese medicine. To this end, he published several studies exploring the pharmacological properties of Chinese materia medica, the nutrient properties of local foodstuffs, as well as a partial translation of the 1404 classic, *Jiuhuang bencao* (Materia medica for relief during times of famine).

⁴⁹ *Ibid.*, p. 35.

collaborative ties with the Public Health Department of the Shanghai Municipal Council also provided material benefits. In a letter dated 1 February 1933 from Dr. Cecil Robertson, head of the Division of Pathological Sciences at the Lester Institute, to Dr. John H. Jordon, Commissioner of the Public Health Department, Robertson lamented, "It seems a pity that such a promising amount of pathological material should not be made use of." The "pathological material" in question comprised of the 196 dogs that were scheduled to be "destroyed" by the Municipal Police. Robertson wrote, "I have received a request from my workers in Helmmthology [sic, "helminthology"] to the effect that the most suitable dogs from which to collect parasites would be stray dogs as they are less well looked after than household dogs. From the SMC report we note that last month 196 dogs were destroyed by the Police and we should be very glad to have access to this material if it could be arranged."⁵⁰ Robertson queried who the appropriate contact person was to make arrangements for the dog corpses. In return for the Public Health Department's assistance in this matter, Robertson offered, "The Results of the survey will be communicated to your Department as soon as a representative number of animals have been examined."⁵¹

Jordon in his capacity as Public Health Commissioner acceded to Robertson's request and even a potential research lead for further investigations.

I would like to call you attention to the fact that to the North of the Fah Wha Village, and the [sic] East of a Creek which runs up from my house, from 200-300 yards up a little way above the back entrance of the Columbia Country Club (102 Columbia Avenue) there are a series of swampy rice fields, which I should suspect are suitable for the breeding of the snails which harbor Schistosomiasis. This may be all rot, but perhaps you people might find it sufficiently interesting to investigate.⁵²

Dogs were not the only sources for pathological material, and through the Lester Institute's working relationship with the Shanghai Municipal Council's Public Health Department, researchers,

⁵⁰ It would seem, the number of stray dogs wandering the streets of Shanghai was something extraordinary. According to an internal memo from Dr. H. Pederson, Veterinary Surgeon of the Veterinary, Food, Dairies, Markets & Sanitation Divisions, 125 to 175 dogs per month that were previously held at the Police kennels were disposed of at the Municipal Disposal Plant in 1933. SMA U1-16-366.

⁵¹ SMA U1-16-366.

⁵² 16 February 1933, SMA U1-16-366.

like Stephen Moi Kee Hu who was interested in filariasis, obtained access to a variety of sites under the administrative jurisdiction of the Shanghai Municipal Council.⁵³ One of the main lines of research promoted by the Lester Institute involved investigations of mosquitoes as the transmitting agents of malaria and filariasis. Hu, a graduate of Cornell and John Hopkins, had been working on filariasis since his undergraduate days in central New York and was granted permission for obtaining blood smears taken during the evening hours from prisoners in the Gaol Hospital. By offering to cover “any trouble or expense in connection with the procuring of these slides,” Hu acquired 300 some blood films for his investigation of filariasis in Shanghai’s Western District.⁵⁴

Five years later, when Hu was “anxious to make a survey of the incidences of Filariasis in the refugee camps,” the Public Health Department of the Shanghai Municipal was again willing to accommodate his request for clinical material.⁵⁵ In contrast to his experience with prisoners at the Gaol Hospital, working with refugees posed several problems, some of which culminated in fits of violence. Hu received formal assurances of cooperation and permission to visit refugee camps on 11 May 1939, and work proceeded for nearly four months until tensions encountered on the ground began to pose a threat to individual lives. T. T. Zung, a Cadet Health Inspector doing rounds at Settlement refugee camps, reported on 8 September 1939,

For the first two months this work [i.e., taking blood samples] was performed about twice a week on the average and up to now we have paid about eighteen visits. All camps with the exception of three, were called for this purpose and almost on all occasions Dr. Hu or his assistant was accompanied by our staff for explaining to the refugees of our purpose as we were more familiar with the camps. The time of our visit was from 8:00pm to 11:00pm.⁵⁶

⁵³ Filariasis is a parasitic and infectious disease caused by nematode worms and often transmitted by flies and mosquitoes.

⁵⁴ SMA U1-16-366. Work with the blood films from prisoners at the Gaol Hospital can be found in Stephen M. K. Hu and T. L. Chang, “Observations on Natural Infection of *Culex pipiens* var. *pallens* Coquillett with *Wuchereria bancrofti* Cobbold in Woosung district, Shanghai, China,” *Chinese Medical Journal* 47 (1933) and R. Cecil Robertson and Stephen M. K. Hu, “Mosquito Control: An Entomological Field Research Station for Mosquito Study in the Shanghai District,” *Chinese Medical Journal* 20 (1934): 344-56. For a published report related a similar venture, see Stephen M. K. Hu, “An Examination of Prisoners at Paoshan, Kiangsu province, for microfilariae of *Wuchereria bancrofti* Cobbold,” *Chinese Medical Journal* 48 (1934): 1143-5.

⁵⁵ SMA U1-16-366.

⁵⁶ Ibid.

Although we do not know the form and content of these explanations to the refugees, we may reasonably surmise that explication of the purpose of obtaining blood failed to resonate or dispel public fears. Zung reported, “I have to mention that in most cases our visit was not welcomed by the refugees. They not only showed no interest in this practice, but also looked upon the matter with apprehension suspecting we had malignant designs upon them since we went there at night times only.” The incomprehension and misapprehension shaping the refugees’ interactions with the researchers and camp health staff became gradually more confrontational. On account of the refugees’ growing hostility, Zung explained, “we sought for police protection on account of their misunderstanding.”

Misunderstanding is a complicated, mutually inflected state of predicament. The refugees “misunderstood” both the intent and the purpose of the researchers’ scientific work, but more practically, they “misunderstood” why strangers would come to their temporary homes a few times a week, perhaps within an interval of a couple of days, and only at night, between the hours of 8:00pm and 11:00pm.⁵⁷ They “misunderstood” the intimations of good (e.g., for the camp residents, the community at large, for all of China, etc.) and assurances of no harm as the researcher or assistant unpacked the necessary needles for drawing blood. These misunderstandings added upon each other, and on 6 September 1939, “as we were doing this work again in one of the camps, our foreman [Woo Yung Nien] was beaten up by one of the refugees resulting in the bruising on his chest. The refugees were taken to the police station, and as no visible wound could be observed, they were later released.”⁵⁸

Unable to surmount refugee resistance and misunderstanding and fearful of incurring bodily harm, Zung and other members of the camp staff who assisted Hu in his collection of clinical

⁵⁷ In order to determine the presence of filariasis, blood must be withdrawn at night, since that is the time when the microfilaria circulate and the likelihood of being bit by a mosquito increases.

⁵⁸ SMA U1-16-366.

material felt compelled to withdraw their support and cooperation. Zung wrote, “[I]n view of the misunderstanding and non-cooperation on the part of the refugees as above mentioned, it is difficult for us to carry on this business, and unless special authorization be given, we will find ourselves under an unfavorable condition in accompanying Dr. Hu for his work.”⁵⁹ Although understated, Zung’s expression of concern, if not fear, for the consequences of continuing to assist Hu is ironic, because it doubles the concern expressed by the refugees themselves. The men who were taken to the police station were released, because “no visible wound could be observed.” In other words, the refugees who felt compelled to resort to violence believed injury and malice had been intended to their persons each time Hu or his assistant withdrew some amount of blood. They believed such injury would be manifest upon their bodies. That the law required a degree of visibility not actually satisfied by the refugees’ claims does not actually invalidate their concern. Injury has a way of blooming days after the event, such that one can imagine the fear, the anxiety, and even anger that swelled in those men and out of their fists.

In general, however, such altercations were not the steadfast rule for biomedical encounters. The collaborative studies on industrial health undertaken by the Lester Institute and the Industrial Section of the Shanghai Municipal Council in 1935 were successful both in terms of execution and resulting insight.⁶⁰ H. Yu, a graduate of the National Medical College (Peking), collaborated with M. Y Dzen, Director of the Greater Shanghai Public Health Laboratory, on a study that evaluated the efficacy of present dosage of anti-cholera vaccinations. M. N. Andrews worked with George Chu, a parasitologist at the National Medical College (Shanghai) on the incidence of malaria in Kiaochiao.⁶¹ Both Ni Zhangqi and Hou Xiangchuan of the Division of Physiological Sciences petitioned for official permission to measure refugee children during the winter of 1937-38, and for both

⁵⁹ Ibid.

⁶⁰ See H. S. Gear, T. Y. Li, Dju Yu Bao, and Joyce Gear, *Industrial Health in Shanghai* (Shanghai: Chinese Medical Association, 1936). This study was composed of three parts: “An Investigation of Printing Works,” “A Study of the Chromium Plating and Polishing Trade,” and “Shanghai Factory Diets compared with those of Institutional Workers.”

⁶¹ SMA U1-16-366.

researchers, their research objectives were largely satisfied by the swift acquiescence on the part of the Public Health Department of the Shanghai Municipal Council and the apparent cooperation of refugees in the camps.⁶² Ni's measuring hand and investigative eye returned to the Chinese student population a few times. He requested permission to measure schoolchildren in the spring of 1938 and was granted access by the Shanghai Municipal Council. He conducted another survey in 1947, and although the governing authorities had changed, the Shanghai Municipal Health Bureau also agreed to Ni's request.⁶³

Research collaborations represented a positive engagement with other scientific and political agencies. They also facilitated the process of building and reaffirming the professional ties of a burgeoning scientific community. To this end, the Lester Institute did more than just engage in research, and from its earliest days, the Lester Institute convened a regular program of lectures open to the general scientific public: members of the medical profession, scientific societies, universities, colleges of medicine, and scientific institutions in Shanghai. The lectures were conducted in Chinese and English and ranged from generalist surveys to more specialized presentations of ongoing research. For example, the syllabus for the 1935-36 lecture season included talks by T. F. Huang, Medical Advisor to the Ministry of Railways on "Medical and Health Problems on the Chinese Railway," and Dr. Wei Hsi on "The Cultivation of Filtrable Viruses," as well as a joint presentation by Drs. Ni Zhangqi and Bernard Read on "Physiological Values in Chinese Gelatin."⁶⁴

⁶² The absence of records detailing conflict or resistance on the part of refugees over the measurement of their children can be misleading, but other sources (newspapers, popular journals, and personal recollections) seem to confirm the perceived innocuousness of measuring children, be they in refugee camps, schools, or child-day festivities.

⁶³ Ni Zhangqi, "Physical Growth of Shanghai School Children," *Proceedings of the Chinese Physiological Society*, 11th Annual Meeting (1947) and "Heights and Weights of Shanghai School Children," *Chinese Medical Journal* 65 (September-October 1947): 373-80. The fragmented nature of Shanghai municipal governance with different sections of the city under the separate authority of the Chinese, the British, and the French was effectively patched over when the Japanese took over the foreign concessions in 1941. By 1948, the Japanese had conceded defeat, and the Nationalists once again assumed nominal control over the country.

⁶⁴ SMA U1-16-211. Write-ups of the lectures were sometimes published in English-language newspapers. See, for example, "Health Work on Railways Is Outlined," *The China Press* (12 December 1935) on T. F. Huang's lecture and "Professor Lim Speaks Before Lester Institute," *The China Press* (24 October 1935). Robert K. S. Lim (Lin Kesheng 林可勝, 1897-1969) had been born in Singapore and educated in Edinburgh. He was a

Localization and Scientific Work

The seemingly self-directed desire to localize the operations and investigations of the Lester Institute, in fact, reflected larger structural pressures shaping scientific institutions throughout China from the mid-1920s onward. Yuetsen Juliette Chung has demonstrated that even the Rockefeller Foundation, whose primary vehicle for effecting the modernization of the Chinese medical sciences was encapsulated in the Peking Union Medical College in Beijing, “yielded to local demand for applied science through vocational training of physicians and public health medicine.”⁶⁵ The Peking Union Medical College, which had been modeled on the John Hopkins Medical School, had initially focused on the integration of clinical practice with laboratory research that was matched by a superior quality medical education program that required thorough training at the undergraduate level in biology, physics, and chemistry before admission.⁶⁶ Its institutional principles mandated “an excellent staff of teachers, a good teaching hospital and dispensary, and well-equipped laboratories,” that would enable the formation of a modern scientific contingent of Chinese medical men to take place.⁶⁷ The Rockefeller Foundation had every expectation that its Chinese medical experiment would “raise the Chinese to be first class medical men, and every proposition must be considered from that point of view. They must rank with the rest of the world.”⁶⁸

With the arrival in 1921 of John B. Grant, who served as the head of the Department of Public Health and Preventive Medicine at PUMC, a more open embrace of public health and social

physiologist interested in the control of gastric secretion and the neurophysiology of pain. He was also a major figure in organizing a medical relief corps and trained doctors, nurses, and technicians during the Sino-Japanese War.

⁶⁵ Yuehtsen Juliette Chung, “Struggle for National Survival: Chinese Eugenics in a Transnational Context, 1896-1945” (Ph.D. dissertation, University of Chicago, 1999), p. 106.

⁶⁶ Mary B. Bullock, *An American Transplant: The Rockefeller Foundation and Peking Union Medical College* (Berkeley: University of California, 1980), chap. 2.

⁶⁷ Cited in Ma Qiusha, “The Peking Union Medical College and the Rockefeller Foundation’s Medical Programs in China,” in *Rockefeller Philanthropy and Modern Biomedicine: International Initiatives from World War I to the Cold War*, ed. William H. Schneider (Bloomington, IN: Indiana University Press, 2002), p. 168.

⁶⁸ Cited in Ma Qiusha, “The Peking Union Medical College and the Rockefeller Foundation’s Medical Programs in China,” p. 168.

medicine programs took place, and in 1925, the PUMC with the sanction and assistance of the Peking Municipal Government established the Peking First Health Demonstration Station (Jingshi jingchating shiban gonggong weisheng shiweushuo 京師警察廳試辦公共衛生事務所), whose operational goals situated the health needs of its target community at its core.⁶⁹ Moreover, structural transformations in the administration of the PUMC resulted in the emergence of a more China-centered perspective in the school's ambitions.⁷⁰ The PUMC supported the newly organized Ministry of Health of the Nationalist government in 1927 and cooperated with the Chinese state to form the Commission on Medical Education and the Public Health Training Institute "in order to expand medical manpower."⁷¹

The transformations taking place behind the walls of the PUMC were, in many ways, indicative of broader societal shifts in which the reclamation of Chinese authority and direct supervision ranked high on the list of both the Nationalist government in Nanjing and Chinese intellectuals more broadly. From 1928 to 1937, China experienced what E-tu Zen Sun has described as "a rare interlude of relative peace. Nominal peace and unite under Nanking gave greater scope to young intellectuals who had started their careers as the cutting edge of the New Culture and had now reached professional maturity."⁷² With the Nationalist expanding their authority into the administrative structures of the country's education system by requiring all foreign-founded Christian colleges and universities to register with the Ministry of Education; strengthening or creating national

⁶⁹ For a detailed description of John B. Grant's career and time in China, please see Bullock, *An American Transplant*, chap. 6.

⁷⁰ In 1928, the Rockefeller Foundation created and endowed an independent corporation, the China Medical Board Incorporation, to directly oversee the operations of the PUMC. The China Medical Board, Inc., assumed full title the land, buildings, and equipment of the PUMC, and the expectation was that the separation of administrative involvement and oversight would facilitate the transfer of power to the Chinese at a later date. From henceforth, the Rockefeller Foundation expanded its philanthropic work beyond medicine and public health to include the social sciences and agriculture. Ma, "The Peking Union Medical College and the Rockefeller Foundation's Medical Programs in China," pp. 172-4.

⁷¹ Chung, "Struggle for National Survival," pp. 136-7.

⁷² E-tu Zen Sun, "The Growth of the Academic Community 1912-1949," in *The Cambridge History of China*, Vol. 13 *Republican China 1912-1949*, Pt. 2, ed. John K. Fairbank and Albert Feuerwerker (Cambridge, UK: Cambridge University Press, 1986), p. 387.

universities under the direct administrative supervision of the Ministry of Education; and attempting to standardize university-level programs of study, research-driven institutions in China, like the PUMC and the Lester Institute, had to become mindful of the local needs impacting upon their institutional viability. The Lester Institute largely escaped the managerial eye of the Ministry of Education, because it did not offer any undergraduate or university level training, and the decision to jettison the educational aspect of the original plans for the Lester Institute seems to have been a direct consequence of the changing political atmosphere.

During this period [September 1927 – May 1928] the plans for the establishment of the medical institute were also discussed with a large number of Chinese representatives of medical education and public health, and it was finally decided that even post-graduate medical education, where it is directed towards the attainment of a diploma or degree, must be undertaken under the immediate control of the Chinese themselves, and that in the terms of the resolution passed by the National Medical Association the time had passed when new institutions for medical education could be usefully established in China under foreign leadership. It was therefore decided to establish a Henry Lester Institute for medical research.⁷³

Moreover, as the Chinese themselves began to occupy in greater numbers the ranks of university graduates and professionals, the desire to build their own scientific infrastructure and networks so as to forestall the effects of cultural imperialism by foreigners working in China's universities or visiting for the expressed purpose of conducting scientific expeditions also grew. In the field of biology, China's extensive territory and "uncharted" flora and fauna proved strong temptations to many European, American, and Japanese survey teams. Chung suggests that Chinese biologists were influenced not only by the social and economic values associated with natural resources, but also by the international contest for the production of scientific knowledge. The process of localization shaped Chinese biology and genetics such that each field grew "to conform to the demand of such native soils as taxonomy and agricultural production" in orientation and, in terms of methodology, "showed a priority of observation and measurement over experiment, or

⁷³ *Henry Lester Institute of Medical Research* (Shanghai: N. C. D. N, 1934), p. 11.

anteriority of descriptive data to causal explication and reproducible experiment in scientific processes.”⁷⁴

Fa-ti Fan has shown how the debate on the origins of Chinese civilization intersected with the development of geology, archaeology, and paleoanthropology in China. He sees science as “a site on which competing knowledge claims, cultural programs, and political tenets jostled with each other for dominance,” and as Chinese geologists and archaeologists began intervening in the international academic conversation, their contributions reflected not only epistemic shifts in understanding, but also “helped to unearth the origins of the nation.” For many Chinese intellectuals, Fan explained, “[t]he archaeology of the nation unearthed the past, surveyed the ruins, and reflected on the present. The nation must look back for meaning and, informed by the past, grope for the future.”⁷⁵ The desire to build a future consonant with modern visions of scientific excellence and sophistication tinted the manner and composition of all scientific work conducted in China during this period. The Lester Institute, by design, could not appease critics who questioned the national loyalties and right of scientific ownership of an organization whose administration openly admitted British sympathies, but by pushing for programs of research grounded in the local specificities of the Chinese context, the Lester Institute could express its dual commitment to modern science and the Chinese nation in deeds.

The Chinese Problem and Local Opportunities

In describing the organization of medical research at the Lester Institute, Earle cautioned,

there is a danger in China lest the results of Western science should be imposed on the people without due regard to the empirical observations which form the basis of the old Chinese medical practice. It is essential that this background be scientifically analyzed before scientific medicine can be established in China.⁷⁶

⁷⁴ Chung, “Struggle for National Survival,” pp. 156.

⁷⁵ Fa-ti Fan, “How did the Chinese Become Native? Science and the Search for National Origins in the May Fourth Era,” in *Beyond the May Fourth Paradigm: In Search of Chinese Modernity*, ed. Kai-Wing Chow, Tze-Ki Hon, Hung-Yok I, and Don C. Price (Lanham, MI: Lexington Books, 2008), pp. 186, 198.

⁷⁶ *Henry Lester Institute of Medical Research*, p. 25.

The “background” alluded to by Earle was more than just vague hand-waving on his part about social and cultural differences, or less politely, the persistence of local Chinese superstitions and other forms of irrational behavior. For Earle, medical research—the kind that had to be conscientiously and pragmatically undertaken in China—could be classified in three ways: fundamental, historical, and applied. Fundamental research concerned the investigation into the general biological phenomena, whereas applied research encapsulated investigations of special disease problems in the light of existing biological knowledge. Historical research, which Earle believed to be “especially important in China owing to the strong hold which native medicine still exercises over the people,” targeted “the dietetic and therapeutic practices which, although empirically adopted have produced over a long period of years the Chinese constitution as it exists to-day.”⁷⁷ Medical research, if it were to be successfully developed and integrated into Chinese society, needed all three of these types to be pursued conjointly.

For its part, the Lester Institute, particularly within the Division of Physiological Sciences, undertook a concerted effort to satisfy each of these three types of research. Nutritional science, which spanned the intellectual initiatives of both the Division of Clinical Research and Experimental Surgery and the Division of Physiological Sciences, afforded a number of opportunities to meld the different interests encapsulated by the tripartite characterization of research as fundamental, historical, and applied. From the time of its inception until its formal dissolution in 1947, nutritional research occupied a high place on the Lester Institute’s overall agenda. Even between 1937 and 1941 when the Lester Institute had to curtail much of its research activities owing war, studies on nutrition represented the bulk of ongoing research. The reason for such sustained interest and commitment stemmed from the Lester Institute’s ongoing commitment to address Chinese problems in relation to local opportunities. Earle himself had observed, “it is remarkable how many clinical signs and symptoms among Chinese patients can now be explained in terms of vitamin and mineral

⁷⁷ Henry Lester Institute of Medical Research, *Annual Report 1934* (Shanghai: 1935), p. 11.

deficiency.”⁷⁸ Nutritional research afforded a variety of opportunities to advance specialist knowledge whose value anticipated its social applicability for the broader Chinese public.

“Diseases which have a definite nutritional basis or which lend themselves to biochemical investigation on its clinical side” were an early and sustained point of interest for the Division of Clinical Medicine. Under the guidance of B. S. Platt, the division invested considerable time and resources in investigating infant nutrition and the social and economic factors contributing to the choice of rice within local Chinese diets.⁷⁹ They focused, on the one hand, on understanding the clinical expressions of beriberi, for example, and its relationship to other vitamin deficiencies like vitamin A (“in the ward by bedside and by laboratory methods”); while on the other, how that same disease developed expressed itself in non-hospital settings through field observation and experiment.⁸⁰

Clinical research did not preclude efforts at situating each topic within its sociohistorical context, and amongst the various experimental work performed on laboratory animals were also more contextual examinations that linked the technical forays of clinical research to the broader community. In “Chinese Methods of Infant Feeding and Nursing,” Platt and his Lester Institute colleague, S. Y. Gin, conducted a survey of “native methods.”⁸¹ Platt and Gin interviewed 387 women who been attending “infant welfare clinics in a native part of Greater Shanghai—for the

⁷⁸ “The Henry Lester Institute of Medical Research,” *Nature* 3757 (1941): 405.

⁷⁹ Benjamin Stanley Platt (1903-1969), more commonly referenced as B. S. Platt, was an associate of the Lester Institute from 1932 to 1938. He later served as the director of the Medical Research Council’s Human Nutrition Research Unit and professor of human nutrition at the London School of Hygiene and Tropical Medicine. He was a key figure in the preparation of the report on nutrition in the (British) Colonial Empire, which was published in 1939. He also served as the United Kingdom’s delegate to the First FAO Conference in Quebec in 1945. As part of the Medical Research Council’s Human Nutrition Research Unit, Platt directed numerous nutrition surveys in Nyasaland and Gambia as well as spearheaded the experimental investigation and measurement of the protein-calorie value of typical diets he had observed being consumed in local communities. See his obituary in *Nature* 223 (23 August 1969): 873-4.

⁸⁰ Henry Lester Institute of Medical Research, *Annual Report 1937-1938* (Shanghai: 1939), p. 17.

⁸¹ This publication represented the first part of a three-part investigation into infant feeding practices. It is unclear whether or not Platt and Gin were able to accomplish the remaining portions, but in conception, they intended to also undertake a “critical examination” of local practices by applying laboratory methods and “translation of the laboratory findings into practice in a typical community.” B. S. Platt and S. Y. Gin, “Chinese Methods of Infant Feeding and Nursing,” *Archives of Disease in Childhood* 13 (1938): 343-54.

most part a poor district.” They found that breast-feeding generally commenced on the second day after the baby had been given a concoction intended to “drive out of the body all of the ‘heating’ substances.” Breastfeeding often occurred in conjunction with the provision to the child of a thin paste of rice flour or of starch cake. After about five months, soft rice, a congee-like preparation, was introduced into the baby’s diet; after six months, feedings included some vegetable soup mixed with the soft rice preparation. From about a year onward, the child’s diet incorporated more elements from the adult diet like soups (vegetable, fish, and meat), egg, biscuit, and oranges. In addition, Platt and Gin also found

Chinese red ‘dates’ (Chinese jujubes) have been fed to babies with the belief, according to tradition Chinese medical teaching, that they promote the circulation and increase the volume of blood. . . . Whilst they may be eaten at any age, [Chinese red dates] are considered to be primarily a constituent of the weaning diet.⁸²

These forays into the broader socio-cultural matrix in which the Lester Institute’s research was meant to both serve and transform demonstrated the professional recognition of the viability and even desirability of understanding the local character of Chinese nutrition. Working in consonance with public agencies and elaborating upon social scientific investigations into urban life, the Lester Institute foregrounded health at the confluence of social, cultural, and economic processes.⁸³

Mark Swislocki has described at length the series of studies conjointly undertaken by the Lester Institute and the Industrial Section of the Shanghai Municipal Council during 1935 and 1936.⁸⁴

⁸² Platt and Gin, “Chinese Methods of Infant Feeding and Nursing,” p. 345. For a more detailed study of a proposed simplification of ordinary cooking method for rice for children and its effect on digestibility, see B. S. Platt and E. F. Yang, “The Use of Whole Rice in the Feeding of Infants and Young Children,” *Proceedings of the Fourth Conference of the Chinese Medical Association, Shanghai, Abstracts: Pediatrics Section* (1937), p. 189, cited in Henry Lester Institute of Medical Research, *Annual Report 1937-38*, p. 24.

⁸³ The first few decades of the twentieth century witnessed a flurry of social scientific work in China as young, intrepid Chinese students like Tao Menghe and Fei Xiaotong in sociology and economics began parceling daily life into discrete units amenable for intensive study. For the social construction of poverty and its sources, see Janet Chen, “Guilty of Indigence: The Urban Poor in China, 1900-1949” (Ph.D. dissertation, Yale University, 2005), pp. 59-104. For a detailed examination of the institutional germination of the social sciences, particularly in the field of economics, see Yung-chen Chiang, *Social Engineering and the Social Sciences in China, 1919-1949* (New York: Cambridge University Press, 2001).

⁸⁴ Mark Swislocki, “Feast and Famine in Republican Shanghai: Urban Food Culture, Nutrition, and the State” (Ph.D. dissertation, Stanford University, 2001), pp. 82-9.

For Swislocki, the collaboration between a private research institute and a governmental agency marked a methodological departure and intellectual re-entrenchment for the nascent field of nutritional science in China. While the preceding decade had been characterized by biochemical investigations firmly and physically grounded in the laboratory, efforts like that between the Lester Institute and the Shanghai Municipal Council represented a distinct move outside of the laboratory and into society's multitudinous sectors.⁸⁵ By analyzing the material circumstances shaping food selection and consumption patterns of Shanghai factory workers, studies like *Industrial Health in Shanghai* encouraged the scientific assessment of nutrition as intimately intertwined with the social environment rather than a simple consequence of genetic heredity. Swislocki points out that the collaborative studies between the Lester Institute and the Shanghai Municipal Council on industrial health and hygiene revealed not only the deplorable state of nutritional health of factory workers at eight chromium plating and polishing factories and seven local factories of various occupations, but also raised the specter of menace, malnutrition, as a distinctive social problem afflicting Shanghai's urban poor in contrast to their rural counterparts.⁸⁶

The investigative spirit directed towards aspects of nutrition as it converged with daily life and specific social communities also helped inspire research into traditional Chinese dietetics and pharmacopoeia. Under the supervision of Bernard Read, the Division of Physiological Sciences emphasized analyses of "the chemical content of Chinese diets and food stuffs in regard to the proximate principles, vitamin and mineral content;" and investigations of the physiological relationships of vitamins in living animals (most often, laboratory animals).⁸⁷ In connection with both of these aims, Read helped inaugurate sustained and systemic investigations of Chinese *materia medica* at the Lester Institute. Read argued,

⁸⁵ Bernard Read et al., *Industrial Health in Shanghai, China: A Study of the Chromium Plating and Polishing Trade*, Chinese Medical Association Special Reports No. 6 (Shanghai: Chinese Medical Association, 1936).

⁸⁶ Swislocki, *Feast and Famine in Republican Shanghai*, pp. 83-9.

⁸⁷ Henry Lester Institute of Medical Research, *Annual Report 1937-1938*, p. 17.

This evaluation [i.e., ‘comparative study of the customs and folklore of other countries in the field of medicine’] goes hand in hand with the development of modern research. The more recent biological discoveries in the field of hormones, vitamins, glandular and organ extracts rationalizes some of the empirical methods in use in China for many centuries.⁸⁸

The Lester Institute’s research program in the “rationalization” of Chinese *materia medica* was not unique to the Institute alone. Western-style doctors, refers to Chinese nationals trained and educated in Western-style medical school at home or abroad, demanded the wholesale abolition of traditional medicine at the first National Public Health Conference convened in 1929, they exempted Chinese drugs from their attack. Sean Hsiang-Lin Lei has argued that the largely successful attempts by Western-style doctors to monopolize scientific competence on Chinese *materia medica* for their own research purposes demonstrated a process of re-networking—one in which sought to dissociate Chinese drugs from their traditional network and assimilate those drugs into a “Western-style doctors’ socio-technical network.”⁸⁹ Read and his Chinese colleagues, for their part, facilitated this process by sanctifying the epistemic value of Chinese drugs for biomedicine through their analyses of the chemical identify and properties of Chinese animal, vegetable, and mineral *materia medica*.⁹⁰ In addition to his anthropometric work on the nutritional status of children, Ni Zhangqi (T. G. Ni) also investigated the action of donkey skin gelatin (*ejiao* 阿膠) in the prevention and cure of experimental

⁸⁸ Henry Lester Institute of Medical Research, *Annual Report 1934* (Shanghai: 1935), p. 32. With the assistance of C. M. Yu and P. S. Chao, Read scoured Chinese sources to identify Chinese materials along scientific lines. See, for example, Read, “Materia Medica Tables and Notes,” *Chinese Medical Association Publication*, 10th ed. (1934); “Chinese Materia Medica, Part VII: Dragons and Snakes,” *Peking Natural History Bulletin* 8 (1934); and *Chinese Medicinal Plants from the Ben Ts’ao Kang Mu AD 1596* (Peking: Peking Natural History Bulletin, 1936).

⁸⁹ Sean Hsiang-lin Lei, “From *Changshan* to a New Anti-Malarial Drug: Re-Networking Chinese Drugs and Excluding Chinese Doctors,” *Social Studies of Science* 29.3 (June 1999): 323-58.

⁹⁰ Interestingly, one of the main contributors to the standardization of Chinese drugs at the Lester Institute was a Korean physician, C. Pak from the Laboratories of the Severance Medical Union College, Seoul. He was a visiting researcher from 1937-1939 whose other research interests included the medical properties of ephedrine, which derives from the Chinese shrub *mahuang* (*Ephedra Sinica*) in the early 1920s by Drs. Carl F. Schmidt and Chen Kehui of the Department of Pharmacology of the Peking Union Medical College.

muscular dystrophy in guinea pigs and encephalo-malacia in chickens—both pathological states were induced by the lack of vitamin E.⁹¹

War and Dislocation

By the fall of 1937, the rich intellectual life at the Henry Lester Institute of Medical Research was forced to confront the travails of political instability and outright war. While its previous ventures into local communities had exposed its researchers to the complex social dynamics of conducting experimental work outside the laboratory, the outbreak of war with Japan utterly transformed the social and economic landscape and rendered all experimental work, by necessity, an extension of social relief. Moreover, claims of political impartiality were untenable in an occupied city. While never particularly vocal in public about British prerogatives in shaping the orientation of the Lester Institute's research agenda, its Chinese researchers, particularly those like Hou Xiangchuan and Ni Zhangqi who remained in Shanghai the Japanese invasion, could nonetheless invoke the international dimension of their institutional affiliation as a kind of defense when confronted with nationalist criticism. But after 1937, the political stakes had shifted and their continuation in Shanghai, even if undertaken unwillingly on account of circumstance, had to confront the fierce patriotism and sense of ennobled sacrifice that led tens of thousands of Chinese faculty, staff, and students to uproot and transport the country's leading universities and research institutes into the interior.⁹²

⁹¹ For a description of his findings, i.e., *ejiao* acted "as an inhibitor of the oxidizing substances in cod liver oil and many other foods, which destroy the normal amount of vitamin E present in the diet," see Henry Lester Institute of Medical Research, *Annual Report 1939*, p. 23.

⁹² I am not suggesting that Chinese researchers who continued to conduct research at the Lester Institute after 1937 were "collaborators," but one cannot help but imagine that the nationalist refrains that tinted the Lester Institute's recruitment efforts prior to 1937 would not have developed greater urgency once that the nation itself was under siege. Hou and Ni's respective decisions to continue researching in Shanghai were not unique—Wu Xian, the famed biochemist and professor at the Peking Union Medical College also continued his residency and work in Beijing until 1942. All three were affiliated with foreign institutions, whose general autonomy was respected by the Japanese until 1942. Due to the paucity of archival materials pertaining to the Institute and its operations during the Japanese occupation—I have seen a few tantalizing suggestions that the Japanese may have attempted to absorb the Institute and its Chinese staff into its own research fold, but have been unable to confirm this—it is difficult to determine how individual Chinese researchers grappled with competing loyalties—be it to the Chinese nation, to universal or global science, to their families, to the Lester Institute, etc. Given the vexed nature of "collaboration," it would be interesting to determine how scientific

Between August 1937 and July 1938, three waves of mass migration took place as Chinese intellectuals pack up and relocated the China's educational institutions from the coastal board to the interior west, northwest, and southwest China. The most famous of these wartime universities was the National Southwest Association University (Xinan lianhe daxue 西南聯合大學), which emerged from the combined operation of three Beijing-Tianjin universities: Qinghua University, National Beijing University, and Nankai University. Teachers and students from these three universities marched nearly 1,300 miles to escape Japanese occupation for the relative security of Kunming, Yunnan. Some sixty-two schools, including National Jiangsu Medical College and National Xiangya Medical College, relocated inland.⁹³ In addition to universities and technical colleges, major research institutes like the Academia Sinica with its ten institutes (physics, chemistry, engineering, geology, astronomy, meteorology, zoology and botany, psychology, history and philology, and social sciences) and the National Academy of Peking with its nine institutes (physics, radium, chemistry, materia medica, physiology, zoology, botany, geology, and historical studies and archaeology) also joined in the migration.

The move inland did not stifle research, but it did alter its shape and direction. James Reardon-Anderson has pointed out that the redistribution of China's educational institutions into the interior afforded the Nationalist Ministry of Education greater power of intervention into the curriculum and research orientation of those schools. Applied fields, particularly engineering, received stronger support and material resources from the Ministry. The general university curriculum was modified to include more than fifty subjects with a direct bearing upon industrial and

work not under the aegis of the Chinese state fit within the political and emotional matrix of the period. That, however, may require a separate dissertation. For an intriguing analysis of *hanjian* (漢奸, traitor or transgressor), in its base sense, as the betrayal of ethno-cultural identity, see Frederic Wakeman Jr., "Hanjian (Traitor)! Collaboration and Retribution in Wartime Shanghai," in *Becoming Chinese: Passages to Modernity and Beyond*, ed. Wen-Hsin Yeh (Berkeley: University of California Press, 2000), pp. 298-341. A more sustained consideration of the political complexities and the nationalist coloring of "collaboration," see Timothy Brook, *Collaboration: Japanese Agents and Local Elites in Wartime China* (Cambridge, MA: Harvard University Press, 2007).

⁹³ *China Handbook, 1937-1943: A Comprehensive Survey of Major Developments in China in Six Years of War*, comp. Chinese Ministry of Information (New York: Macmillan Co., 1943), p. 369-72.

military problems, e.g., chemistry of poison gas, charcoal and oil refining, armament manufacture, road construction, army medical service, and land reclamation, to name a few.⁹⁴ The pure sciences were relegated to a position of lesser importance as, Reardon-Anderson explains, “highest priority was placed on the application of knowledge to achieve useful results.”⁹⁵

While colleges of engineering generally enjoyed the largest enrollment and the best facilities, the pure sciences struggled to locate viable equipment to run basic laboratory experiments.⁹⁶

University instruction in the experimental sciences relied upon ingenuity and practical creativity.

During his 1943 tour of Chinese universities and scientific institutions, Joseph Needham marveled at all that Chinese science students and teachers continued to do despite the adversities of war and lack of modern conveniences. His description of the National Southwest Associated University is worth quote at length:

All the departments are housed in “hutments” built of mud brick, and roofed very simply with tiles or tin sheets, though some have curving roofs in the great tradition of Chinese architecture. Inside, the floors are beaten earth, with a little cement, and extreme ingenuity has been used in fitting up laboratories for research and teaching under these conditions. For example, since no gas is available, all the heating has to be done with electricity. When the supply of element wire for heaters (home-made

⁹⁴ James Reardon-Anderson, “Science in Wartime China,” in *China’s Bitter Victory: The War with Japan, 1937-1945*, ed. James C. Hsiung and Steven I Levine (Armonk, NY: M. E. Sharpe, 1992), p. 216, and *China Handbook, 1937-1945*, p. 384.

⁹⁵ Reardon-Anderson, “Science in Wartime China,” p. 217. It should be noted that the strong attraction of applied knowledge was neither steadfast nor uncontested. An ongoing conflict between utilitarianism (i.e., applicability to the war effort) and the pursuit of esoteric knowledge shaped debates over the research agenda in Nationalist areas. Reardon-Anderson examines this tension with respect to the Chinese chemical industry. Shiwei Chen highlights the political dimension of such debates within the context of the Academia Sinica and its attempts to elude direct Nationalist control, particularly after the death of its president, Cai Yuanpei, in 1940. See his dissertation, “Government and Academy in Republican China: History of Academia Sinica, 1927-1949” (Ph.D. dissertation, Harvard University, 1998), pp. 158-70.

⁹⁶ From 1931 to 1940, the general scholastic trend in enrollment favored science and the allied sciences. Whereas 32,940 students identified their major subjects as literature, law, commerce, and education in 1931, nearly ten years later, the enrollment in such fields had dropped about twenty-five percent. In contrast, the number of students majoring in science, engineering, medicine, and agriculture more than doubled during this same period (from 11,227 in 1931 to 25,262 in 1940). *China Handbook, 1937-1945*, p. 382. The appeal of practical education, which could both garner employment and help save the nation, led many students to study engineering. Reardon-Anderson cites the following breakdown as evidence of the strong popularity of engineering: of the nearly six thousand candidates sitting for the entrance exam at the National Central University in 1943, 31 percent chose engineering, 25 percent law, 23 percent agriculture and education, and lagging far behind, 10 percent letters and 5 percent (each) medicine and science. Reardon-Anderson, “Science in Wartime China,” p. 217.

out of clay) ran out some time ago, work was at a standstill until it was found that gun lathe shavings from one of the Yunnan arsenals would do very well. When microscope slides could not be had, windowpanes broken by air raids were cut up, and the unobtainable coverslips were replaced by local mica. Many other instances could be given of Chinese ingenuity and initiative. When the siren goes, all the most valuable apparatus of the Associated University is lowered into large petrol drums built into the floors of each mud-brick building, to guard against anything but a direct hit.⁹⁷

With formal laboratories and experimental facilities, specimens and reagents, library reference works and current periodicals all in meager supply, students and teachers used alcohol lamps for gas burners and distilled well water. According to a reporter to Kunming in 1939, “the simplest household implements, pots, kettles, meat grinders, were used for chemical experiments.”⁹⁸

Inland Nutritional Research

On the whole, research scientists in a variety of fields confronted their constrained circumstances with gusto and flexibility. Adapting themselves to their new environments, Chinese scientists applied their skills and expertise to studying the food supply and feeding habits of various edible common fishes found in Sichuan, conducting a survey of terrestrial magnetism in Fujian and Jiangxi provinces, and preparing a gravity map of China and the precise determination of longitudes and latitudes.⁹⁹ Biomedical nutrition research did not experience quite as bare bone an existence as the pure sciences, but its former reliance upon the sophistication of a well-equipped laboratory to perform chemical assays of local foods or physiological investigations with laboratory animals yielded in favor of more direct clinical surveys of available populations. The Institute of Physiology of the National Academy of Peking continued with investigations of the nutritious values of foodstuffs, but emphasized local products in their studies in order to ensure applicability of their

⁹⁷ Joseph Needham, *Chinese Science* (London: Pilot Press Ltd., 1945), 13-14. Needham exhibits a high degree of respect for the Chinese scientific endeavor, which is probably best captured in his description of the Department of Pathology of the medical school of the West China Union University Hospital. Repeated bombings and fire had, each time, destroyed the records of the Department of Pathology, but instead of capitulating to circumstance, the Department took to making “their own typewriter ink, which faded on the records.” Needham, *Chinese Science*, p. 15.

⁹⁸ Hubert Freyn, *Chinese Education in the War* (Shanghai: Kelly & Walsh, 1940), 38.

⁹⁹ *China Handbook, 1937-1943*, pp. 405-17.

findings to daily life. The Institute also performed studies on types of Chinese drugs produced in Yunnan and on the basal metabolism of the Yunnanese people.¹⁰⁰ In 1944, a series of investigations appeared in a special nutrition issue of the journal *Kexue*. Chen Shenzhao of the Physiochemistry department of the Military Medical Academy (Junyi xuexiao shengli huaxue xi 軍醫學校生理化學系) and the Army Nutrition Research Institute (Lujun yingyang yanjiusuo 陸軍營養研究所) initiated a study of the diets and physiques of soldiers stationed at Anshun, Guizhou. A collaborative study with his colleagues Wan X, Chen Shangqiu, and Zhang Kuanhou focused on the nutritional composition of the school diet provided to military medical students and its impact upon student growth.¹⁰¹

As is evident, in many of the cases described above, nutrition researchers took advantage of their local settings and constituent populations. Luo Dengyi, who worked in the Experimental Nutrition Laboratory of the Agricultural Chemistry Department of National Zhejiang University (Guoli Zhejiang Daxue Nongye huaxuexi yingyangxue shiyanshi 國立浙江大學農業化學系營養學實驗室) relied upon the cooperation of more than four hundred university students in his investigation of the impact of war upon the nutritional health of students.¹⁰² To demonstrate how student nutrition has changed, Luo conducted repetitive dietary investigations, first in 1939 and again in 1941 and 1942. By juxtaposing two synchronic studies, Luo revealed how in each of the major nutritional categories—caloric intake, amount of protein, vitamin, and minerals—the student diet had degraded over the course of a few years. In contrast, Wang Chengfa and Sun Yanming of the National Institute of Health (Zhongyang Weisheng Shiyanyuan 中央衛生實驗院) concentrated their attention upon the dietaries of employee families of the National Health Administration (Weisheng shu 衛生署). They began interviewing seven high-level families (*gaoji zhiyuan jiating* 高級職員家庭)

¹⁰⁰ Ibid., p. 413.

¹⁰¹ Chen Shenzhao, “Budui zhi shanshi yu tige” 部隊之膳食與體格 [Troop diets and physiques], *Kexue* 27.3 (March 1944): 5-7 and Chen Shenzhao et al., “Junyi xuesheng shanshi diaocha” 軍醫學生膳食調查 [Survey of the dietary of military medical students], *Kexue* 27.3 (March 1944): 8-11.

¹⁰² Luo Dengyi 羅登義, “Kangzhan shiqi daxuesheng de yingyang” 抗戰時期大學生的營養 [University student nutrition during wartime], *Kexue* 27.3 (March 1944): 20-6.

and nine mid-level families (*zhongji zhiyuan jiating* 中級職員家庭) in May 1940. High-level families had a monthly income of three hundred *yuan* or more. Mid-level families earned less than three hundred *yuan* a month. Due to persistent bombing attacks, the study took longer to complete than originally planned and finished in April 1942.¹⁰³ Between 1937 and 1945, nineteen separate investigations were undertaken on Chinese diets during wartime. The number of people covered in the studies ranged from 26 to 1,930. Professionally, subjects were drawn from schools (primary, middle, and university levels), factories, farms, military regiments, and trades groups (tailors and shoemakers).¹⁰⁴

A good example of biomedical nutrition's reach can be found with the series of experiments conducted by researchers from the National Jiangsu Medical College (Guoli Jiangsu yixueyuan; now known as Nanjing yike daxue or Nanjing Medical University), which had relocated to Beibei (北碚), northwest of Chongqing. In January 1940, a team of scientists from the Department of Physiology began a series of nutritional studies at the Chongqing No. 3 Children's Home (Chongqing di'san ertong jiaoyangyuan).¹⁰⁵

In their attempt to understand the nutritional state of the residents (adult and child) of the Chongqing No. 3 Children's Home, a team of four nutritional researchers, Guo Junxian, Sun Zongpeng, Zhu Ding, and Li Qionghua, charted four interlocking studies that investigated both the foods eaten and the people doing the eating. They conducted a detailed dietary survey (*shanshi diaocha* 膳食調查), a survey of nutritional diseases found among the residents, a nutritional study of vitamin

¹⁰³ Wang Chengfa 王成發 and Sun Yanming 孫儼明, "Zhanshi gaozhongji jiating shanshi diaocha chubu baogao" 戰時高中及家庭膳食調查初步報告 [Preliminary report on the dietary survey of high- and mid-level families during wartime], *Kexue* 27.3 (March 1944): 12-9. Wang Chengfa also formulated an "egg yolk-legume mixture" to serve as a substitute for milk or milk powder. He conducted a feeding trial on a 15-day old baby for 60 consecutives. *China Handbook, 1937-1943*, p. 682.

¹⁰⁴ "Nutrition Program in China," NJ 372-342. See also Fu Shaolin's family budget inquiries on Chongqing laborers during the 1940s, NJ 11-177.

¹⁰⁵ Chongqing No. 3, located in Beibei, was established in October 1939. As one of four "warphanages" set up in Chongqing between November 1938 and October 1939, the home provided stability and education for refugee children, who had been rescued from war zones.

C found in local foods, and a clinical report on the prevalency of night-blindness among the Home's children. Each of these studies, the researchers argued, provided valuable information with which to determine how best improve children's diets within a severely constrained economic climate. Moreover, by properly delineating the exact contours of the health and nutritional problems facing the Home's residents, any future recommendations made would be conceived in accordance with nutritional principles.

The researchers' fidelity to biomedical nutritional thinking was a natural consequence of their professional training, but their insistence upon integrating nutritional principles into policy deliberations and practical, everyday decision-making marked an important way in which the language and methodology of nutritional science signified modern scientificity and by its incorporation into policy recommendations legitimated the political authority of science to extend into the realm of everyday life.

Grace Shen has suggested that histories of the modern sciences in China have tended to skirt the question of why science became both important and desirable. The focus generally falls upon the process of comprehension, and while strides have certainly been made in "clarifying the complex acculturation process," Shen argues, "we still take for granted that Chinese would naturally want science once they grasped what it was." In raising the question of desire, Shen seeks to problematize the implicit assumption that science "as laid out in the West was an ineluctable good of stable content and universal appeal."¹⁰⁶ If we direct her question of desire towards the science of nutrition and Chinese nutrition scientists, we find a curious situation in which the obvious response involving foreign imperialism and the survival of the Chinese nation and people to is both applicable and yet not complete. Shen's highlighting of the desires and motivations leading Chinese scientists to embrace science takes us halfway, but not all the way, because it overlooks the ways in which the act of science-making could also generate desire. Assuming we can differentiate between different types

¹⁰⁶ Grace Shen, "Murky Waters: Thoughts on Desire, Utility, and the 'Sea of Modern Science,'" *Isis* 98 (2007): 587.

of desire compelling the utter naïf and the worldly professional to embrace science, it is worth pointing out the reasons, which drove young Chinese intellectuals to pursue science, likely shifted over the decades. But for those like Guo Junxian, Sun Zongpeng, Zhu Ding, and Li Qionghua laboring in inland China without the benefit of much of their former equipment—or even running water—science was its own justification.¹⁰⁷

Chongqing No. 3: Nutrition Research as Social Intervention

In the case of Chinese nutrition scientists, undertaking nutritional surveys opened pathways into specific sectors of the population previously unconsidered. When explaining their motivation, Guo Xi and Sun Zongpeng observed,

With regards to the Chinese diet, in the past few years, there have been several studies conducted, but with the exception of one or two focusing on middle school students, almost all these studies have concentrated upon the question of adult nutrition. There has not been much work done on primary school children, because most do not receive room and board from the schools, thus making it difficult to study [their nutritional health]. With the retreat to the southwest of China, more than 10,000 school-age refugee children have had to be cared for in shelters. How to manage their education and nutrition has become a major problem. This report details our preliminary investigation into the dietary situation of the Chongqing No. 3 Children's Home under the administration of the National Relief Commission.¹⁰⁸

War had rent the social fabric of daily life. Children separated from their parents, whether by death or distance, found themselves wards of a far-reaching network of wartime children's homes built and subsidized by the National Relief Commission from October 1938 until December 1944. According to M. Collette Plum, approximately 220,000 war orphans were housed in these homes, which were

¹⁰⁷ Interestingly, we see this best when we consider how scientific experimentation, in the generic sense, was foregrounded the advice proffered in popular periodicals for home and childcare. In a 1932 issue of the journal *Jiating* (Home), an advice column entitled "The digestion times of plant foods" (Zhiwu zhi xiaohua shijian) appeared under the authorship of one Gong Shou (lit. "male longevity"). For the curious reader seeking scientifically-derived information about the digestion times for different types of food in the stomach, Gong Shou provided a short list with corresponding times: fruits (grapes and peaches), 1 hour 45 minutes; spinach, eggplant, and eastern melon, 2 hours; oranges, 2 hours and five minutes; and bamboo shoots, three hours and fifteen minutes (*Jiating* 29 (1932): 32-3).

¹⁰⁸ Guo Junxian 郭俊銑 and Sun Zongpeng 孫宗彭, "Ertong jiaoyangyuan shi shanshi: Jiaoyu bu zhiding zhongxiaoxue yingyang yanjiu baogao di'yi hao" 兒童教養院是膳食：教育部制定中小學營養研究報告第一號 [Children's Home Diet: Report No. 1 on the Nutrition of Middle and Primary School Children, as directed by the Ministry of Education], NJ 5-15051.

located mostly in the interior but also in Japanese-occupied and Communist-controlled areas.¹⁰⁹ The practical task of caring and educating the children was immense. Ensuring proper attention to the children's basic needs: food, clothing, and accommodation, required a large financial commitment—more than \$10,000,000 for the period of April 1938 to December 1940.¹¹⁰

Identifying practical and economic ways to improve the nutritional health of school-age children functioned as an epistemic intervention that broadened the definition of social relief, such that even if their studies did not necessarily lead to specific policy changes or the creation of government programs, their recalibration of the meanings associated with a basic part of day-to-day life—food and eating—lent credence to modernist claims that science changed not merely one's thinking, but also one's actions. The four nutritional studies conducted by Guo Junxian and his colleagues each articulate a different way to apprehend everyday life and stage minor interventions that can lead to a transformation of individual and collective social practices.¹¹¹ To understand how, let us consider the specific ways in which the Guo and his colleagues embedded their investigations within the daily structure of the Chongqing No. 3 Children's Home.

Mixing food and work

M. Colette Plum has argued that the creation of wartime children's homes was a state-driven project that extended the power of the Nationalist government in such a way as to both perform specific acts of charity and transform the children within its care into modern citizens. Because the formation of the national subject weighed heavily upon the planners' minds, they drew from the writings of the prominent educator Tao Xingzhi and child psychologist Chen Heqin and

¹⁰⁹ M. Colette Plum, "Unlikely Heirs: War Orphans During the Second Sino-Japanese War, 1937-1945" (Ph.D. dissertation, Stanford University, 2006), p. 11. Based on Plum's sources, the projected figure for the total number of Chinese war orphans, at least by 1943, was "over two million."

¹¹⁰ *China Handbook, 1937-1943*, p. 722.

¹¹¹ The four studies are Guo Junxian and Sun Zongpeng, "Ertong jiaoyangyuan shi shanshi;" Guo Junxian, Zhu Ding, Li Qionghua, and Sun Zongpeng, "Xiaoxuesheng zhi yiban yingyang ji yingyang bing" [The general nutrition and nutritional diseases of primary school-age children]; Guo Junxian and Sun Zongpeng, "Xiaoxuesheng zhi bingzhong weishengsu yingyang" [Vitamin C nutrition of primary school-age children]; Guo Junxian and Sun Zongpeng, "Xiaoxuesheng zhi yemangzheng" [Night blindness among primary school-age children], NJ 5-15051.

implemented a program of learning that emphasized practical skills and cooperative production—technical abilities and life skills (*shenghuo jineng* 生活技能), to reiterate Plums's translation, that highlighted the children's potential to be doers for the nation.¹¹² This focus upon practical training in handicrafts and agriculture was evident in the children's daily schedule, which largely consisted of handicraft and agricultural work that produced goods for use in the children's homes or sale in the local market.¹¹³

The emphasis upon child labor, enveloped as it was with nationalist rhetoric about self-reliance and the productivity of the nation, should alter our estimation of the nutritional studies conducted by Guo and his colleagues, because it directs our attention to the political economy supporting certain conceptions of nutritional health. Mapping the contours of daily food consumption was foundational to constructing a working notion of Chinese children's nutritional health, but such a notion was itself indebted to specific aims and objectives. Understanding the nutritional health of school-age children, then, was not simply a matter of intellectual curiosity, and in the case of the Chongqing No. 3 Children's Home, it was a crucial element for maintaining a specific kind of citizen-subject regime. How the researchers interpreted the issue of labor in terms of heat energy was primed to reverberate beyond the narrow confines of the Department of Physiology and throughout the administrative domain of the Ministry of Education.

The first study Guo and his colleagues undertook was a thorough accounting of the food—its various types, the manner of preparation, the quantities consumed and even disposed of—in the children's home. In January 1940, the Chongqing No. 3 was home to 284 occupants, of which 245 were children ranging in age from three to twelve and older. With the exception of eight young boys between the ages of three and seven, nearly all the boys were seven years or older. The few girls residing at the No. 3 were also older, around twelve *sui*. (See Table 1)

¹¹² Plum, "Unlikely Heirs," pp. 210-54.

¹¹³ Based on her examination of the operations of three children's homes—two in Sichuan and one in Zhejiang—Plum has found that children engaged in everything from the manufacture of straw shoes, cloth, and rattan articles to raising vegetables and tending to livestock. See Plum, "Unlikely Heirs," pp. 253-96.

Table 4 : Number and Age Distribution of Persons at the No. 3 Children's Home

		Male	Female	Total
Adult	Instructors	4	10	14
	Work Staff	(20) 22	3	(23) 25
Children	3-5 yrs	3		3
	5-7	5		5
	7-9	38		38
	9-11	75		75
	11-12	34	10	44
	12 and older	67	13	80
Total				284

Guo and his collaborators weighed all the ingredients, both before and after cooking; they oversaw the food prep and evaluated the cooking techniques employed; and they scrutinized the amounts, eaten and not, of each person's particular share of the resulting food. Even without having issued a formal report of their findings, their presence and keen interest about the quantitative dimensions of food production must have sparked the curiosity of the laymen staff. To ask who such individuals were and why they kept sticking their nose into the soup pot would have been a natural reaction. For Guo and his colleagues, these daily intrusions and nitpicky questions marked merely the beginning of their investigations. Using Bernard Read and W. Y. Lee's *Shanghai Foods* (1937) as a reference guide for ascertaining the chemical composition of local foods, they then proceeded to calculate the actual caloric intake as well as the recommended amount of each resident.

The conclusion they arrived at once was simple: both adult and child residents of the Chongqing No. 3 Children's Home failed to receive the recommended amounts, and for each nutritional category of assessment, be it calories, amount of protein or vitamin C, the local diet came up short. The conclusion was hardly surprising, as the country was at war, and despite surface appearances, the conclusion does not reveal nearly as much about research as social praxis as an examination of how Guo and his colleagues determined the recommended nutritional allowances. By

considering in more detail how they arrived at their recommended caloric sums, we can see immediately how the researchers integrated child labor into their calculations.

The manner in which Guo and his colleagues organized and separated the children's ages echoes the scheme presented by the League of Nations 1936 report, "Physiological Bases of Nutrition," and later adopted in 1938 by the Chinese Medical Association in its determination of minimum nutritional requirements for China.¹¹⁴ Because the basic unit for determining caloric needs was a sedentary adult male, to calculate the caloric needs for children required adjusting standards set for the adult male by specific predetermined coefficients, e.g., the coefficient for a child between the ages of 9-11 was .8, which in essence amounted to saying such a child required eighty percent the energy requirement of an adult male.¹¹⁵

Once Guo and his colleagues had determined a base figure, they then proceeded to adjust the numbers in accordance with the level of muscular activity or work exerted. The Chinese Medical Association guidelines had set heat energy supplements in terms of calories per hour work additional. Hence "light work" merited up to 75 calories per hour of work; "moderate work" 75 to 150 calories; "hard work" 150 to 300 calories; and "very hard work" 300 calories and upwards per hour of work.¹¹⁶ Based on the authors' assessment of the daily lives of the children's home's residents, they calculated the corresponding activity-related energy supplementals as follows:

¹¹⁴ I have not been able to find a reasonable and scientific explanation for distributing ages in this manner. There is certainly an element of thoroughness achieved when one charts patterns of change on a yearly basis, but this sort of age categorization (e.g., ages two to three, three to five, five to seven, etc.) and its accompanying energy requirement coefficients glosses over how growth does not occur at a regular, modulated pace and exempts the effects of puberty a role in nutritional needs. For a more detailed examination of how Chinese nutrition scientists attempted to craft minimum requirements for the Chinese from international precedents, please see chapter 4 of this dissertation.

¹¹⁵ Contemporary nutrition no longer applies a simple set of coefficients for determining a child's energy requirements and predicts energy intake on the basis of total energy expenditure data obtained by the doubly labeled water method plus an allowance for energy deposition incident to growth as determined from measurements of weight gain and body composition of normally growing infants and young children. Adolescence (roughly nine through eighteen years of age for boys and girls) is also taken as a distinct category with its own attendant nutritional. In contrast to contemporary practices, the League of Nations and the Chinese Medical Association treated children twelve and older as basically on par with adults in terms of energy requirement.

¹¹⁶ "Report on Minimum Nutritional Requirement for China," SMA U1-16-1942.

Male instructors each do about four hours light work (*qingliang gongzuo* 輕量工作) daily and four hours of moderate work (*zhongliang gongzuo* 重量工作). Female instructors each do about 8 hours of light work. Male staff workers do one hour of very hard work (*ji julie gongzuo* 極劇烈工作), 3 hours of moderate work, and 4 hours of light work. A 10 year old child probably does 4 hours of light work daily. Refugee children (*nantong* 難童) 12 years old and older probably do about four hours of moderate work daily. Female children probably do about four hours of light work.¹¹⁷

This distinction between light, moderate, and very hard obscures the variety of activities that might be subsumed under each heading. Although Guo and his colleagues do not specify what sorts of activities constituted the four hours of light or moderate work undertaken by male and female children at the children's home, we can nonetheless marvel at possibilities already categorized by Wu Xian in 1929 and available for the researchers' reference. Making leather shoes (*zuo pixie* 做皮靴), and washing clothes (*xiyi* 洗衣) counted as "light" work. In contrast, carpentry (*zuo mujiang* 作木匠), metal work (*zuo wujin jiang* 作五金匠), stonemasonry (*shijiang gongzuo* 石匠工作), and cutting wood (*jumu* 鋸木) constituted "moderate" work.¹¹⁸

The social consequences of this kind of abstraction took many forms. Because the researchers categorically labeled the work of those under the age of twelve as "light" and those over twelve "moderate," the specific tasks assigned to the children lost any sense of real-world experience. In terms of nutritional metrics, the work of a young boy about eleven years of age engaged in making straw shoes (*caoxie* 草鞋) was comparable with a boy of the same age making cloth, a significantly more taxing form of work. Alternatively, if the child in question were female, neither age nor type of work would shift the identification of her labor as constitutively "light." Depending upon the specific political objectives in play, this kind of rubric could be used to justify an institutional form of undernourishment in which the depreciation of child labor permits slight-of-hand measures that further decrease the nutritional allowance given to the children. Moreover, the ethical questions

¹¹⁷ Guo and Sun, "Ertong jiaoyangyuan shi shanshi," NJ 5-15051.

¹¹⁸ Wu Xian, *Yingyang gailun* (Shanghai: Shangwu yinshu, 1928; rpt. Taipei: Taiwan shangwu yinshu, 1974), p. 42.

concerning child labor become lost in the logical efficiency of nutritional formulae and input-output calculations. Such tactics would dramatize the hard-edged rationale behind national economic self-sufficiency and indicate the subtler forms of scientific justification used to dispel humanist critiques.¹¹⁹

In the case of the Chongqing No. 3 Children's Home, however, Guo and his colleagues applied the rubric in such a manner as to achieve the opposite effect. The abstraction of child labor as "light" or "moderate" enabled the researchers to include and compare the corresponding labor of the home's adult residents, such that when Guo et al. presented their calculations for the recommended caloric allowance, they proposed a single amount as the baseline for all residents regardless of age. Rather than compiling a table of different allowances differentiated by age group, the researchers argued that recommended energy allowances ought to be based on the total caloric needs of the entire children's home: adult and children. From this grand total, one then took the average per person daily allowance and set this amount as the administrative baseline for determining dietary costs. Because recommended adult allowances far exceeded those recommended for children under the age of eleven, by including adult allowances in their calculations, the researchers essentially inflated the resulting average.

Their purpose was certainly not to "distort" reality by manipulating facts. If anything, this slight, seemingly inconsequential decision to construct their data set one way as opposed to another demonstrates the creative and constructive qualities of numerical "facts." For Guo and his colleagues, a higher standard for the recommended allowance amplified—but did not manufacture—the health consequences associated with the children home's dietary. In their subsequent studies, Guo et al. showed that although they found no cases of under- (*yingyang buzhi* 營養不足) or over-nutrition (*guoduo yingyang* 過多營養), they did observe several cases of nutritionally related conditions like

¹¹⁹ Because children twelve and older were treated as adults in terms of energy requirement, a thermodynamic argument could be made that rendered "child labor" somehow irrelevant. It would be interesting to see whether or not shifts in nutritional thinking can be mapped to the emerging political discourse about child labor and children's rights.

dental caries (*zhuchi* 蛀齒), conjunctival xerosis (*yanjiemo ganzao* 眼結膜乾燥), and night blindness (*yemang* 夜盲).¹²⁰ Of the 232 children they examined, they found 31 cases of dental caries, 18 cases of conjunctival xerosis, and 28 cases of night blindness. For each medical condition, the researchers observed that less than fifteen percent of the children at the Chongqing No. 3 Children's Home were afflicted, and given the low rate of prevalency, this was good news. But lest one conclude that no further concern need be expressed or administrative action be taken, the researchers cautioned that while they found no cases of undernutrition or severe expressions of deficiency diseases, the incidence of conjunctival xerosis and night blindness indicated "unsatisfactory" levels of vitamin A. Moreover, as the researchers also identified a handful of cases of gum inflammation (*chizuiyan* 齒齦炎) and sore joints (*guanjie suntong* 關節酸痛), they argued that these cases should raise suspicions about the adequacy of levels of vitamin C found in the children's home dietary.

In order to clarify the nutritional causation behind the cases of night blindness in the children's home,, Guo Junxian and Sun Zongpeng undertook a further, more detailed examination of the 28 children with night blindness. Guo and Sun identified the children by submitting them to a simple test conducted under the moonlight. In the playground attached to the children's home, there was a flat, stone path, which all the children traversed throughout the course of the day. Guo and Sun tested the children's facility to navigate the path under the moonlight. For normal children (*zhengchang ertong* 正常兒童), the task was simple. They ambled about at leisure, sometimes even breaking into a run as the pleasure took them. For those suffering from night blindness, the task proved both terrifying and unsettling. Each step was tenuous and unstable. The children with night blindness, unable to recognize the darkened path as the same path strewn with light during the day,

¹²⁰ Dental caries were generally considered during this period to be indicative of poor nutrition. Conjunctival xerosis (lit. dryness of the mucous membrane, which lines the inner surface of the eyelids and is reflected over the front of the eyeball) and night blindness (a condition making it difficult or impossible to see in dim light) are induced by vitamin A deficiency. Guo Junxian, Zhu Ding, Li Qionghua, and Sun Zongpeng, "Xiaoxuesheng zhi yingyang ji yingyangbing: Jiaoyu bu zhiding zhongxiaoxuesheng yingyang yanjiu baogao di'er hao," NJ 5-15051.

tumbled quickly to the ground. Those the researchers could compel to complete the task and walk the entire length of the path, regardless of trips and falls, were exempted from their study. The remaining 21 children underwent a ten-day trial treatment with cod liver oil.

The degree to which Guo and Sun had to involve themselves in the daily lives of these children cannot be understated. When they led the children out to stone path, they did not just tally those who faltered in the dim light. Guo and Sun, to the best of their abilities, attempted to identify the very contours of the children's visual perception. For each of the 21 children who went on to receive cod liver oil supplements, they detailed the particular nature of his or her visual infirmity. The vision of child no. 1, for example, began to blur once the sun had set such that by nightfall, seeing anything was incredibly difficult. Child no. 3 experienced difficulty seeing even with glow emitted from a vegetable oil lamp. In contrast, child no. 4 retained some degree of visual acuity under lamp light. The vision of child no. 10 was blurry in dim light, and upon nightfall, he was unable to move about unless assisted.

Thus, when they began providing drops of cod liver oil, they had already insinuated themselves into the social fabric of the children's home.¹²¹ Their presence was not limited to an hour here and there spread over long period of absence. Guo and his colleagues embedded their work within the operations of the children's home, in such a manner as to institutionalize their scientific gaze. The children's home functioned as a living laboratory. The children, for their part, had become familiar with the researchers and their distinctive forms of social interaction. In addition to having their heights, weights, and sitting heights measured, children at the Chongqing No. 3 Children's Home would have also experienced the peculiarity of reflex tests upon their knees and the sensation of strange hands gently pressing upon sides of their necks. They learned to answer questions about their nighttime movements and their degree of comfort in settings with dim or no light. Sometimes, a

¹²¹ Guo and Sun concluded that as their administrations of cod liver oil effectively remedied nearly all 21 cases they had been studying, night blindness had been induced by nutritional deficiencies, specifically insufficient levels of vitamin A. What remains unclear is whether or not the children's home continued to administer cod liver oil to all cases of night blindness as they emerged after Guo and Sun had completed their specific investigation. Cod liver oil or "haliveroil" (i.e., halibut liver oil) was obtainable only by import, and supplies available to children's homes like the Chongqing No. 3 Children's Home came from the International Red Cross Committee (NJ 11-821).

handful of students found themselves asked to furnish urine samples at random times throughout the day.¹²²

All of these subtle modifications to the day staged a material transformation in the constitution of Chinese experiences of modernity.¹²³ Whether or not the children comprehended fully all they were asked to do or explain is of lesser importance than the ways in which their institutional lives came to depend upon this intermingling of social and scientific practices.¹²⁴ Localization entailed the awareness and sensitivity to adapt scientific projects to the needs of specific contexts, but its effects were not limited to the investigations alone. By incorporating specific kinds of scientific practices—the physical examination, the dietary survey, and related activities for identifying deficiency diseases—into the structure of institutional life, Guo and his colleagues imbued routine parts of daily life with scientific weight and esteem.

¹²² Guo Junxian and Sun Zongpeng also investigated the presence of vitamin C deficiencies among the children at the Chongqing No. 3 Children's Home. To determine absorption rates of vitamin C, they selected five boys ages twelve through fifteen and gather urine samples every few hours. Guo Junxian and Sun Zongpeng, "Xiaoxuesheng zhi bingzhong weishengsu yingyang" 小學生之三種維生素營養 [Vitamin C nutrition of primary schoolchildren], NJ 5-15051.

¹²³ An alternate example for how investigators renegotiated the parameters of daily life in order to achieve their scientific objective can be found in the "Family Budget Inquiry of Chongqing Laborers Conducted by the Department of Statistics of Ministry of Social Affairs" (1 October 1942 to 31 November 1942). In describing the study's scope and methodology, the researchers noted,

To avoid the misunderstanding of the members of the families and to expedite our work, we first proceeded to make explicit the aim of our investigation and, then, before inquiring, we assembled the *Baozhang* (保长) and *Jiazhang* (家长) in each district and explained the meaning and object of this investigation and, especially, tried to make them know that the investigation had nothing to do with taxation and military service and that we only wanted to ascertain the living conditions of the laborers' families. Our investigators were well selected and trained in politeness; they were familiar with the purposes and the procedure of the inquiry. In addition, the investigators were instructed to offer help to the families, such as to write letters, carry rice and establish public hospitals free of charge for them. NJ 11-177.

¹²⁴ How, and if, the children who were interned within the Chongqing No. 3 Children's Home assimilated the scientists' various research techniques as part of their daily habitus is difficult to discern from the existing historical record, although we should probably leave the possibility open for further investigation. The physical examination techniques used to ascertain the children's heights, weights, and sitting heights, were being reproduced in popular children's journals for parental and child consumption, and regular exposure through the school system may have all conspired to shift how young Chinese apprehended their own bodies, but we just cannot say for certain.

After 1937, the forces of localization played an ever-greater role in the shaping the contours of biomedical nutritional research in China. For Chinese nutrition scientists working in inland China, localization defined the national bounds of their scientific work. Confronted with practical exigencies that made even basic laboratory work difficult, Chinese nutrition scientists exploited the hidden opportunities of the mundane and directed themselves towards the national war effort by producing scientific knowledge that directly addressed local problems. Interjecting themselves into the daily lives of children, soldiers, or industrial and occupational laborers, Chinese researchers cultivated their scientific enterprises through ingenuity and political finesse. Such skills were unlikely to be lost upon those who had remained in Shanghai to continue their researchers at the Henry Lester Institute of Medical Researcher. But whereas inland Chinese nutrition scientists operated conscientiously under the dictates of a national imperative for survival and self-sufficiency, scientific life at the Lester Institute confronted not only the exigencies of war but also the constraints of competing foreign imperialism.

Following the outbreak of war between Japan and China in July 1937, the Lester Institute was “forced by conditions . . . to suspend the major portion of their work for a period of six months.”¹²⁵ Although the suspension was temporary, the Lester Institute found itself operating in a dramatically different environment from thenceforth. The building, which housed the Lester Institute, did not reopen until 10 October 1938. The loss of some of the British staff—the short visit to England by Dr. Gordon Thompson, the Head of the Division of Clinical Research and Experimental Surgery, became a permanent relocation with the continuance of Sino-Japanese hostilities in and around Shanghai, for example—required a reorganization of administrative divisions as the Lester Institute attempted to hunker down and consolidate its research energies.¹²⁶ All the laboratories were

¹²⁵ “2 Henry Lester Organs To Curtail Activities,” *China Press* (30 November 1937).

¹²⁶ In a 29 January 1938 letter to Sir Edward Mellanby of the British Medical Research Council, Earle noted that the Lester Institute was temporarily closed to evacuate the overseas staff. Earle suggested in a 29 March 1941 letter to Dr. Landsborough Thomson that many of the overseas staff evacuated from Shanghai were

closed, and though research continued, it continued on the fifth floor of the Lester Chinese Hospital and in refugee camps, refugee hospitals, mobile clinics, etc. scattered about the city.¹²⁷

Ongoing war forced the Lester Institute to curtail the scope of its research activities. The Division of Clinical Research and Experimental Surgery had been organized into a smaller unit, the “Clinical Unit,” under the administration of the Division of the Physiological Sciences in 1939. The collaborative relationship between the Lester Institute and the Lester Chinese Hospital had also altered course. In the original plans, clinical research that safeguarded the patient as “a subject for research and of the hospital organization surrounding him” mandated that the Lester Institute control one floor of the Hospital for research purposes, but while this plan worked to some degree, by 1940, it was found that a new arrangement, “whereby the Institute [made] itself responsible for all laboratory services leaving clinical co-operation to the good will of the hospital [appeared] to be more economical for both parties.”¹²⁸ The Division of Pathological Sciences continued its various work in parasitology, but “owing to military occupation of the surrounding country, field research . . . had to be curtailed and we are becoming more dependent upon on our own resources for maintaining the hosts and parasites, which constitute so important a condition of this work.”¹²⁹

The Division of Physiological Sciences was perhaps the single, unintentional beneficiary of the constraints imposed by war. Its administrative prominence translated in a greater emphasis upon nutritional deficiencies, the analysis of Chinese foods, and the clinical manifestations of specific forms of nutritional adjustment. Refugee camps became prime sites for investigation and analysis, and as research members of the Lester Institute played a growing role in “the scientific and medical welfare of the community outside of the Institute by public lectures, broadcasts, and by membership

reassigned by the Medical Research Council for work in Hong Kong, South Africa, and Toronto. The National Archives of the UK, Medical Research Council, FD1/2451: Lester Institute, Shanghai, 1932-47.

¹²⁷ Henry Lester Institute of Medical Research, *Annual Report, 1937-38*, pp. 14-37.

¹²⁸ Henry Lester Institute of Medical Research, *Annual Report, 1940* (Shanghai: Henry Lester Institute of Medical Research, 1941), p. 8.

¹²⁹ Henry Lester Institute of Medical Research, *Annual Report, 1940* (Shanghai: Henry Lester Institute of Medical Research, 1941), p. 7.

of various committees,” these extramural contributions were, from the an institutional perspective, important and even necessary to prevent “the Institute from being too academic and [to give] it, we hope, a local value.”¹³⁰

The spring of 1941 was a difficult period for Earle, who had left the directorship of the Lester Institute in the capable hands of Bernard E. Read, then Director of the Division of Physiological Sciences and returned to England for the purposes of repatriating his diabetic wife as well as recruiting additional staff. His desire to return to Shanghai to facilitate the rebuilding of the Lester Institute’s British staff was hampered, however, by the threat of open war between Japan and the Allied powers. Nevertheless, Earle’s argument to the British government and to the Medical Research Council for assistance was simple: British prestige needed the continued existence of institutions like the Lester Institute. In an 11 March 1941 letter to Mellanby, Earle explained, “Read is alone, and we cannot put a Chinese in charge. It’s therefore essential on public grounds with a view to maintaining British prestige that I want to return.” To underscore the urgency of the situation, Earle continued,

I am sorry to bother you in the midst of your multifarious duties, but quite apart from anything else I should like it known that tho’ [sic] Shanghai is not a British colony, the powers that be are ready to support unofficially efforts to develop medical research in China. We don’t want to leave everything to the Rockefeller Foundation.¹³¹

Mellanby, for his part, generally sympathized with Earle’s position and observed, “The Institute is a well-known centre of medical research, with a good record of scientific work. It is one of a very small number of British institutions of the kind overseas, including those in the Colonies It would be unfortunate if it were allowed to pass altogether into other hands”¹³²

¹³⁰ Henry Lester Institute of Medical Research, *Annual Report, 1940* (Shanghai: Henry Lester Institute of Medical Research, 1941), p. 11. For a more detailed consideration of refugee-related research, please see Chapter 5 of this dissertation.

¹³¹ The National Archives of the UK, Medical Research Council, FD1/2451: Lester Institute, Shanghai, 1932-47.

¹³² The National Archives of the UK, Medical Research Council, FD1/2451: Lester Institute, Shanghai, 1932-47.

Sympathy, however, was perhaps tepid consolation for Earle, because although Mellanby was the Secretary of the Medical Research Council, his ability to assist Earle seemed constrained. At the very least, he wrote to C. A. C. J. Hendriks of the Privy Council Office and requested additional assistance in helping Earle secure passage to China.¹³³ British prestige would have to wait upon the Ministry of Shipping.

The Japanese takeover of the foreign concessions in December 1941 transformed the rules of independent operation for the Lester Institute. The final dismantling of the legal barriers ensuring some sense of normality for the Lester Institute's research activities removed any former protection for non-Japanese intrusion into the day-to-day affairs of the Institute. By the end of 1942, the Japanese had co-opted the Lester Institute and its sibling organizations: the Technical Institute, which had been created "for the teaching of engineering, architecture etc., in the English language and using only British machines and apparatus, and the Lester School, which housed in the Technical Institute building "with teaching in English up to London Matriculation standard, used as a 'feeder' to the Technical Institute, for its own purposes.¹³⁴ Japanese authorities assumed direct control of the Technical Institute, which was renamed the East Asia Technical Institute under the management of the Shanghai branch of the Toa Dobun Kai (東亞同文會). English language training was replaced with Japanese, and the British staff had submitted their resignation to the new director, Mr. Shichitaro Yada, who had brought with him seven "Axis nationals" and "ten new Japanese

¹³³ The National Archives of the UK, Medical Research Council, FD1/2451: Lester Institute, Shanghai, 1932-47.

¹³⁴ The Lester School (Leishide gongye zhiye xuexiao 雷氏德工業職業學校) and the Lester Institute of Technical Education (Leishide gongyi zhuanke xuexiao 雷氏德工藝專科學校) located on Seward Road was formally opened on 1 October 1934. Dr. Wang Shijie (王世杰), the Minister of Education for the Nanjing government, and Sir John Brenan, KCMG, HBM Consul General for Shanghai, laid the foundation stones. SMA Q235-1-672. After the formal closure of the schools, the machinery and equipment of both the Lester School and the Lester Institute of Technical Education were sold to the Shanghai Municipal College of Technology by contract on 7 November 1950. SMA B105-5-197.

teachers.”¹³⁵ On 12 March 1943, the Japanese passed a measure for the internment of all “enemy aliens,” and the Lester Institute’s British members like Bernard Read were interned.

As early as 1943, the Lester Institute faced a series of crises that threatened its future as a British-backed research institute in China. Although the Japanese permitted the structure of the Shanghai Municipal Council to continue to function even after 1941, the senior-level British officers of the Council had been removed in 1942, and in practice, the Japanese had rendered the British utterly impotent in political and economic governance. The abolition of extraterritoriality and the rendition of all the settlements and territories back to China threatened the legality of the Lester Trust’s various interests. In light of the Sino-British Treaty of 1943 and the growing risk of legal claims upon its purse, which included its land acquisitions and Chinese monetary holdings, the Lester Trust incorporated itself as a Hong Kong company and registered with the Bureau of Social Affairs as a charitable organization.¹³⁶ The Lester Trust, which provided for the operational expenses of the Lester Institute; the Technical Institute; and the Lester School had been almost entirely invested in China. Up until 1937, its income derived from mortgages, debenture interest, and house rents from Chinese properties and, on the whole, had been sufficient to meet the cost of the Lester Institute, the Technical Institute, and the Lester School. But after nearly a decade of war and what the Trustees called “Japanese manipulation of Chinese currency,” the sums raised from their local investments could barely cover the expenses of even one of the Trust’s organizations.

In 1945-46, Earle embarked upon a campaign to resuscitate the downtrodden Lester Institute. Although no longer the Director of the Lester Institute, as Bernard Read had officially assumed the position in 1946, Earle continued to provide strong vocal support by reaching out to sympathetic ears. With its buildings in inhabitable shape despite having been occupied by Japanese Army and then later the Chinese Nationalist Army, discussions between the British Consulate-General and the China Division of the British Council (Yingguo wenhua weiyuanhui 英國文化委員

¹³⁵ “Henry Lester Institute is now Renamed,” *Shanghai Times* (13 December 1942).

¹³⁶ SMA Q190-1-14045.

會) took place to ascertain how much was in fact salvageable. According to G. Hedley of the British Council, work to restore the damages inflicted by the Japanese and Chinese armies was already underway. The ground floor of the Lester Institute had been lent to the International Relief Committee, who had “spent a great deal in renovating the actual building.” Though their lease ran until the end of 1947, Hedley felt certain “their presence, however, would not prevent research work being restarted.” The major issue was the lack of funds. The Lester Trust’s local income was “negligible,” and substantial grants would have to be mustered to reequip the Lester Institute to the standard of a professional research institute.

The question of British prestige reemerged as a central trope. Hedley wrote, “It is highly desirable, if not imperative, for British prestige to get something started in one of these two great institutions [i.e., the Lester Institute and the Technical Institute].” In presenting his case, he drew a direct reference to the Peking Union Medical College and observed that the Lester Institute was “the only British one of its kind in China.” He continued, “Although we cannot aim at competing with the overwhelming American influence in every field in Shanghai, I do think it is to be desired that one British Academic Institute be helped to restart its work.”¹³⁷ Hedley was not alone in his assessment. In a 27 December 1945 memo, Dr. Howard Jones of the British Council wrote,

Both Sir E. Mellanby and Dr. Sanders expressed the view emphatically that if the Council, or some other British agency, did not provide full financial support for the rehabilitation of the Lester Institute, the British might as well give up any hope of affecting Chinese medicine.

Conclusion

To return to James Vernon’s suggestion that we consider the infrastructures making the work of nutrition, not to mention the individual discoveries, possible, it is worth recognizing that while the Lester Institute as a specialist organization dedicated to the advancement of biomedical knowledge afforded young Chinese scientists opportunities to conduct research and create the

¹³⁷ National Archives of the UK, Records of the British Council, BW 23/25.

intellectual pathways for domesticating biomedicine, particularly biomedical nutrition, within the Chinese context, sole focus upon the Lester Institute's institutional composition can obscure our ability to see the diversity of ways in which the scientists themselves reworked and negotiated the substantive matter of biomedical nutrition. Through the Lester Institute, Chinese researchers like Hou Xiangchuan, Ni Zhangqi, and Lu Gwei-djen participated within a globalized community of like-minded scientists. They sought out and pursued research questions whose relevance may have been shaped by the local particularities of the Chinese social environment, but whose scholastic integrity was directed outwards towards the international community of biomedical researchers and physicians. The Lester Institute provided an important part of infrastructure, but not its most permanent installation.

Chapter 4: Nutrition for the Chinese National Body

Introduction

In the April 1939 issue of the *Chinese Medical Journal*, a report by the Nutrition Committee for the Council of Public Health, a service-oriented subsidiary organization of the Chinese Medical Association, appeared under the bold heading, “Minimum Nutritional Requirement for China.”¹³⁸ In the report, the Nutrition Committee presented the results of a four-month investigation into how best to determine the proper dietary recommendations for the Chinese people. The Nutrition Committee had been composed of some of the most preeminent research scientists in China: Wu Xian, Professor Biochemistry at Peking Union Medical College; Hou Xiangchuan, Associate Researcher in Physiological Sciences, Henry Lester Institute of Medical Research; W. H. Adolph, Professor of Chemistry, Yenching University; W. Y. Swen, Professor of Agriculture, University of Nanjing; and Mrs. Siu-feng Huang, former dietitian, Peking Union Medical College Hospital. They took as their model and point of departure the bulletin under the title “Physiological Bases of Nutrition,” which had been issued by the League of Nations’ Health Organization three years prior.¹³⁹

The Nutrition Committee, which was organized on 7 January 1937, identified a set of terms by which to conduct their work. Outfitted with the task of devising a set of recommendations on the Chinese diet, including minimum requirement and suggested menus, the Nutrition Committee insisted that the final report be published in Chinese with an English translation. The report was to

¹³⁸ Committee on Nutrition for the Council on Public Health, Chinese Medical Association, “Minimum Nutritional Requirement for China,” *Chinese Medical Journal* 55.4 (April 1939): 301-23. The report was first issued as part of the Chinese Medical Association’s Special Report Series. See *Zhongguo minzhong zuidi xiandu zhi yingyang xuyao: Zhonghua yixuehui gonggong weisheng weiyuanhui tezhu yingyang weiyuanhui baogaoshu* 中國民眾最低限度之營養需要：中華醫學會公共衛生委員會特組營養委員會報告書 [Minimum Nutritional Requirement for China: Report of the Committee on Nutrition of the Council on Public Health of the Chinese Medical Association] (Shanghai: Chinese Medical Association, 1938).

¹³⁹ Health Organization, League of Nations, “Physiological Bases of Nutrition,” *Quarterly Bulletin of the Health Organization* 5 (1936): 391.

detail “in very simple language” diet menus for children and soldiers on active service. The Nutrition Committee assumed the responsibility of identifying dietary recommendations for three distinct categories: adults; pregnant women and nursing mothers; and infants and children. Special attention was to be paid to the “cost and availability of foods under local conditions.”¹⁴⁰

The Chinese report by the Nutrition Committee is a curious affair. In terms of its written structure, the Committee chose to present their recommendations for the Chinese people in a dialogic form with excerpts from the “Physiological Bases of Nutrition” interspersed with their own revisions and assessments. Reading the Chinese report is like participating as an audience to a cooperative analysis between colleagues. One side presents a set of premises; the other artfully concurs or diverges as necessary—all of which takes place under the general pretense of consensus. The suggestion of two interlocutors of equal standing is an important component of the presentation of the dietary recommendations. Rather than uncritically reiterate ideas or guidelines devised elsewhere and by specialists unfamiliar of Chinese conditions, the Chinese report communicated its scientific and intellectual authority through its juxtaposition of specific sections from the League of Nation’s report with its own findings and recommendations. Introducing the Chinese specialist voice, as it were, into the nutritional debate offset any unexamined tendency to lend too great a credence to experts from the West. Instead, the Nutrition Committee brokered an intermediary space—one that permitted proper, if implicit, recognition of the nutritional work being conducted in China.

China’s contribution to the international discourse of nutritional standards and requirements encapsulated a number of tensions and competing interests characteristic of what the American pioneer of nutrition, Elmer McCollum called “the Newer Knowledge of Nutrition.” New Nutritionists like Wilbur O. Atwater and Ellen H. Richards had focused on the “practical economy” of food in which the goal of good health could be attained through the rational, economical

¹⁴⁰ “Council on Public Health,” *Chinese Medical Journal* 51 (May 1937): 764.

management of food expenses.¹⁴¹ Tracking caloric values and learning how to substitute cheaper foods that nonetheless yielded comparable amounts of proteins, carbohydrates, or fats for more expensive foods represented practical skills that could be taught to the general public, especially the working classes. By emphasizing food as fuel for the “human machine,” New Nutrition articulated ways in which to spend less while still maintaining good health so as to ensure the constancy and productivity of human labor.¹⁴² As James Vernon has explained,

Armed with these techniques, social and nutritional scientists believed that they could precisely identify the amount and type of food that human bodies required in order to remain healthy, and, beyond that, to become more productive. Discussions of hunger were reduced to technical equations showing how many calories human beings required and how much they cost.¹⁴³

In contrast, the “Newer Knowledge of Nutrition” marshaled in a dramatically different paradigm for understanding the relationship between food and health. The “Newer Knowledge of Nutrition,” with its discovery of the crucial role played by essential food elements (vitamins and minerals) in ensuring life and health, demonstrated that disease could result by the absence of certain essential food elements. For many in the medical community, this constituted an intellectual leap of faith in an opposing direction. That disorders could spring not only from the presence of foreign, noxious agents but also from the absence of something benign contradicted all 19th century medical teaching. In the words of Albert Szent-Györgyi, the Hungarian physiologist who is credited with discovering vitamin C, “A vitamin is a substance you get sick from if you don’t eat it.”¹⁴⁴

¹⁴¹ Harvey A. Levenstein, *Revolution at the Table: The Transformation of the American Diet* (Berkeley: University of California Press, 2005), pp. 72-85, and 147-60.

¹⁴² The now classic treatment of the historical nexus of health, economy, and productivity is Anson Rabinbach’s *The Human Motor: Energy, Fatigue, and the Origins of Modernity* (Berkeley: University of California Press, 1990). See also Jan O’Hara-May, “Measuring Man’s Needs,” *Journal of the History of Biology* 4.2 (1971): 249-73; Naomi Aronson, “Nutrition as a Social Problem: A Case Study of Entrepreneurial Strategy in Science,” *Social Problems* 29.5 (June 1982): 474-87; and Harmke Kamminga and Andrew Cunningham, eds., *The Science and Culture of Nutrition, 1840-1940* (Amsterdam: Rodopi, 1995).

¹⁴³ James Vernon, *Hunger: A Modern History* (Cambridge, MA: Belknap Press of Harvard University Press, 2007), p. 117.

¹⁴⁴ Cited in Walter Gratzer, *Terrors of the Table: The Curious History of Nutrition* (Oxford: Oxford University Press, 2005), p. 162.

The League of Nations Health Organization's report, "Physiological Bases of Nutrition," exemplified this new line of thinking by concentrating attention upon the importance of vitamins and minerals to the human diet. Quality, rather than quantity, became the focal point around which social and scientific energy was mobilized. And although nutritional calculations of the heat and energy properties of the three different constituents of foods—proteins, carbohydrates, and fats—continued to play a role in the formulation of international nutritional requirements and standards, the emphasis had shifted away from minimums—a numerical baseline from which social and nutritional scientists could begin assessing the social costs of poor nutrition in terms of health, productivity, efficiency, and social stability—and towards the language of optimization. Thus the purpose of the international nutrition work of League of Nations Health Organization was to set forth guidelines for how to apply nutritional principles to the purpose of obtaining optimal health.

But what becomes evident upon examining the Chinese report and how it attempts to build upon and modify standards set forth in "Physiological Bases of Nutrition" is how dialogic and proactive Chinese nutrition scientists were in crafting both a message and a method in keeping with how they understood Chinese difference. Although the Nutrition Committee obviously shared many of the theoretical suppositions advanced in the "Physiological Bases of Nutrition," as a committee composed of Chinese nutritional scientists, the Nutrition Committee chose the precise terms in which they believed biomedical nutritional knowledge ought to be applied to the Chinese context. International nutritional science, as represented by the League of Nations Health Organization, were ready to declare the prioritization of optimal health as nutrition's main target. Chinese nutritional scientists were less convinced of this conceptual shift. The idea of quality over quantity assumed a different shape and form in the hands of Chinese nutritional scientists.

The structure of this chapter will incorporate the 1938 nutritional guidelines set forth by the Chinese Medical Association's Nutrition Committee as the primary framework within which to draw out some of the major substantive debates shaping the production of a Chinese discourse of biomedical nutrition. In doing so, I am not positing the 1938 nutritional guidelines as the final

culmination of all Chinese nutrition work, but rather I want to demonstrate how the composition of the guidelines depended upon a nestling of the many layers and voices making up the Chinese scientific community. Chinese intellectuals with an interest in biomedical nutrition used the concept of guidelines to ground their arguments linking the nutritional health of the individual to that of the nation. They wanted to exploit the normative possibilities, even as they recognized the arbitrary force and the constructed nature, of nutritional guidelines.

Nutritional Health and the Nation

In an essay for *Duli pinglun* (*Independent Thought*) in 1932, Wu Xian began his piece by characterizing the source of corruption tainting national affairs as being of two kinds: selfishness and weakness. In each case, the fault lay, Wu maintained, with man. But while selfishness was a matter of morality, weakness was specifically a problem of physical culture (*tǐyù wèntí*), and in this regard, Wu Xian, one of the foremost biochemists of his time and the first to publish a general textbook on scientific nutrition in 1928, drew upon his specialist knowledge to make a generalist case for how to address the “Our Country’s Food Problem.”¹⁴⁵ Wu Xian advocated the development and application of scientific nutritional knowledge to tackle the very real, physical debilitation afflicting the nation’s people.

Wu Xian was not alone in stressing the urgency of taking heed of the nation’s dire state of nutrition. His linkage of the nation’s health to the nutritional state of its people—particularly those still in infancy and childhood—was a common refrain reiterated by him and his biomedical colleagues, as well as nutritionally-minded educators, throughout the 1930s and 1940s.¹⁴⁶ The main

¹⁴⁵ Wu Xian, “Wuguoren zhi chifan wenti” [Our Country’s Food Problem], *Duli Pinglun* [Independent Review] 2 (May 1932): 15-9.

¹⁴⁶ Drawing connections between individual health and the health of the nation was clearly a thematic refrain whose emergence dated back to the end of the Qing dynasty. Zhang Zhongmin has argued that scholars have to date paid little attention to the robust publishing culture for books on physiology and, as a result, have overlooked the efforts of Chinese intellectuals during the last twenty years of the Qing to construct a “hygienic modernity” by linking health and hygiene to the nation. The adaptation of nutrition, and biomedical nutritional language, to the formation of a modern nation may be considered a variation upon the cultural theme Zhang

line of argument pursued by Chinese nutrition scientists conceived of the individual as both a reflection and an integral ingredient in the making-up of the nation. Indeed, the linkage of individual health with the health of the nation facilitated two correlative transformations: redefining the priority of individual health in terms of national uplift, in contrast to older notions that associated health with longevity and moral cultivation; and casting the nation as the ultimate arbiter for individual success in health and nutrition. The biochemists Zheng Ji (鄭集) and Zhou Tongbi (周同璧) expressed it most simple when they wrote,

That nutrition is vital to an individual's mind and body is without a doubt, and if considered more generally, nutrition is similarly important for a nation and its people. A nation is comprised of a group of people, and its enterprise the composite of individual enterprises. If a person is healthy with a flourishing career, then the race and nation will also achieve a state of wealth and prosperity. Thus, nutrition is not simply a question of individual health; a strong race and vibrant nation both depend upon good nutrition.¹⁴⁷

In his opening essay for the nutrition series featured the journal *Science*, the Chinese biochemist Zheng Ji pursued this same idea with greater sensitivity. He formulated the relationship between biomedical nutrition and the nation as indirectly, but nonetheless conditionally, linked.¹⁴⁸ Because the nutrition of local dietaries directly impacted the physical health and development of humans, if during childhood, one was insufficiently nourished, then the consequences would be twofold. Poor nutrition during childhood would result in incomplete development of the child's physical and intellectual powers—a body small and weak (*shencai ruoxiao* 身材弱小), a mind untapped and dull (*zizhi yudun* 資質愚鈍), and ultimately a child ever prone to illnesses (*jibing congsheng* 疾病叢生). The effects of poor nutrition did not, however, end with childhood. Physically and mentally

has written about in “Wan Qing chuban de shengli weisheng shuji ji qi duzhe” 晚清出版的生理衛生書籍及其讀者 [Books of physiology published in late Qing Dynasty and their readers], *Shilin* 史林 [Historical Review] 4 (2009): 20-36.

¹⁴⁷ Zheng Ji 鄭集 and Zhou Tongbi 周同璧, “Shenma jiao yingyang? Yingyangsu yu rensheng you he zhongyao guanxi?” [What is nutrition? How does nutrient relate to life?], *Kexue* 23.2 (February 1939): 91-3.

¹⁴⁸ Zheng Ji, “Zhongguoren zhi yingyang gaikuang” [The state of nutrition for the Chinese people], *Kexue* 23.1 (January 1939): 25-34.

weak child grew into physically and mentally weak adults, and for a country whose long and storied past had imbued its people with tendencies that privileged arts and culture over physical culture and nutrition (*tiyu yu yingyang* 體育與營養), the consequence was evident in the persistent state of enfeeblement. Zheng argued,

Most people in this country are humped back and have a wallowed waste. Their facial color—particularly urbanites—is very poor. In addition, very few of the country's primary and middle school youths possess fully developed, strong physiques. Our mortality rate is higher than that of the Europeans, Americans, and Japanese; and our lifespan significantly shorter. These sorts of phenomena directly contribute to the disadvantage of the individual and indirectly to the disadvantage of our national race (*guojia minzu* 國家民族).

In a fervor echoing the very real perils facing the Chinese nation, Zheng continued,

If we allow this situation to persist, if we don't devise a plan [to improve the nutrition and overall health of the people], then we must face the threat [to the very existence] of the nation—a threat a thousand times worse than our enemies' guns and bombs. For if the body is deficient and the mind dispirited and degenerate to the point of lacking ability and a sense of responsibility, of being mercenary and selfish, then have we not already resigned ourselves to the circumstances? If a substantial proportion of the citizenry is dispirited, then this national race cannot not be doomed (*weiyou bu miewangzhe ye* 未有不滅亡者也).¹⁴⁹

Behind the macabre quality of Zheng's language lay a practical problem facing the country: manpower, and insofar as biomedical nutrition was concerned, understanding how to harness and develop manpower—one of the decided objectives of nutritional thinking—emphasized the critical role of diet and nutrition in creating such power. Human labor, when considered from the physiological perspective, achieved an analyzable form through the sustained and detailed reconfiguration of the body as a machine whose inputs and outputs adhered to regular, discernable laws. Not only could one begin to surmise about the body's potential—its ability to work—the question of efficacy and efficiency became the governing rubric for understanding such potential.¹⁵⁰

¹⁴⁹ Zheng, "Zhongguoren zhi yingyang gaikuang," p. 26.

¹⁵⁰ For a close examination of the conjunction of work and energy to produce a new scientific and cultural framework in nineteenth century Europe—an intellectual transformation best represented in the "human motor," see Anson Rabinbach, *The Human Motor: Energy, Fatigue, and the Origins of Modernity* (Berkeley: University of California Press, 1992).

Sentiments like those expressed by Wu Xian and Zheng Ji postulated how the physical body ought to be regulated like a well-oiled machine, and in linking individual nutrition to the health of the nation, Chinese nutrition scientists were invoking refrains about power and wealth with which Yan Fu had himself grappled. What were the prerequisites of wealth and power? As Benjamin Schwartz has masterfully demonstrated, Yan Fu's complex engagement with specific strands of Western political thought (Herbert Spencer, John Stuart Mill, and Adam Smith) led him to champion two specific qualities: energy and the individual. The energy—intellectual, moral, and physical—that the West had exalted and enabled it to achieve unparalleled industrial and military might had been, Yan Fu concluded, foundational to “[t]he Faustian nature of Western culture that had led to the Promethean conquest of external nature and the enormous growth of social-political power within human society.”¹⁵¹

Alerting the country to the perils of poor nutrition and bemoaning the lamentable quantities of proteins and vitamins consumed may seem a pale and unromantic corollary to Yan Fu's ruminations about energy and the individual, and yet at a practical level, the nutritional body and its attendant thermo-dynamic concerns channeled many of those same ideas. Nutrition scientists marshaled through their research a vision consonant with Yan Fu's conception of the individual whose energy when consolidated with the energies of others in bureaucratic organizations does not diminish or become inhibited, but rather enhanced and channeled toward constructive goals.¹⁵² The nation as the cumulative social formation of individual energies depended upon sound, rationalized nutrition. Jin Shuchu explain,

Sound nutrition enables a body to receive all that it needs to grow. Those who are of sallow complexion, lacking of muscle, and infirm beyond one's years (*weilaoxianshuai* 未老先衰) are suffering from insufficient nourishment (*yingyangbuzu* 營養不足). For the individual, these [qualities] are [a sign of] misfortune; for a

¹⁵¹ Benjamin Schwartz, *In the Search of Wealth and Power: Yen Fu and the West* (Cambridge, MA: Belknap of Harvard University Press, 1964), p. 239.

¹⁵² Schwartz, *In the Search of Wealth and Power*, p. 240.

country, [a sign of] loss. That is why Europe and America have made it a duty to pay especial attention to the nation's nutrition and health.¹⁵³

But whereas Yan Fu's interlinking of liberalism and Social Darwinism sought to promote specific political and social values like liberty, equality, and democracy, Chinese nutrition scientists were not presenting any specific political platform of ideas. Theirs was a more straightforward concern comfortably ensconced within a scientific framework for analyzing biological phenomena. As Wu Xian had clearly defined in his seminal textbook on nutrition, the function of food was to provide nearly the sum total of the body's physiological needs, and the essential quality of food was its ability to generate heat energy. The biological system that preoccupied Chinese nutrition scientists revolved around questions of quantity and quality and the identification of standards of dietary health that would increase physical and mental productivity. The social costs and benefits of such investigations were on the whole implied, i.e., better nutrition meant better health, which meant better students, workers, and soldiers, but in that space of naturalized assumptions emerged a dual-headed critique of the country's poor state of nutrition and the failure of the Chinese state to properly address the problem. Thus, even without elaborating upon a specific political platform, without explicitly subscribing to any one political philosophy, Chinese nutrition scientists were nonetheless constructing a notion of individual and institutional agency as integral to the formation of the modern Chinese nation.

The Question of Standards

In introducing the Chinese report, the Committee noted, "we have confined ourselves to a statement of fundamental factors governing nutritive requirements and to a recommendation indicating the type of balanced diet, which is practical for the mass of people in China under the

¹⁵³ Jin Shuchu's preface to Zheng Ji, "Zhongguoren zhi yingyang gaikuang" 中國人之營養概況 [The nutritional situation of the Chinese people], *Kexue* [Science] 23.1 (January 1939): 25.

present situations.”¹⁵⁴ Fundamental factors governing nutritive requirements consisted of first identifying the principles structuring their recommendations and then the recommended dietaries, or generic meal plans that would serve to elucidate how the abstract, technical aspects of the report could be translated into material terms. The principles (caloric, protein, mineral, and vitamin requirements) drew directly from the Health Organization’s “Physiological Bases of Nutrition.” But lest one were to assume the Committee’s uncritical acceptance of international dictates for the Chinese people, the report emphasized, “sections quoted from this League of Nations publication [have been] set in quotes.” Thus although the Committee adopted the basic unit for nutritional configuration, i.e., “[a]n adult, male or female, living an ordinary every day life in a temperate climate and not engaged in manual work,” they qualified their adoption by reassessing the associated assumptions about this abstracted adult male or female in “Physiological Bases of Nutrition.”¹⁵⁵

In the first place, the Committee pointed out that the theoretical construct of an adult male or female, which presumed some abstracted notion of American or European physicality, had to be adjusted to accommodate Chinese difference. An adult Chinese male or female was likely to possess a smaller body weight as compared with Occidentals. Three decades of anthropometric research had confirmed the general observation that in terms of bodily measurements, Chinese people tended to be smaller than their Western counterparts. The extent to which such anthropometric differences could be attributed to racial as opposed to environmental (including nutritional) factors was less clear and had become a point of debate among the scientifically-minded Chinese intellectual elite.

¹⁵⁴ Committee on Nutrition, “Minimum Nutritional Requirement for China,” *Chinese Medical Journal* 55.4 (April 1939): 303.

¹⁵⁵ Curiously, when Xu Pengcheng of the Chemistry Department at Yenching University translated and annotated “Physiological Bases of Nutrition” into Chinese, he actually adds a word to the original English title, which was then reflected back into the Chinese. Xu translated the title of the 1936 report as “Shiliang yingyang de shengli jichu.” He then appended his own English translation of the title, “Physiological Cases for Adequate Nutrition.” Although it is impossible to determine how or why *shiliang* (adequate) was introduced into both the Chinese and retranslated English, its presence is suggestive of the strong inclination among Chinese nutrition scientists for retaining the idea of the minimum as the primary conceptual framework for addressing Chinese nutritional requirements. Xu Pengcheng, “Yingyang de shengli jichu” [Physiological bases of nutrition], *Kexue [Science]* 21.1 (January 1937): 50-7.

Strategies of Engagement: Nutrition versus Eugenics

Nutritional scientists, in contrast to many of their May Fourth colleagues, espoused less conviction in the efficacy and overall applicability of eugenic policies to improve the racial stock of the nation.¹⁵⁶ Xu Pengcheng, a biochemist from Yenching University, noted in his translation of “Physiological Bases of Nutrition,” “Chinese bodies are not like [Westerners]. Racial inheritance is one of the contributing factors. [But] in fact, one of the most important causes [for differences in the physical bodies between Chinese and Westerners] is postnatal undernourishment (*boutian de yingyangbuzu* 後天得營養不足).”¹⁵⁷ Jin Shuchu (金叔初), who introduced a new regular series of articles on nutrition in the journal *Kexue* in 1939, minced little when he explained the social significance of nutritional work.

Most people in our country are feeble and weak—a situation that has around for quite some time. When we examine the reasons [for such a state], we find that it is not so much on account of heredity as the acquired effects of the deprivations of nutrition.¹⁵⁸

For Jin, recognizing the primary importance nutrition, especially childhood nutrition, played in the present state of national affairs opened practical pathways for social work. He did not deny the relevance of heredity or the imperative of racial improvement facing the nation, but his conviction that nutrition afforded real prospects for efficacy led him to downplay the value of eugenic proposals floating about in contemporary circles. Jin wrote,

With respect to racial uplift/improvement (*gailiang renzhong* 改良人種), despite what contemporary eugenicists espouse, such matters are abstruse and subject to chance. [Measures to improve the Chinese race] are not easy to implement and do not compare in ease with promoting measures for improving the people’s diet (*buru*

¹⁵⁶ For a clear and insightful examination of the different intellectual inflections on the eugenics theme, particularly between Zhou Jianren and Pan Guangdan, see Hiroko Sakamoto, “The Cult of ‘Love and Eugenics’ in May Fourth Discourse,” *positions* 12.2 (2004): 329-76. For a more general treatment, see Frank Dikötter, *Imperfect Conceptions: Medical Knowledge, Birth Defects, and Eugenics in China* (London: Hurst & Co., 1998).

¹⁵⁷ Xu Pengcheng, “Yingyang de shengli jichu” [Physiological bases of nutrition], *Kexue* [Science] 21.1 (January 1937): 56.

¹⁵⁸ Jin Shuchu’s preface to Zheng Ji, “Zhongguoren zhi yingyang gaikuang” 中國人之營養概況 [The nutritional situation of the Chinese people], *Kexue* [Science] 23.1 (January 1939): 25.

gailiang shanshi zhi yi yu tuixing 不如改良膳食之易於推行). We can improve our physical development by nutrients alone.¹⁵⁹

Jin did not describe the eugenic measures he had in mind, but the influence of eugenics had successfully permeated a wide-range of Republican debates on love, marriage, home, women's liberation, sexuality, mental and physical health, China's population problem, and the formation of the national identity. Beginning in the late nineteenth century with Yan Fu's free translation of Thomas Huxley's *Evolution and Ethics* (1898), which helped spread awareness of evolutionary theory to the country's literate, Chinese intellectuals began broaching questions of socio-evolutionary development of the nation through the lens of race.¹⁶⁰ Hiroko Sakamoto has argued that Chinese thinking about eugenics—particularly degeneracy theory, which gained traction after the Russo-Japanese War of 1905 through Japanese texts—played a critical role in both May Fourth discourse and the broader New Culture movement.

Her comparison of the divergent eugenic position of Zhou Jianren, the younger brother to Lu Xun and Zhou Zuoren, and Pan Guangdan, the biologist and former student of American eugenicist Charles B. Davenport at Columbia University, reveals the complex ways in which Chinese intellectuals sought to reconcile the forces of heredity and social environment.¹⁶¹ Pan, by training and intellectual proclivity, prioritized the role of heredity and dismissed assertions of social equality, perceiving instead that “human beings seem to be naturally differentiated according to ability in the process of evolution.”¹⁶² Valuing the survival of the race above all else, Pan espoused “a modernist evolutionist version of moral doctrine that human nature is evil.” He believed that with the advance

¹⁵⁹ Ibid.

¹⁶⁰ Interestingly, Huxley himself was against eugenics, but because Yan Fu drew upon Herbert Spencer's critique of Huxley for his translation, the overall color and tenure of Yan Fu's translation runs somewhat counter to Huxley's original text. Yan Fu's inclination to think in terms of eugenics was evident in his 1898 essay “Toward Race Preservation” in *Guowen bao* (National Bulletin). Hiroko Sakamoto, “The Cult of ‘Love and Eugenics’ in May Fourth Movement Discourse,” *positions* 12.2 (2004): 329-76.

¹⁶¹ For an alternate consideration of the eugenics debate between Pan Guangdan and Zhou Jianren, see Yuechtsen Juliette Chung, “Struggle for National Survival: Chinese Eugenics in a Transnational Context, 1896-1945” (Ph.D. dissertation, University of Chicago, 1999), pp. 185-95.

¹⁶² Sakamoto, “The Cult of ‘Love and Eugenics’ in May Fourth Movement Discourse,” p. 362.

of civilization, cultural selection (e.g., later or love marriages, volitional childlessness or singlehood, female economic empowerment, etc.) superseded natural selection, and to ensure the future of race, social measures had to be implemented to forestall or contain the dysgenic tendencies associated with Westernization.¹⁶³ Although far more favorably disposed towards the positive implementation of eugenics, his general argument tended to strike chords of social and cultural conservatism that identified merit in practices like arranged marriages, polygamy, and ancestral worship.

Pan's conservative overtones sparked the critical ire of Zhou Jianren, who though not scientifically-trained, but rather self-taught, had assumed a vocal and active role in popularizing biology and genetics to the Chinese public.¹⁶⁴ For Zhou, the fundamental issue addressed by eugenics was one of quality. Although the two men differed little in their estimation of the lower classes and minorities, who on the whole tended to devalue or perpetuate adverse characteristics like "ugliness, brutality, mental illness and disease," Zhou saw forms of redemption in acts of human intervention. Without devaluing the importance of heredity, Zhou emphasized the extent to which environmental factors could be managed to improve the overall genetic disposition of the Chinese people. Heredity need not be the final word upon the quality of the people, and survival from infancy did not necessarily indicate superiority of racial stock. Zhou cited poverty as the more likely explanation for high infant mortality rates; he pointed out that biographies of eminent men and women of the past often included descriptions of susceptibility to or long suffering from disease; and he emphasized that a decline of a race often owed more to environmental changes and did not necessarily equate with biological inferiority. Individual choice as opposed to traditional conventions was, Zhou argued, a more effective tool for achieving eugenic ends.¹⁶⁵ His advocacy of methods of birth control, including sterilization, and the isolation of undesirables suggested an embrace of negative eugenic

¹⁶³ Chung, "Struggle for National Survival," p. 189.

¹⁶⁴ In his book, *Jinbua he tuihua* [Evolution and Devolution] (Shanghai: Guanghua shuju, 1930), Zhou Jianren included a Chinese translation of an essay by William H. Adolph, a prominent biochemist at Yenching University, entitled "Zhongguo rongyang he daixie zuoyong de qingxing" (Chinese nutrition and metabolic function).

¹⁶⁵ Sakamoto, "The Cult of 'Love and Eugenics' in May Fourth Movement Discourse," p. 365.

measures, but as Hiroko Sakamoto has shown, Zhou also believed that the best “positive” eugenics involved the cooperation of eugenicists and educators in “spreading knowledge about genetics to infuse youth with the ideas of genetics, thus cultivating in them the ability to make genetically sound choices in love and helping them to realize the importance of improving the race.”¹⁶⁶

This mixing of positive and negative strategies highlighted the growing popularity of Lamarckian ideas, which upheld the transmittance of somatic modifications acquired during post-natal development and as a consequence of adaptations to external conditions to the offspring. Yuehtsen Juliette Chung has persuasively argued that the strong Lamarckian slant to Chinese eugenic thinking should not be taken as some sort of Chinese intellectual failing to properly comprehend the subtleties and nuance of Western eugenics. Indeed, insofar as eugenics as a legitimate field of scientific inquiry that was strongly intertwined with genetics became rooted in Chinese intellectual life, its development was consonant with the formation of other scientific disciplines.

For Chinese intellectuals, the fundamental question implicit in debates about national/racial uplift and development involved how to be both modern and Chinese. As Chung as explained,

Becoming fit while remaining ‘Japanese’ or ‘Chinese’ was a challenging dilemma—a parallel to the modernization dilemma of ‘how to become modern while not losing an identity’—which the Japanese and Chinese eugenicists needed to wrestle with. This dilemma was implanted when the ideas of racial improvement were initially introduced into the East, as exemplified by the debate between Kato Kiroyuki and Takahashi Yoshio on the yellow-white intermarriage. The eugenicists had to redefine a racial hierarchy and situate Japanese and Chinese generic traits and determine their fit and unfit characters.¹⁶⁷

With its emphasis upon environmental factors and the inheritability of acquired characteristics, Lamarckian eugenics generated a conceptual schema that imparted meaning and transformational power to pragmatic strategies for dealing with the spread of venereal diseases, tuberculosis, and other ailments sapping the strength of the country as a whole. It resonated with the emergent discourse of

¹⁶⁶ Zhou Jianren cited in Sakamoto, “The Cult of ‘Love and Eugenics’ in May Fourth Movement Discourse,” p. 365.

¹⁶⁷ Yuehtsen Juliette Chung, “Struggle for National Survival: Chinese Eugenics in a Transnational Context, 1896-1945” (Ph.D. dissertation, University of Chicago, 1999), pp. 159-60.

social hygiene propounded by Christian organizations like the Young Men's Christian Association (YMCA) and medical entities like the Joint Council on Public Health Education (Zhonghua jiaoyu weisheng lianhehui 中華教育衛生聯合會) and the Chinese Medical Association.¹⁶⁸ But most importantly, Lamarckian eugenics seemed to rectify the primary failing distinguishing social hygienic ideas from Mendelian eugenic ideas. In the eyes of Mendelian eugenics, environmental improvements brought about by greater public attention to the merits of social hygiene were only ever temporary. Such improvements could not guarantee real progress of the race and nation. But if those same improvements in medicine, education, and economy could be passed down to the next generation through individual procreation, then did not the race and nation achieve the steady benefits of good birth by magnitude?

Pan's ongoing debates during the 1930s with social critics like Zhou Jianren, social scientists like Sun Benwen (1892-1979), who was director of the Chinese Sociology Society, and Nationalist party strategists like Ren Zhuoxuan (1896-1990) resulted in Pan's own reworking of his eugenics position. He too began to advocate social interventions along the lines of cultural mechanisms and environmental components, and in doing so, Chung suggests, articulated the growing importance the Chinese cultural body was assuming in these eugenic debates. Lamarckism, Chung argues, was "an antidote to cure this cultural body. In this fashion, Lamarckism offered a solution to the dilemma of how to become fit while remaining 'Chinese.'" ¹⁶⁹

For Chinese nutrition scientists, the debate about racial stock obscured and misdirected popular and political attention towards issues that were by their nature obtuse and impractical. As Wu Xian emphasized, "Heredity cannot be changed, but nutrition can be improved. To those who take heart in national affairs, do not dismiss [the importance of] food."¹⁷⁰ Fitter births, improved

¹⁶⁸ The Joint Council on Public Health Education was formed by the cooperative efforts of the National Medical Association, the China Medical Missionary Association, and the YMCA in 1916.

¹⁶⁹ Chung, "Struggle for National Survival," pp. 205-6.

¹⁷⁰ Wu Xian, "Zhongguoren zhi chifan wenti" 中國人之吃飯問題 [The nation's food problem], *Duli pinglun* 獨立評論 [Independent thought] 2 (May 1932): 19.

genetic material, prescribed marriage practices to promote certain mental or physical traits—all these objectives presumed greater human influence than could be necessarily be mustered in daily practice. Nutrition, on the other hand, represented a basic, foundational component of everyday life, and the consequences of poor nutrition were evident for all to see. The benefits of improved nutrition, in turn, achieved many of the stated aims of eugenics, and perhaps for that reason, Chinese nutrition scientists placed greater emphasis upon biomedically-tested nutritional strategies for ameliorating the Chinese national body. Arguing for nutritionally-focused social engineering work instead of pontificating about the social benefits of racial mixing or the sterilization of the less desirable portions of the population, nutritional scientists maintained that their approach was altogether more pragmatic and achievable—hence their interest in rationalizing the Chinese diet and attempting to change existing dietaries and eating patterns.¹⁷¹

Negotiating Terms: Quantity, Quality, and their Nuances

By modifying the abstract category of nutritional assessment to incorporate what Chinese nutritional scientists believed to be an important characteristic of the Chinese people, i.e., smaller body weight, the Nutrition Committee of the Chinese Medical Association, who had assumed the responsibility for determining the appropriate nutritional guidelines for the country as a whole, attempted to reconfigure the implicit logic set forth by the League of Nations standards. The Nutrition Committee observed, “Although the Chinese has a smaller body weight and therefore a smaller caloric requirement, the same allowance of 2400 is recommended on account of the lower coefficient of digestibility of foods in the Chinese vegetarian type of diet as compared with the European diet.”¹⁷² According to the prevailing nutritional understanding of the day, smaller body

¹⁷¹ Discussion of the benefits of racial mixing, specifically the integration of the yellow and white races, can be seen as early as the 1890s by prominent Chinese intellectualist like Yan Fu, Liang Qichao, and Kang Youwei. The rise of degeneracy theory, particularly after the Russo-Japanese War of 1905, helped initiate greater intellectual attention to the question of the modern “home” and the new “model family,” and the extent to which such social transformations could help improve the general vigor of the Chinese race. Sakamoto, “The Cult of ‘Love and Eugenics’ in May Fourth Discourse,” pp. 334-6.

¹⁷² Committee on Nutrition, “Minimum Nutritional Requirement for China,” p. 304.

weight should have entailed a corresponding decrease in total caloric requirement, but such a conclusion was counterproductive for the Committee's aims. In seeking to establish minimum nutritional requirements for the Chinese, the Nutrition Committee needed to ensure that all aspects of demonstrable Chinese difference, from bodily composition to regional dietaries, were integrated into the decision-making process. Smaller body weight was an essential component for determining nutritional needs, but not, as the Nutrition Committee suggested, to the extent that it outweighed other considerations like digestibility.

The coefficient of digestibility referred to the relation between constituents of food consumed and the corresponding constituents of the feces. *Chemistry of Food and Nutrition*, which was written by Henry C. Sherman, a Columbia University chemist who held a joint appointment at Teachers College, and whose 1911 book was the oft-cited nutrition textbook by Chinese researchers, explained the coefficient of digestibility as follows: "[I]f the feces from a given diet contain 5 per cent as much protein as was contained in the food, this proportion is assumed to have been lost or expended in digestion, and the coefficient of digestibility of the protein of the diet is stated to be 95 per cent."¹⁷³ Thus, the difference in amounts found in the food and then in the feces represented that which was available to the body. Wilbur Atwater, the father of American nutritional science, had determined the coefficients of digestibility for the main nutrients of the basic food groups in the late nineteenth century, and his results placed animal foods highest in utilizable protein, fat and carbohydrates.

¹⁷³ Henry C. Sherman, *Chemistry of Food and Nutrition* (New York: Macmillan Co., 1918), p. 101. First published in 1911, *Chemistry of Food and Nutrition* was quite a successful textbook in home economics and dietetics courses in the United States, and it subsequently underwent several reissues, the most recent being in 1952.

Table 5: Atwater's Coefficients of Digestibility (percentage)¹⁷⁴

	Protein	Fat	Carbohydrates
Animal foods	98	97	100
Cereals and sugars	85	90	98
Vegetables and fruits	80	90	95

The question of digestibility may seem a curious digression, but by attributing the need to retain the baseline of 2400 calories as the body's caloric requirement despite the smaller body weight of the Chinese, the Committee was attempting to balance a series of perceived deficiencies against the demands of a normative ideal. Because the Committee used the League of Nation's "Physiological Bases of Nutrition" as their starting point and basis, they had to account for how divergences from the norms were legitimate and necessary to accommodate an alternate geographic and cultural sphere. Thus on the one hand, they diminished the causality of reasoning that linked smaller body weights with fewer required calories, and on the other hand, reaffirmed prevailing nutritional logic that the best calories to have were those derived from animal-based foods. Low coefficients of digestibility represented an alternate way of emphasizing the lack of animal-based foods in the Chinese diet. In practical terms, this meant that although the Chinese diet satisfied caloric requirements, their nutritional composition lacked certain positive, desirable qualities found in diets promoting optimal health.

And indeed, recent studies by Ruth Guy and K. S. Yeh at the First Health Station of the Beiping Municipality; Zheng Ji, Tao Hong, and Zhu Zhanggeng of the Nanjing Biological Research Center (Shengwu Yanjiusuo); and Ge Chunlin of the Chemistry Department, Shandong University all provided elaborate detail justifying the conclusion that in terms of numerical value, local Chinese

¹⁷⁴ Wilbur O. Atwater and Charles F. Langworthy, *A Digest of Metabolism Experiments in which the Balance of Income and Outgo was Determined* (Washington, DC: Government Printing Office, 1898), p. 85. The table included in Sherman's *Chemistry of Food and Nutrition* was an expanded on that included "cereals and breadstuffs" and "dried legumes" and separated "vegetables" and "fruits." The percentage for fats and carbohydrates were largely the same, with the main differences pertaining to protein percentage for "dried legumes" (78), "vegetables" (83), and "fruits" (85). See Sherman, *Chemistry of Food and Nutrition*, p. 101.

diets could and did afford sufficient caloric coverage.¹⁷⁵ Prior to the issuance of the League of Nations and the Chinese Medical Association's dietary recommendations, the figure representing essential caloric needs for an adult male in the Chinese context varied according to the researcher and the specific study. American and European nutritional studies witnessed less variance in this regard. Paul Weindling has observed that the standard figure of 3000 calories—the daily caloric requirement of a man at work, which had been elucidated by Voit, Atwater, and Rubner—persisted until 1932, when that figure came under challenge by the League of Nations Health Organization efforts to standardize and systematize international nutritional guidelines.¹⁷⁶

For Chinese researchers, the caloric baseline depended upon the reference book at hand. In the 1935 dietary survey of Nanjing, Zheng Ji and his colleagues cited 2801 calories as the daily caloric requirement. They then found in their investigation of the diets of Nanjing workers and their families that though the poorest group obtained only 2322 calories daily—a deficit of 329 calories in comparison to the 2801 standard—the wealthiest group exceeded the standard caloric requirement by 433 calories.¹⁷⁷ Indeed, only those families whose monthly income was less than 40 *yuan* failed to meet the caloric requirement. All other families—those with an average income between 40 – 150 *yuan* and those between 150 – 300 *yuan*—partook of diets that amounted to 2829 and 2870 calories, respectively. Ruth Guy and K. S. Yeh set the basic caloric need for an adult weight between 50-60 kg and of a height between 145-155 cm at 2000 calories. The diets they study, milled-cereal-meat diet

¹⁷⁵ Zheng Ji 鄭集, Tao Hong 陶宏, and Zhu Zhanggeng 朱章廣, “Nanjing dongji shanshi diaocha” 南京冬季膳食調查 [A survey of Nanjing winter diets], *Kexue* 科學 19.11 (November 1935): 1753-58, which also appeared as “A Study of the Winter Dietary in Nanjing,” *Contributions from the Biological Laboratory of the Science Society of China, Zoological Service* 10.6 (1935). Ge Chunlin 葛春林, “Zhongxuesheng shanshi yingyang chubu yanjiu” 中學生膳食營養初步研究 [Preliminary research into the nutritional value of middle school students' diet], *Kexue* 科學 20.7 (July 1936): 564-74; and Ruth A. Guy and K. S. Yeh, “Peking Diets,” *Chinese Medical Journal* 54.3 (September 1938): 201-22. See also Zhu Zhen

¹⁷⁶ Paul Weindling, “The Role of International Organizations in Setting Nutritional Standards in the 1920s and 1930s,” in *The Science and Culture of Nutrition, 1840-1940*, eds. Harmke Kamminga and Andrew Cunningham (Amsterdam: Rodopi, 1995), pp. 325-8.

¹⁷⁷ Zheng and his collaborators divided their subject base into four categories (A, B, C, and D) according to the monthly income of the head of the household (每戶家長每月之收入). Group A had a monthly income of 300 or more *yuan*; B 150 to 300 *yuan*; C 40 to 150 *yuan*; and D less than 40 *yuan*.

and the whole-cereal-soybean diet, straddle this 2000 value in a reasonable enough manner for the authors to suggest that though there are two distinct types of diets found in Peking, “Both, at their best, are excellent, as may be seen, not only from the computation of their composition, but by the ultimate test, the health, vigor and reproductive performance of the people who eat them.”¹⁷⁸

In Ge Chunlin’s survey of the diets of middle school students, ages 15 to 17, Ge discovered an even more unexpected result: caloric amounts for winter and summer diets that surpassed the 3000 mark. Drawing upon Henry C. Sherman’s *Chemistry of Food and Nutrition* and Wu Xian’s work on the diets of Beiping schoolchildren in *Yingyang gailun (Principles of Nutrition)*, Ge noted,

American boys age 15 to 17, according to Sherman’s calculations, need 2700 to 4000 calories. Wu’s survey of the diets of Beiping middle school students found that average daily caloric intake is 2746 calories. This study has discovered that the [Nanjing] summer diet yields 3150.8 ± 39.1 calories and the winter diet 3420 ± 21.92 . The winter diet gives 270 more calories than the summer diet. During harvest season, students labor rather more and therefore need more calories—hence the sum of 3420 calories.¹⁷⁹

Thus the problem was not so much quantity as quality. Despite the superficial satisfaction of caloric needs, be they 2000, 2400, or 2801, the fact remained that such calories were easily made and easily lost. “Correct nutrition,” the assembled nutritional specialists of the League of Nations’ *Nutrition Report* had argued, consisted of a diet that supplied the necessary substances for the growth and repair of the organism, as well as the energy for the production of animal heat and muscular work.¹⁸⁰ Calories as the measured expression of heat or energy producing value of food satisfied a person’s general energy requirements to do work. But in terms of aiding and enhancing the body’s ability to grow and repair itself, calories were only part of the story. Contemporary nutritional wisdom maintained that there were two general categories of food: “energy-bearing” foods and

¹⁷⁸ The whole-cereal legume diet was generally the diet of the poor, whereas the milled-cereal-meat diet tended to be eaten by the rich. Ruth Guy and K. S. Yeh, “Peking Diets,” *Chinese Medical Journal* 54.3 (September 1938): 206.

¹⁷⁹ Ge Chunlin, “Zhongxuesheng shanshi yingyang chubu yanjiu,” *Kexue* 20.7 (July 1936): 566.

¹⁸⁰ League of Nations, Mixed Committee of Experts on Nutrition, *Nutrition: Final Report of the Mixed Committee of the League of Nations on The Relation of Nutrition to Health, Agriculture, and Economic Policy* (Geneva: League of Nations, 1937), p. 60.

“protective” foods. The Chinese diet with its grounding and heavy reliance upon the five grains (*wu gu*) provided sufficient coverage in terms of “energy-bearing” foods, but with respect to “protective” foods, it tended to coming up lacking.

Wu Xian had remarked, “80% of the Chinese people reside in the countryside; the remaining 20% live in the cities. Mid-level/middle class families comprise the majority of households, and wealthy families the minority. Thus we when speak of the Chinese diet, [the diets of] rural and mid-level households form the representative examples.”¹⁸¹ The Chinese diet was primarily composed of grains and legumes (*gulei doulei* 穀類豆類). Foods rich in animal proteins, which the *Nutrition* report identified as “body-building foods,” occupied a smaller, sometimes miniscule, portion, and herein lay the problem. To build and repair tissues, the League of Nation’s *Nutrition* report asserted, “the proteins contained in animal foods are of better *quality* than those contained in foods of plant origin, the proteins of milk, eggs and glandular animal tissues (liver, kidney) being specially valuable.”¹⁸²

By this standard, the average Chinese diet was distinctly inferior. “For the Occidental in whose diet about 50% of the protein is of animal origin,” the Nutrition Committee observed, “the minimum requirement for the adult is 1 gram of protein per kg of body weight.” This assignment of one gram of protein per kilogram of body weight was, in many respects, a simple rule of thumb borne, not out of exhaustive chemical analyses of the human body’s minimum protein needs to satisfy basic physiologic functions, but rather from disciplinary disagreement over the advantages of high-level protein requirements. Protein, which the father of modern nutrition science Justus von Liebig (1803-1873) had separated and enshrined in the 1840s and 1850s as one of the three foundational elements of human nutrition—the other two being carbohydrates and fats—was universally recognized as a muscle-building substance and “absolutely necessary for human

¹⁸¹ Wu Xian 吳憲, *Yingyang gailun* 營養概論 [*Principles of Nutrition*] (Shanghai: Shangwu yinshu, 1928; rpt. Taipei: Taiwan shangwu yinshu, 1974), p. 87.

¹⁸² League of Nations, *Nutrition*, p. 60.

strength.”¹⁸³ During the first decade of the twentieth century, protein requirements based on recommendations of the German physiologist Carl von Voit (1831-1908) and the American chemist Wilbur O. Atwater (1844-1907) dictated a hundred grams and upwards of protein for an adult male whose body weight was 165 pounds or around 80 kilos.¹⁸⁴ It wasn’t until the physiologist Russell H. Chittenden (1856-1943), the first director of Yale University’s Sheffield School of Science, published his most influential book, *The Nutrition of Man*, in 1907 that the Voit-Atwater standard fell from its mighty perch.

The fall, it should be noted, was perhaps not nearly as great as one might imagine, and indeed, if compared with contemporary guidelines, Chittenden’s settled recommendation of 60 grams and the 75 to 100 grams advised by Sherman in *The Chemistry of Food and Nutrition* will hardly seem a precipitous decline at all.¹⁸⁵ But during the early twentieth century, Sherman’s and Chittenden’s respective reevaluation of protein requirements represented scientific confirmation that a low-protein diet did not result in deleterious health. Harvey Levenstein has highlighted how the convergence of

¹⁸³ Harvey A. Levenstein, *Revolution at the Table: The Transformation of the American Diet* (Berkeley: University of California Press, 2003), p. 90. Not only did scientists and the general public conceive of proteins as synonymous with strength and strength-building, they often drew upon racial/national analogies as evidence of evolutionary prowess. One example may be found in Sherman’s overview of contemporary opinions regarding the value of the liberal protein diet. He cites the German pathologist Carl von Noorden (1858-1944), who wrote in 1893,

When one considers that the dietary habits of people are the results of biological laws, it would seem that the action of these laws, extending through the thousands of years of existence of the species, would have resulted in the establishment of suitable habits regarding the amounts of protein consumed. The data gathered by Voit may be taken as showing that this normal habit involves the consumption of about 105 grams of digestible protein per day, a smaller protein consumption being usually associated with weak individuals or inactive peoples. While men can maintain equilibrium on less, still it can rightly be said that a liberal protein consumption makes for a full development of the man. A single individual may for years, or even decades, offend against this biological law unpunished. When, however, the small consumption of protein continues for generations, there results a weak race.

Carl von Noorden, cited in Sherman, *Chemistry of Food and Nutrition*, p. 375.

¹⁸⁴ For a man weighing 165 pounds, Voit insisted upon 118 grams of protein a day, while Atwater recommended 125 grams for good health. Levenstein, *Revolution at the Table*, p. 89

¹⁸⁵ According to the protein guidelines of the Dietary Reference Intake issued by the Institute of Medicine of the US National Academy of Sciences, women aged 19 to 70 should consume 46 grams of protein per day while men ages 19 to 70 should consume 56 grams of protein per day. As a rule then, this works out to be approximately 0.8 grams of protein per kilogram of lean body weight. Athletes are often recommended slightly higher allotments.

new dietary fads, e.g., low-protein diets, and laboratory work on the chemistry of foods and human beings reinforced claims by non-scientist faddists like Horace Fletcher of “fletcherizing” fame and Dr. John Harvey Kellogg that a low-protein diet—one with a protein intake as low as 45 grams of protein a day—did not produce ill-effects and was perhaps rather advantageous for achieving good health.¹⁸⁶ These sorts of health polemics did not, however, play a significant role in Chinese nutritional science; Wu Xian summarizes the vicissitudes in protein requirements in his textbook *Yingyang gailun* (*Principles of Nutrition*); and though hardly a convert of the high-protein requirements previously dictated by Voit and Atwater, Wu remained skeptical of claims that a person needed as little as 44 grams of protein a day.¹⁸⁷ Wu observed,

Based on these assessments [i.e., Sherman, Leitch, and Duckworth], the protein requirement for an adult is roughly 50 grams, which is slightly higher than Sherman’s value. As is evident, [50 grams] represents the absolute minimum requirement, but that which satisfies minimum requirements is not necessarily optimal. A more moderate proposal would be 70 grams of protein per day, which is a bit more than customary as the average weight of an American is 70 kilos. Thus for every kilo of body weight, one would need one gram of protein. Northern Chinese men, on average, weigh 60 kilos—thus, a daily protein requirement of 60 grams.¹⁸⁸

¹⁸⁶ “Fletcherizing” or “thorough mastication” was heavily promoted by Horace Fletcher as a kind of wonder cure for ill health and other ailments. Believing that the back of the mouth contained a mechanism essential to the digestive process, Fletcher recommend “chewing each mouthful of food until it had absolutely no taste and was involuntarily swallowed, which normally meant chewing at least one hundred times.” Levenstein, *Revolution at the Table*, p. 87. Although prolonged chewing was not a new idea, Fletcherizing did catch on among scientists and non-scientists alike. Among some of Fletcher’s strongest supports included Upton Sinclair, the economist Irving Fisher, Henry James and his brother, the philosopher William James. Dr. John Harvey Kellogg was a vocal proponent of vegetarianism. He is perhaps best known for his joint-efforts with his brother Will Keith Kellogg in the invention of corn flakes and his health-driving “Sanatorium” located in Battle Creek, Michigan.

¹⁸⁷ Wu attributed the protein minimum of 44 grams to Sherman, and in broad strokes, he was correct, although it was Chittenden who first advanced the idea that the human body could manage quite well on only 45 grams of protein a day. Sherman summarized the available research literature on the topic and found that contemporary investigations on 37 male and four female subjects indicated that the apparent protein requirements derived from the experiments ranged from 20.0 to 79.2 grams, thus averaging 49.2 grams of protein per man of 70 kilogram body weight. Sherman, *Chemistry of Food and Nutrition*, p. 220.

¹⁸⁸ Wu Xian, *Yingyang gailun*, p. 54.

Table 6: Protein Recommendations (grams per kilograms of body weight)¹⁸⁹

Age (years	Chinese Recommendations	League of Nations Recommendations
1-3	3.5	3.5
3-5	3.5	3.0
5-12	3.0	2.5
12-15	3.0	2.5
15-17	2.5	2.0
17-21	2.0	1.5
21 and upwards	1.5	1.0
<i>Women:</i>		
Pregnant – 0-3 months	1.5	1.0
4-9 months	2.0	1.5
Nursing	2.5	2.0

Wu Xian noted that although the League of Nations Health Organization had set one gram of protein per kilogram of body weight as its protein requirement, its decision had been predicated upon the assumption that the sources of protein within the diet was multiple and included a good proportion from animals. Indeed, if American dietary surveys were any indication of actual consumption patterns, meat, milk, and eggs occupied a high proportion of the diet and more than amply satisfied the protein requirement of 70 grams of proteins per day.¹⁹⁰ But the importance of the American example was less fidelity to real consumption than the presentation of robust national progress. To eat meat, and a lot of it, signified evolutionary advancement and national success on an international scale.

In setting the Chinese guideline for protein requirement, the Nutrition Committee took these details into consideration and identified a method by which to adjust the broad contours of the international standard to fit both the Chinese body and environment. Raising the ratio of protein to kilogram of body weight opened up conceptual space to systemize and rationalize Chinese difference. “For the Chinese whose diet is essentially vegetarian the [protein] requirement should be higher.”

¹⁸⁹ Committee on Nutrition, “Minimum Nutritional Requirement for China,” p. 306 and Health Organization, Technical Commission, *Report on the Physiological Bases of Nutrition* (Geneva: The Commission, 1936).

¹⁹⁰ Levenstein describes a results of a food survey of students in a boarding house at the University of Minnesota in 1910 as “typical” for its time. “[T]hey consumed an average of 3,715 calories and 105 grams of protein per person per day, and this does not include food and beverages consumed outside the boarding house.” Levenstein, *Revolution at the Table*, p. 96.

Building off of Wu Xian's proposal of 60 grams of protein, the Nutrition Committee continued, "An allowance of 80 grams a day for an adult of 55 kg of body weight or approximately 1.5 grams per kg, is probably sufficient. This amount may be slightly reduced if more animal protein can be included in the diet."¹⁹¹

The emphasis, however, had shifted. The League of Nations Health Organization devised nutritional guidelines that sought to promote optimal health, and its standardization of a proposed allowance of one gram of protein per kilogram of body weight for adults was meant to provide cushion for not only health maintenance but also health advancement. In other words, a diet that adhered to the one gram of protein per kilogram of body weight daily represented a healthy way to live. The Chinese guidelines operated from a completely different vantage point. The Chinese nutrition scientists working on the Nutrition Committee accepted the one gram of protein per kilogram of body weight as demonstrative of "the minimum requirement for the adult"—that which the Chinese needed to obtain to raise the level of nutritional health to match American, European, and Japanese precedents.

Thus, whereas the question of protein requirements had for Sherman and his American and European interlocutors had centered largely upon quantity to the near exclusion of socio-economic factors contributing to both selection and consumption patterns, the problem of protein within the Chinese context was from the start one of both quantity and quality. The proposed modification of the international standard was modest, an increase of .5 grams per kilo of body weight for all ages groups, but nonetheless it was important, because it reflected a concerted attempt by Chinese nutrition scientists to address perceived deficiencies through the language of nutritional science. Chinese bodies were small, Chinese nutrition scientists argued, but such smallness could be offset by proper manipulation of nutritional determinants.

The absence or insufficiency of animal-derived proteins in Chinese diets was, however, a more complex problem to tackle, as it required social and economic interventions far exceeding the

¹⁹¹ Committee on Nutrition, "Minimum Nutritional Requirement for China," p. 305.

disciplinary jurisdiction of biomedical nutritional science. Moreover, the cultural saturation of meat as symbolic not only of strength and fortitude, but also wealth and prosperity complicated the task of redesigning the Chinese diet. At best, the Nutrition Committee could only sketch a temporary panacea in which the poorer quality of protein was supplemented through quantity: hence, the increased protein allowance recommended by Chinese nutrition scientists. But though the modification of an international precedent for protein requirement may seem an insignificant action with little consequence, the act of negotiating and re-negotiating nutritional guidelines enabled Chinese nutrition scientists to carve out space for difference and divergence. The perception that the poorer quality of grain/plant-based proteins constituted a national problem colored the way in which Chinese nutrition scientists envisioned China's potential to be a modern nation composed of modern, healthy citizens, but the intellectual endeavor to explain such a problem afforded the opportunity to redefine individual and institutional forms of agency that could ameliorate such deficiencies.

Structural Forces

Wu Xian was perhaps the most vocal in characterizing the problem of Chinese dietary proteins as the historical outcome of deep fissures in the country's economic bedrock. Writing in 1932 for the journal *Duli pinglun* (*Independent thought*), Wu postulated that in the early history of mankind, humans depended upon hunting for obtaining nourishment. The discovery of fire and cooking transformed life by making even the hardest of grains edible. "In China," Wu wrote, "agriculture developed early, and by the third century, the people's diet already emphasized the five grains. A leisurely survey of the classics shows several references to hunting during this period as well. The land was plentiful and population light such that that the people did not suffer from economic pressures, and food could be obtained at will (*zìyóu xuǎnzé* 自由選擇)."¹⁹² As idyllic as ancient times might sound with its ample land, generous eats, and sparse population, the development of a sedentary, agriculture-based society was not without its advantages. Hunting culture receded, and in

¹⁹² Wu Xian, "Wu guoren zhi chifan wenti" 吾國人之吃飯問題 [The nation's eating problem], *Duli pinglun* 獨立評論 [*Independent Thought*] 2 (May 1932): 15.

its place arose an agricultural civilization with a booming population. Wu neither celebrated nor disparaged this growth, but rather emphasized that with the decline in hunting during the Qin (221-206 BCE) and the Han (206 BCE-220 CE) dynasties, the Chinese diet assumed a more vegetarian nature. The factors facilitating the growth of a major civilization were the same factors leading to a depreciation of the standard of living and greater competition for limited resources. Agriculture had become the foundation of the country (*nong wei bang ben* 農為邦本), and as eating grains constituted a lesser financial burden than eating meat, the people's diet gradually became thoroughly vegetarian.

Wu explained,

Eating meat was expensive, whereas eating grains was not. In addition, with the introduction of Buddhism to Chinese society [during the Six Dynasties period, 220-589 CE], its devotees (lit. "superstitious followers," *mixin zhi tu* 迷信之徒) believed that killing animals was immoral (*yi sha sheng wei zui e* 以殺生為罪惡). Although the number of people adhering to the Buddhist practice of abstaining from meat and fish was not great, the idea that vegetarianism was a moral good permeated people's consciousness and definitely influenced the Chinese people's diet.¹⁹³

Mixing socio-cultural and economic influences in his explanation of the history of the Chinese diet, Wu straddled a curious quandary as he attempted to explicate the causes for deficiencies in the Chinese diet without also denigrating Chinese society and civilization as backward or culturally unsophisticated. He repeatedly stressed historical differences in political economy and the contentious power relations shaping the formation of European states as integral for any understanding of disparities in diet. "European nations," Wu wrote, "developed later than China, and as land was limited, more than ten separate states had contend for hegemony." Such divisiveness and political acrimony accounted for the mutually reinforcing rise of both civilized and martial cultures. Rather than disappearing, hunting was in essence domesticated as a pastime, while the complex struggle for political survival translated itself into a competitive spirit that fueled the national people while also contributing to the florescence of science and technology. Land remained scarce for European countries, and though the population grew, it grew more slowly than had been the case in

¹⁹³ Wu Xian, "Wu guoren zhi chifan wenti," p. 15.

China. But whereas the Chinese were forced by increasingly harsh economic constraints to compete for ever more limited resources, the Europeans discovered recourse and profitability in colonial expansion to the Americas, Australia, and Africa.¹⁹⁴

Wu's suggestion that historical forces of civilization were, at least in part, responsible for the emergence of specific imbalances in the Chinese diet was not unusual. Ren Xian 紉嫻, who penned a piece for *Zhonghua yiyao* in 1939, wrote,

[I]n terms of the progress of material civilization (*wuzhi wenming de jincheng* 物質文明的進程) nutrition did not originally constitute a problem; rather, it is with the advancement of science and society that the problem of nutrition emerged. It is with the advancement of science that foods naturally plentiful/high in nutritional value have been altered by human or mechanical manufacture, thus losing its intrinsic nutritional value.¹⁹⁵

Since the early years of the new Republic, Chinese physicians had debated the extent to which science and technology itself was to blame for nutritional ailments. Ren Xian echoed these early critics by posing the example of white versus brown rice. Ren wrote,

Everyone knows that unpolished rice/brown rice (*caomi* 糙米) is high in vitamins (*weitaiming* 為太命), but because of scientific advancement/progress, unpolished rice is ground/rolled (*nian* 碾), and the vitamin rich husks are thrown away (*kang bifan paoye* 糠秕反拋葉).

The cultural preference for polished white rice instead of the more nutritious, coarse brown rice was framed as part of the deleterious effects associated with modern society, its crowded urban ways, and technologically mediated food products. The consequences extended far beyond one of preference.

“Material civilization,” Ren bemoaned, “means that the physique of civilized people (*wenmin ren* 文明

¹⁹⁴ Wu Xian, “Wu guoren zhi chifan wenti,” pp. 15-6. For a similar exposition with extended discussion of dietary surveys conducted in China, see Wu Xian, *Yingyang gailun*, pp. 86-115. Mark Swislocki has drawn from the text in Wu Xian’s *Yingyang gailun* in his comparative analysis of different interpretative explanations advanced by Chinese nutrition scientists of malnutrition. See, Swislocki, “Feast and Famine in Republican Shanghai,” pp. 79-89.

¹⁹⁵ Ren Xian, “Yingyang mantan” 營養漫談 [A conversation on nutrition], *Zhonghua yiyao* 1.11-12 (October 1939): 33-4.

人) is no better than that of savages (*yeman* 野蠻), urbanites' no healthier than rural folk." To rectify this situation, Ren urged his readers to eat more natural, fresh foodstuffs. He argued,

[I]f we then reconsider the problem of present-day nutrition [in light of the fact that the health of urban, civilized folk is no healthier than rural folk], it becomes clear that the criteria for good nutrition is to eat more natural foodstuffs (*tianran yingyang* 天然營養) and less man-made ones.¹⁹⁶

Juxtaposing a healthy, robust, and rural citizenry still vibrant in its relationship to the land against sallow overstressed urban residents highly dependent upon the importation of basic foodstuffs, Ren and his scientific colleagues found much to fault with modern technology and its industrialization of food practices.

But Wu's critique was less a critique against technology than an attempt to contextualize engrained dietary preferences by shifting the focus away from complaints like willful ignorance, i.e., a failure of comprehension or an unwillingness to comprehend scientific nutritional knowledge. By concentrating upon the structural factors that superceded the personal decision-making process of any single individual, Wu could recalibrate the analytic space so as to permit a more balanced consideration of possible strengths and weaknesses associated with the Chinese diet. His reluctance to simply disparage or dismiss Chinese nutritional practices set an example followed by many of his scientific colleagues. Zheng Ji listed three strengths common to Chinese dietary practices: thorough cooking techniques (lit. "cooked food," *shu shi* 熟食), strong representation of grains (*gulei chengfen gao* 穀類成份高), and good seasoning (*tiaowei youliang* 調味優良). According to Zheng,

Cooked food is a hallmark of our culture. Every national race, whose culture has not yet developed, eats birds and animals raw (*rumaoyinxue* 茹毛飲血), but once its culture has begun to progress, the people will change to cooked food. The advantages of cooked foods are many. Not only does [cooking] increase flavor, it facilitates easier digestion and kills off germs—a particular strength of our cooking techniques.

¹⁹⁶ Ren Xian was reasonable enough to append a caveat to his exhortation to eat fresh, natural foods. He observed, "This is certainly not absolute: if the natural foodstuff does not adhere to hygienic standards, it is not inappropriate to apply manmade process [*ru tianran yingyangpin zhi bu he weisheng zhe, you feidei jiayi rengong gaizao butuo* 如天然營養品之不合衛生者，又非得加以人工改造不妥]. Ren Xian, "Yingyang mantan," p. 33-4.

Moreover, in spite of the general scientific consensus that the grain-heavy Chinese diet needed to diversify and incorporate more animal-based foods (e.g., meat, milk, eggs, etc.), Zheng managed to discern something commendable about the Chinese dependence upon grains. Zheng pointed out, “Grains are economical and calorie-rich.” He did not deny the importance of meat products, but neither did he shirk from the recognition that grains served many purposes, and for this reason, represented one of the strengths of the Chinese diet.

By parceling one’s everyday interaction with food into abstract units of calories or essential nutrients like proteins, carbohydrates, vitamins, and minerals, Chinese nutrition scientists tended to eviscerate the social and cultural meanings of food and the act of eating. Nutrition was, nutrition scientists contended, about obtaining the proper nourishment to enable the body as a physiological machine to perform correctly. Nutrients functioned as taskmasters within a regulatory system dependent upon a precise balance of inputs and outputs. Taste and enjoyment were superfluous and largely exempted from nutritional discussions. Zheng Ji’s approbation of Chinese techniques for seasoning and enhancing flavor represented a modest departure from the standard discursive contrivances. He stressed,

Chinese seasoning techniques far outpace that of other countries. Often, there will be more than ten different seasonings for one item of food. This kind of technique has departed the realm of science and long since achieved the status of art. Focusing too much upon flavor, however, can result in overlooking the value of nutrition. If one pays attention to the principles of nutrition and the nutritional value of the food, then how much more would we be able to extol about our cooking?¹⁹⁷

By highlighting the potential good associated with Chinese seasoning, Zheng introduces another dimension to the standard nutritional discourse. He makes space for an aesthetic appreciation that need not conflict or undermine the scientific construction of nutrition and food, and at the same time, he extends a kind of legitimation of Chinese dietary practices by suggesting that scientific

¹⁹⁷ Zheng Ji, “Zhongguoren zhi yingyang gaikuang” 中國人之營養概況 [The nutritional state of the Chinese people], *Kexue* 23.1 (January 1939): 32-33.

nutritional principles can operate at the level of supplement—it is that which elevates an already sophisticated treatment of foods and flavors.¹⁹⁸

Why the quality of the proteins found in the Chinese diet should arouse so much anxiety must be seen in relation to the broader social and cultural milieu in which Chinese intellectuals attempted to critically engage and evaluate the value of traditional ideas and practices. In order for Chinese nutritional scientists to make sense of and in turn advocate for the rationalization of the Chinese diet and dietary practices, they had to recast what was and was not part of the historical tradition writ large as well as redefine what constituted the foundational elements of commonsense knowledge for the Chinese everyday. For Wu Xian, the reasons accounting for the vegetarian nature of the Chinese diet were rooted in socio-cultural and economic transformations, thousands of years in the making. By redirecting attention towards structural factors, Wu leveled the discursive field for both positive and negative assessments. A nutritional critique like that presented by Zheng Ji, did not revolve sole upon an axis of Chinese deficiency, but rather assembled redeemable qualities by which one could both recognize strengths and attend to the weakness in the Chinese diet.

The Chinese diet may have failed to achieve comparable levels of protein—both in terms of quantity and quality when compared with the League of Nations standard—but Chinese nutrition scientists found ways to make the best of a less than desirable situation. Zheng Ji had pointed out that grains formed an economical and calorie-rich basis to the Chinese diet, and such qualities were not to be dismissed lightly. Thus, one way in which Chinese nutrition scientists deployed biomedical nutrition so as to articulate forms of political action involved redefining the debate about poorer

¹⁹⁸ Conversely, if perhaps paradoxically, Zheng Ji also voiced disapproval of the strong affinity for spicy, sweet, garlicky, etc. flavors displayed by Chinese people. Those living in the southwestern provinces exhibited too great a preference for spicy, hot foods Zheng complained. Hot peppers (*lajiao* 辣椒), black pepper (*hujiao* 胡椒), and Sichuan peppers (*huajiao* 花椒) were nearly always included in each meal, but the problem that eating too much spice, hot foods results in damage to the stomach. Zheng also targeted the Jiangnan region for its excessive use of sugar, Northerners' partiality to onion and garlic, and Guangdong people's affection for "uncommon" (*fei putong shiyong zhi dongwu* 非普通食用之動物) animals like snakes and rats, which often were carriers of disease and could lead people to scorn Guangdong people as uncivilized. Zheng Ji, "Zhongguoren zhi yingyang gaikuang," p. 33.

quality proteins in terms of energy-bearing carbohydrates and legume (especially soy) proteins.¹⁹⁹ Rather than concentrating upon the inferiority of Chinese proteins, Chinese nutrition scientists shifted attention to the crucial importance of the total daily caloric intake in securing minimum health and promoting soy proteins as viable alternatives to the absence or deficiency of animal-derived proteins.

Nutrition Promotion Committee

In terms of political praxis, the ability of Chinese nutrition scientists to directly shape the health and dietary practices of the country was inversely related to the strength of their conviction that unless the people's livelihood were improved, the nutritional state of the Chinese people would continue to be impaired. Although consulted by and even enlisted into the services of the National government, Chinese nutrition scientists often found themselves constrained by the competing interests of other governmental agencies and institutions. Moreover, a national campaign to improve nutrition by changing people's popular understanding of food and health and reorganizing social and economic practices with the objective of achieving better nutrition in mind ultimately ranked rather low on the government's list of priorities. Introducing state medicine and building a viable health infrastructure as part of national reconstruction represented a more urgent and fundamental task by which the Nationalist government could extend state power and direct the mobilization of people and resources.²⁰⁰ That is not to suggest that biomedical nutrition failed to enter into any of the programs and methods Nationalist health planners employed. Following upon the increased prominence nutrition topics assumed in popular cookbooks, journals, and didactic domestic manuals, biomedical nutrition also achieved greater political currency through its conjunction with the health of the school child. Early state-led initiatives by local municipal governments to measure the heights and weights of schoolchildren often included nutrition as part of the analytic objective. After all, it

¹⁹⁹ For a more detailed consideration of how nutrition scientists drew upon the power of soy to advance a social relief program for children, please see chapter five of this dissertation.

²⁰⁰ Ka-che Yip, *Health and National Reconstruction in Nationalist China, The Development of Modern Health Services, 1928-1937* (Ann Arbor, MI: Association for Asian Studies, Inc., 1995), chap. 2 and 7.

was reasoned, viable height-weight charts could furnish the basic tool by which to quickly identify latent and not so latent ailments like malnutrition.²⁰¹ By the late 1930s, rumblings could be heard as directives from the National Health Administration (*weisheng shu* 衛生署), which was attached to the Ministry of Interior (*neizheng bu* 內政部), flowed downward to local education offices to begin conducting small-scale investigations into the relationship between school dietaries and student health.²⁰² According to a set of instructions presented by the National Health Administration in April 1938, the aim of such investigations was to determine how to best utilize local foodstuffs in a nutritiously efficacious manner so as to improve student health and vigor (*xuesheng tili* 學生體力). As each local district was likely to face slightly different food production circumstances (including growing and cooking methods) as well as a different selection of foodstuffs, the practical need for investigating the local particularities present at primary and middle schools was clear.²⁰³

Indeed, although the practical influence of the Nutrition Promotion Committee (*Yingyang gajin yundong* 營養改進運動) was limited, the campaign it waged to improve the nation's nutritional adopted many of the same arguments propounded by Wu Xian, Zheng Ji, et al. The National Health Administration spearheaded dietary surveys and nutritional studies in 1941 as well as published four kinds of booklets on nutrition for school, libraries, and public organizations.²⁰⁴ In addition to undertaking preliminary steps towards preparing a standardized list of minimum diet and nutrition

²⁰¹ For a discussion of height-weight surveys and the practicalities of measurement, see chapter 1 of this dissertation, "Human Measurement and the Language of Normality in China." Based on archival sources, the national implementation of height-weight charts for the purposes of diagnosing malnutrition in schoolchildren seems to have not occurred until after 1945, at which point one can find local education office (*jiaoyu ting* 教育廳) reports detailing both the procedure and the results of school inspections of malnourished students being directed upwards to the Ministry of Education (*jiaoyu bu* 教育部). The incorporation of height-weight charts in local and provincial level health contests was long-standing, dating back to the first decade after the founding of the Chinese republic.

²⁰² NJ 5-15052.

²⁰³ NJ 5-15052.

²⁰⁴ *China Handbook 1937-1943, A Comprehensive Survey of Major Developments in China in Six Years of War*, comp. Chinese Ministry of Information (New York: Macmillan Co., 1943), p. 682-3.

requirements for Chinese servicemen, the National Health Administration also conducted a small-scale clinical trial with two companies of privates to ascertain the specific health benefits of an improved diet.²⁰⁵ For each of these initiatives, stress was placed on the importance of securing and increasing vitamin intake; incorporating more legume proteins, especially soy, into local diets; and dissuading, if not outright prohibiting, the application of the nation's grain supplies for the production of alcohol.²⁰⁶

In December 1940, the Nationalist government launched the Nutrition Promotion Committee in Chongqing. With top-tier representation by the government's ministries, as well as participation of social organizations like the Women's Advisory Council (Funü zhidao weiyuanhui 婦女指導委員會), the Council for the Agricultural Development (Nongchan cujin weiyuanhui 農產促進委員會), and the governing board of the New Life Movement (Xinyun zonghui 新運總會), the Nutrition Promotion Committee advanced a mixed agenda that on the one hand, sought to increase the public's knowledge of the basic principles of scientific nutrition, and on the other, targeted agricultural and industrial practices that posed a direct threat upon the nutritional state of the people. Its presidium was composed of Kong Xiangxi (孔祥熙 1881-1967), Vice-President of the Executive Yuan and Minister of Finance; Chen Lifu (陳立夫 1900-2001), Minister of Education (Jiaoyu bu 教育部); Weng Wenhao (翁文灝 1889-), Minister of Economic Affairs (Jingji bu 經濟部); Shen Honglie (沈鴻烈 1882-1970), Minister of Agriculture and Forestry (Nonglin bu 農林部); Gu Zhenggang (谷正綱 1901-1993), Minister of Social Affairs (Shehui bu 社會部); Jin Baoshan (also known as P. Z. King, 金寶善 1893-1984), Director-General of the National Health Administration (Weisheng shu 衛生署); Mr. Chen Chi-tsai, Controller General; Wu Guozhen (吳國楨 1903-1984),

²⁰⁵ *China Handbook 1937-1943*, p. 683.

²⁰⁶ NJ 5-15052.

former Mayor of Chongqing; and Mr. Kang Hsin-jun, Chairman of the Chongqing Provisional Political Council who also served as the presidium chair of the Nutrition Promotion Committee.²⁰⁷

As part of this campaign, two special meetings were held in which participants focused solely on the “Problem of Food and Nutrition.” Having identified three objectives: to popularize nutrition work, to act swiftly in terms of execution and implementation, and to be fiscally responsible, the committee divided its work into two spheres of administration. That which directly concerned questions of health and nutrition was to be assigned to the National Health Administration, whose various medical experts were to furnish nutritional guidance and training as well as develop demonstration models and instructional guides for improving local dietary practices and foodstuffs. The Central Agricultural Experimentation Center (Zhongyang nongye shiyansuo 中央農業實驗所) was delegated the responsibilities of collecting and collating materials on the methods of planting different nutritious foodstuffs and publishing data on recent production levels.²⁰⁸ A separate sub-committee responsible for organizing publicity campaigns was formed to disseminate and build a lasting basis for nutritional commonsense among the public by targeting family feeding practices and raising the public’s perception of fruits and vegetables.²⁰⁹

In outlining the December 1942 meeting’s purpose and platform, Kang Hsin-jun reiterated many of the strengths and weaknesses previously remarked upon by Zheng Ji. Kang Hsin-jun observed, “The wealth, strength, and well-being of the national race depends upon the whether or not the national physique is robust (*jianquan* 健全) and whether or not nutritional value of everyday foods (*richang yinshi zhi yingyang* 日常飲食之營養) is sufficient.” Although Kang

²⁰⁷ *China Handbook 1937-1943*, p. 682-3.

²⁰⁸ Li Zidian, “Zhongyang nongye shiyansuo shulun” [A review of the Central Agricultural Experimentation Center], *Lishi dang’an* [Historical Archives] (April 2006): 113-20; and Shao Jinkai, “Minguo shiqi Zhongyang nongye shiyansuo de shuidao gailiang shulun” [A review of rice paddy improvements by the Central Agricultural Experimentation Center during the Republican period], *Anhui nongye kexue* [Journal of Anhui Agricultural Science] 36.19 (2008): 8389-91.

²⁰⁹ NJ 11-3243.

and many of his colleagues on the Nutrition Promotion Committee were neither particularly well-versed or specially trained in biomedical nutritional science, Kang assured his audience that the proper knowledge was readily accessible and well established. Drawing from reports issued by the concurrent meeting on public health techniques (*weisheng jishu huiyi* 衛生技術會議), Kang sketched out the basic nutritional tenets. “Food,” Kang stated, “is the basis of nutrition, and human nutrition is determined by the quantity and quality of the of the food. Our daily food needs can be broken down into 1) carbohydrates (*tanshuihua bewu* 碳水化合物), 2) fats (*zhifang* 脂肪), 3) proteins (*danbaizhi* 蛋白質), and 4) four types of protective foods (*baohuxing shiwu* 保護性食物).”²¹⁰ Kang then proceeded to describe the contemporary consensus regarding each nutritional requirement, but for our purposes, we will focus upon his discussion of heat energy and proteins.

Kang’s discussion of heat energy reflected the general standards recommended in 1938 by the Nutrition Committee of the Chinese Medical Association. Kang observed, “Heat energy (*reneng* 熱能) is the source of strength and power (*li* 力). If the total caloric intake is insufficient, then some part of the human body’s constitution will fail to support its other more important physiological functions.” He repeated the Nutrition Committee recommended minimum daily caloric allowance of 2400 calories, but pointed out, “Because each person’s work [i.e., muscular activity may be light, moderate, hard, etc.] differs, each person’s specific caloric needs also differ.”²¹¹ But whereas the Nutrition Committee sought to articulate nutritional adjustments to compensate for the “essentially vegetarian” nature of the Chinese diet, Kang honed in upon the prominence of grains and accentuated its contribution to the body’s need for heat energy. Simply put, Kang emphasized,

²¹⁰ NJ 11-3243.

²¹¹ NJ 11-3243. The Nutrition Committee’s caloric supplement for muscular activity was adopted directly from the nutritional guidelines of the League of Nations Health Organization. Its scale of adjustment was as follows:

Light work	<i>up to</i>	75 calories per hour of work
Moderate work		75-150
Hard work		150-300
Very hard work		300 calories and upwards per hour of work

Committee on Nutrition, “Minimum Nutritional Requirement for China,” p. 304.

“Carbohydrates are the best source for heat energy.” What better source could be found to make up the body’s energy requirements than the grains acting as the foundation to the Chinese diet?

The importance of grains did not preclude Kang from admitting the perceived weakness of the Chinese diet, i.e., the lack of animal-derived proteins, and but in this respect, Kang had identified an alternate and practical course to assist the project of improving the nation’s nutrition. “Proteins,” Kang explained, “are the basic building blocks of our bodies. Each cell contains proteins, and proteins are important for the metabolic function of cells, which need a nonstop allowance of protein to replenish the proteins lost.”²¹² In terms of dietary allowance, the specific requirement varies among individuals and is subject to body weight. Kang permitted some flexibility in this calculation such that whereas the Nutrition Committee insisted upon 1.5 grams of protein per kilogram of body weight, Kang suggested a targeted range of 1 to 1.5 grams of protein per kilogram of body weight.

With quantity reasonably settled, Kang moved on to the question of quality. He weighed the situation thusly:

We know that [on the topic of] the nutritional value of proteins, there are positives and negatives. On the positive side, [proteins are made up of] the most complete types of amino acids (*anjisuan* 氨基酸). On the negative side, animal proteins (*dongwu danbaizhi* 動物蛋白質) tend to be superior to plant proteins (*zhiwu dongbaizhi* 植物蛋白質), of which the type from legumes (*doulei* 豆類) are the most complete.

Having been exposed to some degree to the debate on protein quality, Kang admitted that the Chinese diet tended to come up short with respect to animal-derived proteins, but rather than propose systemic or institutional changes to facilitate the introduction of increased sources for animal-derived proteins, Kang highlighted how the Chinese diet could nonetheless achieve a similar nutritional outcome with plant-derived proteins.

Although the source of protein is not the same, and the amino acids are also different, we can nonetheless increase the kinds of plant proteins we ingest such that even if within each unit of protein the amino acids absorbed are not complete/perfect (*wanbei* 完備), the sum total intake of protein is better than an

²¹² NJ 11-3243.

single unit of protein. Thus, when we eat the different kinds of vegetables, the more the better; and during those times when our diets lack animal proteins, we should eat more legumes.²¹³

To facilitate this nutritional diversity, the Nutrition Promotion Committee recommended that responsible organizations and agencies involved in food administration and market distribution focus upon the purchase and transportation of the minor cereals like legumes (*doulei* 豆類), maize (*yushushu* 玉蜀黍), and sorghum (*gaoliang* 高粱) for public consumption. Not only were such cereals cheaper, they were also rich in nutritive value (*fu yu yingyangzhi bi mi liang* 富於營養值). Moreover, during times of crisis when sources for rice become constrained, the Nutrition Promotion Committee argued, it was even more imperative that a proactive role be taken to encourage the consumption of minor cereals. The Nutrition Promotion Committee called upon the Executive Yuan (Xingzhengyuan 行政院) to issue a governmental order for grain management and buying and selling offices to purchase and transport minor cereals; publish broadsheets encouraging consumers to choose legumes, maize, or sorghum when making purchasing decisions; and promote the milling of maize and sorghum for easier use. In addition, the Nutrition Promotion Committee suggested that the Executive Yuan direct public granaries to mix in a tenth or two of milled minor cereals to make steamed buns and pastries (*mantou zhaobing* 饅頭糕餅). Such food items were then to be distributed to public employees and their families, to schools, factories, and like organizations to promote the benefits of good nutrition.²¹⁴ The Nutrition Promotion Committee also advised that proper measures be taken to restrict or prohibit the use of grains for alcohol production for non-industrial or non-vehicular purposes (i.e., hard liquor [*daqiujiu* 大麴酒], *baijiu* 白酒 or Shaoxing rice wine 紹興酒).²¹⁵

²¹³ NJ 11-3243.

²¹⁴ NJ 5-15052.

²¹⁵ NJ 5-15052.

While these measures demonstrated a degree of governmental awareness for nutritionally-minded public policy, the extent to which the Nationalist government was both able and willing to implement such measures was limited. The Nutrition Promotion Committee's prescription for the prohibition of liquor production reflected a New Life conviction to weed out social hedonism in its various manifestations. Chiang Kai-shek drew upon several wells for inspiration in his formulation of the basic tenets of the New Life Movement, and in particular, he advocated for the revival of four traditional Confucian virtues: propriety, righteousness, integrity, and a sense of shame (*li, yi, lian, chi*). Unless the populace reformed its social mores by disciplining undesirable behavior—spitting, urinating, or smoking in public; for women, the wearing of provocative clothing—a national consciousness could not be forged to meet the challenge of creating a self-sufficient and economically prosperous new China.²¹⁶

Targeting public consumption of alcohol fit within this program of state regulation of the people's everyday lives, but it also highlighted the growing industrial importance of Chinese grains for purposes other than basic dietary consumption. Grain harvests formed the foundation of the Chinese diet. By the late 1930s, it also undergirded the country's industrialization and war effort. In an attempt to reduce dependency on petroleum imports (e.g., gasoline, diesel fuel, motor oil for motorized transportation), the Nationalists had aligned themselves with private investors to form several jointly-owned factories to produce industrial alcohol in Shanghai and other cities.²¹⁷ In 1929,

²¹⁶ Arif Dirlik argues that the New Life Movement's appropriation of specific Confucian virtues was not a direct call for a revival of Confucianism, but rather an attempt to thread a kind of social and intellectual coherency through his notion of Chineseness. See Dirlik, "The Ideological Foundations of the New Life Movement: A Study in Counterrevolution," *Journal of Asian Studies* 34.4 (August 1975): 945-80. Although most scholars have focused upon the prohibitive, if not repressive, elements of New Life ideology, Hsiao-pei Yan suggests that New Life prescriptions for natural feet and unbound breasts for women could also be liberating for Chinese women, particularly those for whom an embrace of modern *tjyu* and health defined the modernity they both desired and sought to perform. See Yan, "Body Politics, Modernity, and National Salvation: The Modern Girl and the New Life Movement," *Asian Studies Review* 29 (June 2005): 165-86. For a broader treatment for how modern rituals of state facilitated the formation of a new political culture and Chinese identity, see Henrietta Harrison, *The Making of the Republican Citizen: Political Ceremonies and Symbols in China, 1911-1929* (New York: Oxford University Press, 2000).

²¹⁷ Ethyl alcohol (ethanol) can be manufactured as a gasoline substitute. By the 1930s, European countries had established a working economy of "gasohol," a mixture of ethanol and gasoline, which allowed governments

over six million gallons of alcohol was imported into China, but by 1935, the Chinese were basically self-sufficient in industrial alcohol.²¹⁸ Moreover, after 1937, the Chinese manufacture of alcohol as a gasoline substitute became one of the major industries of Nationalist China.²¹⁹

In terms of building the Chinese war economy, the domestic production of alcohol played a critical role in the Nationalist's military-economic plans for modernization. William Kirby has demonstrated that China's war economy owed much to measures undertaken prior to the outbreak of war with Japan in 1937.²²⁰ The National Resources Commission (Ziyuan Weiyuanhui 資源委員會) under the National Military Council (Junzheng Bu 軍政部) headed the government's efforts in planning basic industries and economic mobilization.²²¹ As an organ of civilian expertise, the National Resources Commission evolved into what Kirby has described as "a secret ministry of industry and planning, staffed primarily by academic scientists and engineers, mostly trained abroad, whose aim it was to design the foundations of a Chinese 'national defense economy' (*guofang jingzhi* 國防經制)." ²²²

the benefit of extending their petroleum supplies. Mixtures of gasoline and pure alcohol (anhydrous or "water free") can be mixed even at low temperatures and pose no problems for an internal combustion engine. Mixtures of gasoline and common industrial alcohol, which is 95% pure, separate at lower temperatures and therefore cannot be used as gasoline. The manufacture of anhydrous alcohol was extremely expensive and impractical given the adolescent state of Chinese industry, but in 1934, researchers at the National Bureau of Industrial Research, which was established in 1930 under the Ministry of Industry, discovered a formula to overcome this bottleneck. By mixing 70 percent gasoline, 25 percent normal ethanol (95% pure), and 5 percent amyl or butyl alcohol, Chinese researchers obtained a "gasohol" mixture that worked in an internal combustion engine and could be produced at reasonable expense. James Reardon-Anderson, *The Study of Change: Chemistry in China, 1840-1949* (Cambridge: Cambridge University Press, 1991), p. 244.

²¹⁸ Reardon-Anderson, *The Study of Change*, p. 244.

²¹⁹ Reardon, Anderson, *The Study of Change*, p. 244.

²²⁰ William C. Kirby, "The Chinese War Economy," in *China's Bitter Victory: The War with Japan, 1937-1945* (Armonk, NY: M. E. Sharpe, 1992), pp. 185-212.

²²¹ When created, the commission was originally named the National Defense Planning Commission (Guofang shezhi weiyuanhui 國防設置委員會) and under the authority of the General Secretary. It was renamed in 1935 as the National Resources Commission and moved to the National Military Council.

²²² According to Kirby, the planned "national defense economy" was meant to be entirely state-owned and managed. Private and foreign investment would be regulated according to national priorities, and although the development of such a "controlled" (*tongzhi* 統治) economy would require technology transfer from Western

The civilian presence in government did not decrease with the “militarization of economic policy,” and instead, Kirby finds that after 1932, the Nationalist government began incorporating to greater effect the specialized talents and technical training of China’s intellectuals and scientists, as was the fashion of the day, for the “scientific management” of the nation’s economic resources for national defense and economic development. The geologist Ding Wenjiang (Ting Wen-chiang 丁文江, 1887-1936), who played a critical role in the formation of the predecessor agency of the National Resources Commission, the Nation Defense Planning Commission, had been a vocal proponent of the “new model” (*xinshi* 新式) in which political leadership would rely heavily upon “scientific” development planners.²²³ A fellow geologist, Weng Wenhao (翁文灏, 1889-1971), served as the head of the National Resources Commission and later concurrently as economics minister. Under Weng’s leadership, the National Resources Commission grew from a “relatively small agency that prided itself on apolitical expertise” in 1937 to controlling some 40 percent of the industry in Nationalist-controlled China and one of the largest government bureaucracies in 1942.²²⁴ The manufacture of liquid fuels was crucial for the development of the war economy, and the National Resources Commission assumed an early and proactive role in developing domestic production. Through the

nations for the creation of defense industries, Western influence would be limited to technical assistance agreements as opposed to equity ownership. Kirby continues,

Private Chinese capital was to have no role whatsoever. Although unfinished at the time the war broke out, the new military-industrial enterprises of the prewar period (e.g., Central Steel Works, Central Machine Works, Central Electrical Manufacturing Works) marked a step in the direction of central government control over industrial and technological development, which during the late Qing and early Republican periods had occurred largely under private, provincial, or foreign auspices.

Kirby, “The Chinese War Economy,” pp. 188-9.

²²³ Kirby, “The Chinese War Economy,” p. 189.

²²⁴ The expansion of state power in private industries blurred the line between public and private enterprises. Kirby lists the National Resources Commission as administering 23 industrial and mining enterprises and employing fewer than 2,000 staff members under its direct authority in 1937. Within a year, its scope of operations had grown to include 63 enterprises, 40 of which it operated by itself and 23 others in tandem with other government units or private capital. By 1944, Kirby writes, “the NRC had 103 units in its manufacturing, mining, and electrical enterprises, including 28 that had been ‘annexed’ from private or local public ownership. It employed over 12,000 staff members and an estimated workforce (excluding miners) of 160,000 workers.” Kirby, “The Chinese War Economy,” p. 193.

authority and influence of the National Resources Commission, which pioneered the use of alcohol as a gasoline substitute, the production of industrial alcohol provided three quarters of all liquid fuels used in Nationalist-controlled China.²²⁵

Grain had become more than just the sustenance of the general population. It was the backbone and fuel enabling Chinese industry to continue and support the nation's military effort. Although Chinese scientists could not have predicted the vicissitudes of nutritional thinking in the decades to come, it is worth noting that many of the arguments embraced by Chinese nutrition scientists as part of an intellectual attempt to localize the global science of biomedical nutrition—the reaffirmation of the importance of grains and plant proteins—have since received more favorable analysis as contemporary researchers reexamine past methodologies and conceptual schemas. Contemporary nutritional studies have suggested that the nutritional quality of plant proteins may have been underestimated in animal studies, since animals used in experimentation have greater protein needs per body weight than humans. Moreover, accumulated human data confirm the adequacy of plant proteins for meeting the needs of both adults and children.²²⁶ Kang Hsin-jun's suggestion that local diets could supplement the lack of animal proteins by consuming more kinds of plant proteins was perhaps not so far off the mark.

²²⁵ Ibid., p. 196.

²²⁶ For a general overview, see Patricia K. Johnson and Joan Sabaté, "Nutritional Implications of Vegetarian Diets," in *Modern Nutrition in Health and Disease*, ed. Maurice E. Shils et al., 10th ed (Philadelphia: Lippincott Williams & Wilkins, 2006), pp. 1638-54. Interestingly, one of the consequences of contemporary research has been a reassessment of the validity and applicability of the animal model for understanding human nutrition. For example, with respect to the question of protein needs, much of the laboratory work has involved test animals like rats and guinea pigs, which, as mentioned above, possess greater protein needs per body weight than humans. Metabolic rates obviously differ between animals and humans, but such differences can skew both the design and the results of laboratory work in a way that makes such data difficult to apply to a human dietary. Moreover, the structure of laboratory studies tends prize the isolation of a specific factor and examining the body in relation to that single factor. Human nutrition in daily practice rarely occurs with such specificity.

Conclusion

The emergence of a Chinese discourse of nutrition was indebted to the dynamic ways in which Chinese nutrition scientists sought to mold international precepts to reflect the specific needs of the Chinese social and political landscapes. Although the League of Nations nutritional standards often served as the de facto norm against which Chinese levels of nutrition, nutritional habits, and local food systems were found lacking, the resulting discourse of deficiency yielded not passive acceptance, but rather a strong desire to construct normative standards that addressed the specificities of the Chinese people and the Chinese diet—hence, the proactive stance maintained by the Nutrition Committee of the Chinese Medical Association. Energy needs, protein requirements, adjustments for children and women, each of these topics provided ample space within which Chinese nutrition scientists could argue and analyze the proper quantitative relationship for the Chinese people.

By situating the disciplinary development of nutritional science within the framework of the Chinese nation, Chinese nutrition scientists articulated a double-edged critique that operated upon a notion of individual and institutional agency that could, at times, be redirected against the Chinese state. Men like Wu Xian, Zheng Ji, Shen Tong, and Jin Shuchu tended to avoid overt criticism of the Nationalist government, favoring instead lengthy meditations about all that the individual or primary social institutions caring for the individual (e.g., schools, refugees camps, children's homes, etc.) could do to improve nutritional health. But even as the emphasis may have been laid upon the actions of the well-meaning citizen or citizen-to-be, individual agency was circumscribed by complex political and economic factors that impeded efforts to improve one's own or one's family's nutrition. Wu Xian, for one, was cognizant of this fact. In a follow-up essay to his 1932 piece, "Our Country's Food Problem," Wu Xian insisted,

"These past few years have brought about more dependable statistics on the country's population, arable farmland, and crop varieties. We can study the food problem from the point of view of political geography, and based on such results, we can determine that the Chinese people are unable to obtain good food (*Zhongguo ren chi budao haofan* 中國吃不到好飯). This is definitely a problem. Moreover, I

believe, if we want to improve nutrition, we must first begin by improving the economy (*xu cong gailiang jingji rushou* 須從改良經濟入手).²²⁷

Tackling the food problem meant grappling with the complexities of land usage, industrialization, and international trade. Energy-rich foods generally derived from animals, and raising animals for domestic consumption required intensive labor and land. The amount of arable land needed to provide just one food item varied dramatically if the food in question were plant as opposed to animal-derived. Wu listed the following land requirements: the potato, .76 acres; cornmeal, .79 acres; wheat, 1.45 acres; pork and pork fat, 3.7 acres (including slaughtering facilities); pork and pork fat, .7 acres (pasturing only); beef, 2.3 acres (including slaughtering facilities); and beef, 1.5 acres (pasturing only). Based on these figures, Wu concluded, “If one had a piece of land and used it to farm plant-based foods, one person could be feed [from the harvest]. If the land were used to raise animal-based foods, one even one person could be feed.”²²⁸

But even if China were able to produce a cornucopia of energy-rich foods, which Wu found to be highly unlikely given the low per person acreage yield but also not an uncommon phenomenon as other European countries were also unable to produce enough food to feed itself, the Chinese economy depended upon foreign imports to furnish even the most basic of everyday necessities. The lack of industrialization translated into a scarcity of manufactured goods that could be traded on the international market to supplement China’s food inadequacies. Wu exclaimed, “Not only do we face inadequacy of food supplies in China, even everyday essentials like clothes and tools come from abroad. Each year, with respect to foreign commerce, almost all of it consists of imports.” One of the consequences of this trade imbalance manifested itself in how peasants negotiated their local markets for value and profit. Wu explained, “Peasants cannot enjoy the foods of their own labor,

²²⁷ Wu Xian, “Zai lun chifan de wenti” [Reconsidering the food problem], *Duli pinglun* 205 (June 1936): 14.

²²⁸ Ibid.

because they must sell the foods of high value on the open market, and in return, buy foods of lesser value [for their own use].”²²⁹

The problem articulated by Wu was far from novel, and Wu Xian was certainly not the first to raise it for public discussion. John Lossing Buck had observed and described in greater detail the same social and economic dynamics in his monumental study, *Land Utilization in China* (1937), but in terms of the formation of a Chinese nutritional discourse, Wu Xian’s characterization of China’s food problem as a problem that touched upon food production, education, and the economy flagged the discourse’s potential as a language of political critique. Failure to achieve international standards for nutritional health cast the Chinese nation in a negative light and added further evidence of the degradation and perhaps degeneration of a formerly grand and indomitable empire. But from another angle, engaging directly with international standards—be they in the specific form of energy requirements for adult males or in the more generalized sense of intellectual agreement that nutritional standards serve as public guarantors of political action—afforded Chinese nutrition scientists a measure of political leverage with which to pressure the state to substantiate its claims and actualize its promises. That Wu does not pursue this dimension of the argument suggests a certain degree of political disinclination, and yet by bringing the reader to the precipice of an expository conclusion that industrialization and economic self-sufficiency could directly remedy China’s food problem, Wu nonetheless insinuated the proper matrix for understanding the social relevance of biomedical nutrition. Even without a specific program for political action, Wu and his scientific colleagues elaborated intellectual space for the articulation of a Chinese discourse of nutrition, and as we shall see in the following chapter, this sense of flexibility and scientific authority translated into an innovative experimentation in nutritionally-minded social relief programs.

²²⁹ Ibid., p. 15.

Chapter 5: Nutritional Activism: The Science of Nutrition and Social Relief, from Shanghai to the Southwest, 1937-1945

Introduction

“Rice has been up at almost \$3.00 a catty while salaries have been lagging way behind,” Nellie Lee wrote in September 1941, “so nutrition is a big problem. Everybody is more or less undernourished as compared with the pre-war standard, with eggs at .50 a piece and pork \$4.00 a catty. My work is very timely and is met with good response, except that it has been terribly difficult to get things done what with the air raids, poor general health of the people which result in frequent illnesses, and the poor transportation which make any movement a big event.”²³⁰

Nellie Lee, an American-born Chinese, had herself undertaken a major relocation of person and belongings from Shanghai to the interior of China. Having left the cosmopolitan and materially-built up environment of Shanghai with its street lights, movie theaters, and paved roads, Lee confronted a very different world in what must have felt like the backwaters of Sichuan. Whatever proverbial delights of urban living there may have been for Lee in Shanghai, it was all a distant memory made dimmer by the lack of electricity and mud floors in her newly settled home of Chongqing. Gone were marbled steps and towering buildings of the Bund, the commercial delights of Nanjing Road; in their place, Lee found herself in and between dugouts and mud huts. Time was punctuated by air raids. There was no music “to soften ones [sic] spirit,” and whatever emotion, positive or negative, she may have derived from watching the planes flying afar had long since left her. “[T]hey have been roaming over our heads recently, and I have given up taking chances.” With one’s day bookmarked in early fashion: “early to rise and early to bed,” Miss Lee was lonely. Her parents were either in Hong Kong or the United States—her uncertainty of their location matched

²³⁰ 5 September 1941 letter to Dr. Hackett, Mount Holyoke College Archives and Special Collections.

by the simple declaration, “My folks are all well.”²³¹ Although she began her war work “accidentally,” her purpose in Chongqing was anything but accidental.²³² Having helped complete what was by all accounts a successful experiment in the provisioning of nutritional supplements to refugee children on the coast, Nellie Lee had, in her own words, “initiated the movement to spread the use of bean milk and bean residue cakes in the interior.”²³³

The task before her was formidable. Her 5 September 1941 letter to her mentor, Dr. Hackett, glossed over the details of her work, mentioning only that she had been at it for the last two years, and that there were now branches in Kunming, Guiyang, Chengdu, and Chongqing. A later letter to Julian Arnold, former Commercial Attaché to the American Legation in Peking and acting Chairman of the Chinese Nutritional Aid Council (CNAC, *Zhonghua yingyang cujin hui*) in New York, described a less matter-a-fact, perhaps even cruel, world confronting the young woman. “Man prefers to be alone in sorrow. Ever since I came into the interior, there has been a succession of frustration, feeling most of the time lonesome in my struggle. It is only during the past few months that I feel I am beginning to do something. I have been in Chungking for over a year and a half, and up to last July I have felt miserable most of the time—without help and without a space of one’s own.”²³⁴

The original idea implemented in Shanghai in November 1937 after the outbreak of war between Japan and China was almost simple in comparison to this new initiative in the interior. The Shanghai Refugee Children’s Nutritional Aid Committee (henceforth “Refugee Children’s Committee,” Shanghai *nanmin ertong yingyang weiyuanhui*) was formed in November 1937, and its

²³¹ Ibid.

²³² Nellie Lee described her involvement with the Shanghai Refugee Children’s Nutritional Aid Committee as the natural consequence of a series of fortuitous happenings. “I was to go to Hong Kong for vacation when the spark started in Shanghai, and with transportation blocked, idled at Shanghai. I got to visit a Cantonese Refugee camp with 6,000 people, crowded in the most miserable condition. As other’s [sic] went to look for place for confinement, I telephoned all the dairies in town for milk for the refugee babies. I was very lucky, and got several hundred pounds a day to distribute. From cow’s milk I went into [soy] bean milk.”

²³³ Ibid.

²³⁴ 17 November 1942 letter to Julian Arnold, Box 4, F. 1, New York Public Library.

aim to provide soymilk (*doujiang pin* 豆漿品) for refugee children was in keeping with the urgency of the times.²³⁵ For Hou Xiangchuan (H. C. Hou, 候祥川), an associate researcher in the Division of Physiological Sciences at the Henry Lester Institute of Medical Research, the influx of refugees posed an incredible challenge in connection with the feeding of so many people, but it also afforded an unusual opportunity for combining science and relief work. He and the other physicians who volunteered time and provided medical care to the camps “became alarmed at the conditions” prevailing there.²³⁶ Overcrowding, insufficient water supply, damp and dirty quarters, little attention to the spread of infectious diseases—all of these problems emerged in one form or another at the refugee camps in Shanghai. But change for the better was possible, and for Hou, who also served as the Chairman of the Refugee Health Committee of the Shanghai International Red Cross and whose professional expertise and scientific training centered on nutrition and nutritional deficiency diseases, the Refugee Children’s Committee was aptly situated to make a unique contribution to the general refugee social relief efforts taking place in the International Settlement. By focusing upon children, and in particular their diet, it played a key role in helping to alleviate the inequities and uncertainties of camp life. Hou, for his part, provided the scientific know-how and experimental temperament to transform the Council’s work from simply emergency refugee relief into a scientific enterprise fit for a burgeoning capitalist economy.

²³⁵ The advisory committee that oversaw the Refugee Children’s Committee’s day-to-day operations bore the rather confusing title of Refugee Children’s Nutritional Aid Committee. The importance of local physicians in civic life and the extent to which the more prominent ones could affect the lives of city residents of all socio-economic levels is testified by the life and work of the famous gynecologist Cai Xiangsun. Frederic Wakeman, Jr., in his essay, “Occupied Shanghai: The Struggle Between Chinese and Western Medicine,” notes that Cai played a major leadership role in several Jiangwan associations, “responsible for the district’s fire department, garbage collection, and other civic activities.” Cai established major hospitals (the Jiangwan Dawn Hospital in 1924) and large clinics; he led local municipal gentry organizations in the organization and administration of philanthropic work, road-paving, cemetery building, and refugee shelters. See Frederic Wakeman, Jr. “Occupied Shanghai: The Struggle Between Chinese and Western Medicine,” in *China at War: Regions of China, 1937-1945*, ed. Stephen R. MacKinnon, Diana Lary, and Ezra F. Vogel (Stanford: Stanford University Press, 2007), p. 269.

²³⁶ Internal report: “Soya Bean Milk for Refugee Children: A Shanghai Experiment,” Box 4 F. 12, New York Public Library. Dr. Hou Xiangchuan and his colleague, Dr. Peter Mar, both associates at the Henry Lester Institute of Medical Research, are both documented in SMC Public Health Department files as volunteering their services to area camps. See SMA U1-16-1037.

Nellie Lee, who had previously worked as a secretary for the agrarian research professor, Dr. J. Lossing Buck, had been assigned by the Refugee Children's Committee to oversee the managerial side of the soybean milk and soybean cake operation. She worked with local businesses to obtain the necessary ingredients and secure premises for the milk and cake production; she organized and coordinated the distribution depots, the delivery routes, and the necessary personnel; and at the end of each month, she delivered a monthly expense report documenting the highs and lows of production, changes in protocol, and the occasional summary of scientific investigations undertaken by Hou himself.

As part of a larger campaign to improve the nutritional health of refugee children, Hou, Lee, and their colleagues embarked upon a project that situated nutrition as the crucial site for the dissemination of modern knowledge and values. Health was reconfigured in terms of biomedical nutrition with its emphases upon calories, proteins, and the chemical composition of popular foodstuffs, and its characterizations of healthy bodies according to regulatory principles, numerical assessments, and empirical testing. Although indigenous and classical Chinese understandings of health and nutrition would continue to shape the challenges the Refugee Children's Committee faced and the reception they received from their target population, its work conceptualized health in a manner quite unlike previous relief efforts whose goals had also included the provision of foodstuffs. This reinterpretation of health afforded a different kind of opportunity to reach the general Chinese public.

War had transformed the city into one massive sea of human swells and uncertainties, and even the most fundamental of tasks, the provision of food, became impossibly implicated in the movement of troops, military strategies, and geopolitical objectives. For the members of the Refugee Children's Committee, making food, any food, available was insufficient. The task they set for themselves was something much less transparent and rather more intangible. Their target was "nutritional health," and their method was the transformation of the simple soybean into a modern, scientific foodstuff. This combination of form and function substantiated a mode of social-scientific

inquiry that valorized the possibility of optimal health through social engineering. The Refugee Children's Committee represented one of the first organized attempts in China at nutritional activism through its application of biomedical nutritional principles to the social world.

By helping to create a scientifically nutritious food—one that required laboratory experimentation, chemical analyses to ensure nutritional standards, and large-scale trials among human subjects to determine its nutritional benefit—the Refugee Children's Committee was also helping to articulate and actualize the modern Chinese body. For its part, soybean milk represented the quintessentially modern, healthy food for the modern healthy Chinese body.

But within this social-scientific endeavor for achieving nutritional health, there is also the human side. The process by which soybean milk came to be touted as a modern, nutritious food depended upon the work of people like Hou Xiangchuan and Nellie Fung Lee. The notions and techniques they employed and actively applied to their target population, i.e., children, opened up a space in which to actively reshape the conceptualization and embodiment of the modern Chinese body. Although the Refugee Children's Committee focused upon emergency relief for a specific subset of the refugee population, its goals, as evidenced by its transplantation to the Chinese interior following the Nationalist government's retreat, were much more comprehensive. When the Refugee Children's Committee reinvented itself as the Chinese Nutritional Aid Committee (henceforth "Nutrition Committee") in 1939-1940, they did not abandon their concern for refugee children. Instead, they rearticulated the primary objectives to include all children, not just refugee children, and in doing so, they opened the discussion for changing the health of all Chinese people regardless of age. Both organizations enlisted the cooperation of men and women with biomedical and social scientific training in order to convert social-scientific ideas into a concrete social engineering project that staked the welfare of the nation upon the nutritional health of its citizenry.²³⁷

This chapter will focus upon the human agents active in the formation and operation of the Refugee Children's Committee and the Nutrition Committee, with particular emphasis upon the roles

²³⁷ My use of the term "social-scientific" is meant as shorthand for the emergent social science and "pure" science discourses and practices in China.

played by Nellie Lee, Hou Xiangchuan, and the Henry Lester Institute for Medical Research (Shanghai).

Backdrop of War: the Camp

Tension between China and Japan had been mounting since the Japanese seizure of Manchuria in 1931. Further encroachments into northeastern China took place in the succeeding years: Rehe, just north of the Great Wall, fell to the Japan in early 1933, and by 1935, Japan had assumed control of the northern province of Chahar, west of Rehe. Although historical hindsight now recognizes the Marco Polo Bridge incident on 7 July 1937 as a major turning point in Sino-Japanese relations, as well as the starting date for the War of Resistance, for the Chinese of the time, total war was not yet an inescapable reality. With the commencement of the Shanghai campaign (August to September 1937), however, war transformed daily life and set in motion the migration of millions of Chinese to the western interior. In the words of the Chinese essayist and novelist, Lin Yutang, “The greatest migration of people in all history had begun.”²³⁸

In the days leading up to the commencement of the Shanghai campaign on 13 August 1937, rumors of the impending crisis flooded the city. The *North-China Herald* estimated that roughly 50,000 refugees had entered the Settlement from Chapei from 26 July through 5 August. Citing growing concern for the “large-scale departure of Japanese residents from China and the presence of sandbags in certain isolated sections of Chapei,” refugees piled their belongings “high in lorries and rickshaws, on handcarts and even carried by coolies, [and] poured into the International Settlement from Chapei and Kiangwan.”²³⁹ One family suffered a “double misfortune,” when two hand-carts, laden with family property consisting of \$3,000 worth of cash, jewellery and clothing “disappeared in

²³⁸ Lin Yutang, *A Leaf in the Storm*, p. 214.

²³⁹ *North-China Herald*, 11 August 1937, p. 231.

the stream of lorries and other forms of transportation which poured into the Settlement and the French Concession.”²⁴⁰

In her dissertation, “A Nation Walking: The ‘Great Retreat’ in the War of Resistance, 1937-1945,” Liu Lu demonstrates how the Shanghai campaign helped alter the Chinese perception of war. “Urban population was no longer sheltered from warfare. Civilians became military targets, and more importantly, the war had become so violent that neither side could afford to compromise.”²⁴¹ Fighting took over buildings and destroyed neighborhoods; shelling by the Japanese navy and repeated aerial bombings, mostly by the Japanese but also by Chinese planes, produced havoc and devastation to the city and its residents. No place was safe from military aggression.²⁴² By the time the Chinese forces began to retreat westward on 11 November 1937, the world’s fifth largest city that formerly had an estimated population of 3.5 million was struggling to cope with the human consequences of direct military action. An estimated one million people fled from their homes during the crisis.²⁴³

The majority of the displaced sought refuge with friends and family in locations deemed safer and temporarily free from fighting and bombardment, which in practice meant heading towards Shanghai’s foreign concessions.²⁴⁴ For those unable to secure such refuge, accommodation assumed

²⁴⁰ Idem.

²⁴¹ Liu Lu, “A Nation Walking: The ‘Great Retreat’ in the War of Resistance, 1937-1945” (Ph.D. dissertation, University of California, San Diego, 2002), p. 34.

²⁴² Shanghai’s foreign concessions were largely spared of the fighting, which had been heavily concentrated in districts under Chinese control. Even after the Nationalist retreat inland, the Japanese control of Shanghai was incomplete as foreign [British and French] control of the concessions continued until late 1941.

²⁴³ Henriot draws his figures from a variety of sources including US NARA files and local reporting of the crisis in the *China Quarterly*. Christian Henriot, “Shanghai and the Experience of War: The Fate of Refugees,” *European Journal of East Asian Studies* 5.2 (2006): 220-221, fn. 11.

²⁴⁴ The *North-China Herald* (Shanghai) observed that for many of the refugees fleeing to the International Settlement and the French Concession prior to the outbreak of war on 13 August 1937, “in nine cases out of ten, [the refugees] know exactly where they are going in the Settlement or the French Concession.” *The North-China Herald* (Shanghai), 11 August 1937, p. 231. The implication being linked to the soaring price of rents. Based on his evaluation of contemporary sources, Henriot draws a similar conclusion. He writes, “Thousands were able to take care of themselves and find suitable accommodation with friends and relatives, or in hotels or places they were able to rent. . . . It was estimated that by December 1937, 663,000 refugees lived upon the resources of friends and family.” Henriot, “Shanghai and the Experience of War,” pp. 224-5.

a myriad of irregular and even unconventional forms. Refugee camps of every color, shape, and size, and with varying degrees of official sanction, dotted the urban landscape. The *Shanghai Times* observed the transformation of the New World Pleasure House from a theater “where scores each evening gathered to while away pleasant hours viewing the re-enactment of old-time romances” to an ad hoc camp for some 9,000 refugees from Hongkew and Chapei.²⁴⁵ Conditions were hardly ideal; the building was heavily overcrowded and ill-equipped to house so many. People slept on mats or directly upon concrete. Stairwells were converted into additional sleeping quarters, and improvised latrines dominated two isolated sections of the “huge backyard” extending out from the ground floor.²⁴⁶ Medical officers from the Shanghai Municipal Council Public Health Department characterized the premises as “dirty” with “insufficient water supply.” They noted “only a very small stove” and “no possibilities of providing water for washing purposes.”²⁴⁷ Buildings in states of disrepair and neglect were just as likely to become refugee shelters as schools, universities, temples, and churches.²⁴⁸

Native-place associations, as well as provincial guilds and benevolent societies, played a crucial and early role in the establishment of refugee camps. They organized materials and resources to house and feed refugees; they coordinated evacuations from the city to home villages; and they functioned as the main financial supporters of the committees later created to address the problem of refugee assistance.²⁴⁹ Native-place associations also worked as public advocates and mediators for the refugees residing in camps under the direct jurisdiction of international agencies like the Shanghai

²⁴⁵ *Shanghai Times*, 14 September 1937 and 23 September 1937.

²⁴⁶ Ibid.

²⁴⁷ SMA U1-16-1037, p. 13.

²⁴⁸ Etha M. Nagler, “The problem of food and shelter for refugees in Shanghai,” *China Quarterly* 3.1 (Winter 1937-1938): pp. 69-70.

²⁴⁹ Feng Yi, “Elites locales et solidarité: L’aide aux réfugiés à Shanghai (1937-1940),” *Etudes chinoises* 15.1-2 (1996): 71-106.

International Red Cross and concession authorities.²⁵⁰ The relationship, however, was a complex one. In one instance, the Cantonese Residents Association both telephoned and sent a written request to Judge C. Franklin, Chairman of the Shanghai Municipal Council, demanding immediate attention to the provision of “hospital facilities in the Settlement to take care of sick and dying refugees.”²⁵¹ Having unsuccessfully attempted to move three dying refugees into nearby hospitals, all of which refused the refugees’ admittance, the Association was fuming at the injustice. “All the hospitals are full at present. We could not send our sick refugees to any one of these hospitals, and we have no extra space for accommodating them. Some of these cases are very bad infectious ones, which is a menace to the general health of the whole camp.”²⁵² The Acting Commissioner of Public Health for the Shanghai Municipal Council adamantly disagreed with the Cantonese Residents Association’s assessment, insisting that measures were in place, space was available at area hospitals, and in addition, “a hospital to deal solely with sick refugees has been established in the premises of the Hangchow Restaurant, 1454 Avenue Edward VII.”²⁵³ He did not, however, reject all of their claims and insisted that the names of the offending hospitals be reported.

With camps “on nearly every street, in several places in a single block and on nearly every bit of ‘vacant’ land,” the concession authorities attempted to, on the one hand, reduce the number of camps so as to enforce quality control, and, on the other, adequately provision and administer to food, health, and housing needs of the displaced.²⁵⁴ They worked in conjunction with the Shanghai

²⁵⁰ Three main committees: the Shanghai International Relief Committee, the Federation of Shanghai Charity Organizations (Shanghai cishan tuanti lianhe jiuzaizhui) and the Chinese municipality-sponsored Refugee Relief Committee (Shanghai cishan tuanti lianhe jiuzaizhui nanmin jiuji weiyuanhui) were created to coordinate the multifarious relief initiatives. The Shanghai International Red Cross was also active, but largely in a coordinating capacity. Henriot, “Shanghai and the Experience of War,” p. 227.

²⁵¹ 3 September 1937 letter from J. K. Choy, Vice-President, Cantonese Residents Association to Judge C. Franklin, Chairman of the SMC, SMA U1-16-1037.

²⁵² Ibid.

²⁵³ 4 September 1937 memorandum from Acting Commissioner of Public Health to Secretary of SMC, SMA U1-16-1037.

²⁵⁴ W. B. Boone, “Shanghai’s Refugee Problem,” *China Quarterly* 3.1 (Winter 1937-1938): 62, cited in Henriot, p. 227.

International Red Cross to implement regular inspections of all known camps—a task complicated by the regular receipt of petitions for aid from ad hoc camps. The Engineer-in-Chief of the Shanghai Waterworks Company notified the Public Health Department on 8 September 1937 of their desire for the department “to take over the refugee camp, which my Company has constructed on the site of the fever hospital at the junction of Kiaochow and Singapore Roads.”²⁵⁵ Curiously, the request seems to have arisen when the company assessed the true nature of the camp’s occupancy. “The camp contains 800 women and children and a few old men evacuated from our own quarters at Yangtszepoo and from the homes of those of our men who live in the neighborhood, and it is apparent that we have evacuated a good many who are not relatives of our employees.” Having already provided “shelters, cooking and washing places, water and electric light,”—food provisions were exempt as the refugees were “rationing themselves—the company offered to continue supplying light and water if the department agreed to assume responsibility for the camp.²⁵⁶

Statistics on the total number of camps and occupancy is difficult to ascertain. Henriot has pointed out how the methodological diversity of counting and reporting evidenced by contemporary sources complicates a systematic accounting. But even with these difficulties in mind, a rough picture can be determined. The Public Health Department of the Shanghai Municipal Council recognized 161 camps with an estimated occupancy of approximately 97,000 refugees for December 1937, while newspapers of the time cited figures closer to 137,000 refugees in an unspecified number of camps at the end of November 1937.²⁵⁷ According to the table provided by Feng Yi, and supplemented by Christian Henriot, the total number of camps in the International Settlement seems to have peaked on 6 December 1937 with 158 camps housing 95,336 refugees. In the French Concession, the number of camps fluctuated between 40 and 47 camps between August and December 1937 for

²⁵⁵ SMA U1-16-1037.

²⁵⁶ Ibid.

²⁵⁷ Ibid.

some 23,000 to 27,000 refugees.²⁵⁸ The predominant majority of refugees came from the ranks of the *xiao shimin* (small urbanites or peasantry around Shanghai), and its composition weighed heavily towards women and children.²⁵⁹

For the Shanghai Municipal Council and the International Red Cross, the administration and maintenance of refugee camps ought to have been a regulated affair with regular inspections, official assessments, and punitive sanctions to enforce order and discipline. Care, and in particular the efficacy of care, depended upon a well-ordered system composed of specific committees with delegated tasks. Based on information gathered during regular visits by two or three persons from the Visiting Committee of the International Red Cross to camps throughout the International Settlement and the French Concession, N. B. Doodha, the Chairman of the Visiting Committee, observed, “The degree of organization runs from a low standard where the refugees are counted and given some sort of nourishment, to where there is high efficiency in management and a good diet is provided.” To ensure proper care and to “improve the lot of Chinese refugees,” however, “some sort of more or less standardized system which could be practiced throughout,” would have to be created. He maintained that the ideal camp held upwards of four or five thousand inmates—“It is felt that the smaller camps are generally inefficiently operated, and that they show a comparatively higher cost per capita than the larger camps.”—and whose internal organization and management adhered to a clear and systematic division of labor and responsibility.²⁶⁰

Transparency and the production of data were key elements to Doodha’s conceptualization of camp organization and the delivery of care. Refugees, in so far as they provide the human referents to the slew of numbers and figures a well-run camp continuously gathers and collates throughout each day are comprehensible only so far as their needs and general affairs are quantifiable.

²⁵⁸ See Table I, “Number of refugee camps and refugees in the Shanghai foreign settlements (1937-1944),” Henriot, p. 228.

²⁵⁹ Henriot, “Shanghai and the Experience of War,” pp. 231-4.

²⁶⁰ N. B. Doodha, “Organization of Refugee Camps as Worked Out by the Visiting Committee,” *China Quarterly* 3.1 (Winter 1937-1938): 88-94.

He recommended immediate registration of each person upon entry to a refugee camp and the assignation of serial numbers, one per refugee, for identification purposes. Camps units—the generalized, abstracted term for a hut, a room, or a floor depending upon the specific construction of the camp—functioned as part of the denomination process, while also serving as an organizational device for the implementation of camp discipline and routine. Camp records included statistics reflecting the number of refugees in the camp each day, numerical breakdowns in terms of men, women, and children, the total number of sick, etc. ought to be readily accessible and available for public examination by being posted on “a bulletin board . . . in a conspicuous place near the entrance to the camp office.”

In practice, these expectations for institutional order, though implemented at the administrative level, were often confounded by the local realities on the ground. With most camps under the direct supervision of various native-place associations, guilds, and benevolent societies, the Public Health Department and the Medical Committee of the Chinese Medical Association encountered a variety of red-tape complications, misunderstandings, and conflicting interests in their attempts to oversee the health and welfare of refugees.²⁶¹ The attendant complexities and challenges are evident in the Public Health Department’s attempt to control the spread of infectious diseases. The scale of the emergency relief effort had necessitated the voluntary cooperation of all manner of medically trained personnel throughout the city. The Public Health Department deployed medical officers and inspectors to ascertain the state of camp life; it helped secure material support for inoculations and vaccinations; and it administered a system of sanitary control to help prevent or contain the spread of infectious disease. For each endeavor, the Department depended upon not only the cooperation of the on-the-ground medical personnel (Chinese and western-style physicians, nurses, student volunteers) but also the cooperation of the camp’s management. In the case of the

²⁶¹ The responsibilities of the Medical Committee of the Chinese Medical Association included “surveying the medical situation and recommending measures for meeting the needs of the situation,” and the staff and membership of the CMA provided the necessary personnel for the implementation of refugee medical work since the Shanghai International Red Cross lacked the “technical medical staff.” Sze, Szeming, “Medical Care for Shanghai Refugees,” *China Quarterly* (Winter 1937-1938): 77.

New World camp, which had been financially supported and administered by the Cantonese Refugees' Relief Committee (Guangdong youhu tongxiang jiuji nanmin weiyuanhui), medical officers from the Shanghai Municipal Council Public Health Department reported on 18 August 1937 that medical care at the camp was provided by one Chinese male nurse and one female Chinese doctor.²⁶² Both individuals offered "to help spot cases of communicable diseases in order to isolate them in time."²⁶³ But less than a month later, on 3 September 1937, Robert C. Robertson who headed the Public Health Department's Committee on Refugee Problems complained to the Secretary of the Shanghai Municipal Council, "My medical officers inspecting this Camp urgently report to me that there is great difficulty in impressing upon the Cantonese volunteer doctors, the importance of preventing epidemics, and that they are not cooperative in the Health Department's recommendation." Robertson further stated, "One case of Cholera has been found to date in this badly organized, overcrowded, and much too big camp."²⁶⁴ Although details are scant, the New World camp was reorganized and improved along the lines demanded by the Public Health Department. Organized evacuations of the refugees by the Cantonese Refugee Association helped to reduce the total camp population, and by 23 September 1937, the *Shanghai Times* reported of the New World camp, "What was once a rather objectionable spot is now a habitable centre housing 4,000 inmates"²⁶⁵

As an administrative organ delegated with the primary task of protecting the public's health to the extent that it had "the right, even the duty, to impose hygiene and sanitation regulations on private citizens for the public health," the Public Health Department possessed rather limited resources to enforce compliance within the various refugee camps. Camps that failed to take the necessary measures to, for example, prevent fire risks from unrestricted cooking, remove "unlicensed

²⁶² The Cantonese Refugees' Relief Committee was composed of members from the Cantonese Residents' Association, Cantonese Guild, and the Cantonese Merchants Association. SMA U1-16-1037, p. 35.

²⁶³ SMA U1-16-1037, p. 16.

²⁶⁴ SMA U1-16-1037, p. 21.

²⁶⁵ *Shanghai Times*, 23 September 1937.

hawkers . . . selling foodstuffs which, in many cases, are unfit for human consumption,” and maintain latrines and drains “in a sanitary condition”²⁶⁶ received constant scrutiny from the Public Health Department as well as other related departments (e.g., Public Works, Fire Brigade, and the Municipal Police). The Public Health Department could and did sanction ration provisions, particularly in the form of drugs, allotted to the specific camp, and it could and did withhold financial support if it deemed an errant camp unreliable for the funds.²⁶⁷ The department was willing to use public censure through the presses and, in the most severe cases, even threatened to “ship them [refugees] back to their own country.”²⁶⁸ But even with these measures at hand, enforcing compliance was by no means a straightforward task.

Despite these difficulties, the Public Health Department was far from unsuccessful in overseeing the infrastructure for the care and maintenance of refugee health. Refugees underwent mass inoculations, delousing, and quarantine measures where necessary.²⁶⁹ The Shanghai United Epidemiology Committee organized and administered delousing and bathing services for refugees.²⁷⁰ From 1 November 1937 through 31 January 1938, mobile delousing units visited four hospitals, 69

²⁶⁶ SMA U1-16-1037, pp. 63-4.

²⁶⁷ The Public Health Department of the Shanghai Municipal Council was not the only funding source; the Shanghai International Red Cross also provided monthly grants to assist in the maintenance and administration of refugee clinics. For both agencies, conformance with stipulated requirements was necessary to ensure sustained financial support. Sze, “Medical Care for Shanghai Refugees,” p. 80.

²⁶⁸ SMA U1-16-1037, pp. 36-9; 61-2. Social organizations engaged in the emergency relief effort, particularly native-place associations, organized the evacuation of refugees to their home villages as part of their work in refugee assistance. See Feng Yi, “Elites locales et solidarité,” pp. 92-3. These evacuations were not punitive in nature, and it is unclear how the Public Health Department would be effectively to communicate the punitive aspect of their deportation of refugees for lack of compliance.

²⁶⁹ Challenges to these measures assumed a variety of forms. In describing the obstacles facing the Public Health Department’s initial efforts to clean up the New World camp, the *Shanghai Times* observed, “Dr. Lucke [resident pathologist for the Public Health Department] had to overcome numerous obstacles raised by petty officials and, in some cases, by the refugees themselves.” ²⁶⁹ The *Times* article went on to suggest that much of the refugee resistance derived from the refugees’ unwillingness “to submit themselves to the hands of a foreign doctor” on account of having been “accustomed to the attentions from Chinese medical men.” *Shanghai Times*, 23 September 1937. For a general discussion of the Public Health Department’s preventative public health work, see “Health Department Annual Report: Acting Commissioner’s Introduction, Vital Statistics, and Communicable Diseases,” *North-China Herald* (9 March 1938), p. 378.

²⁷⁰ The dissolution of the SUEC in January 1938 resulted in the reversion of such services to the auspices of the Shanghai International Red Cross. See “News and Notes,” *CMJ* 53 (1938): 397-8.

camps (once), 29 camps (twice), and three camps (thrice); 47,663 refugees and 1,957 garments and beddings were treated. During that same period, the mobile bathing unit visited twelve camps and treated 4,069 persons.²⁷¹ Through the winter of 1937, the Shanghai International Red Cross supported “nineteen camps clinics (catering to a refugee population of 24,000) and nine mobile clinics (reaching 65 camps with a refugee population of 58,000).”²⁷² The Chinese Medical Association, working in conjunction with SIRC, set up six camp clinics and eight mobile clinics that visited daily an average of six to seven camps between 8:30 a.m. to 4:30 p.m., to provide curative and preventative medical aid. Camps with populations over 1,000 were outfitted with a clinic, while camps with less than 1,000 refugees were serviced by mobile clinics.²⁷³ The Chinese Medical Association created a Central Medical Supplies Depot under the supervision of Drs. Bernard E. Read and T. C. Chi that functioned as a depository from which refugee clinics and hospitals could draw upon for drugs like salol,²⁷⁴ acid carbolic, Dover’s powder,²⁷⁵ digitalis,²⁷⁶ and sulfa drugs.²⁷⁷ “A simple pharmacopoeia was worked out for the use of refugee clinics, all approved clinics [and hospitals] being permitted to apply for drugs and supplies listed in this pharmacopoeias up to their respective quota.”²⁷⁸ The Chinese Medical Association organized a Public Health Nursing Service with a staff of ten public health nurses, whose responsibilities included assisting the work of doctors and clinics and giving

²⁷¹ Ibid. For a description of delousing process, please see, Chi Ta-chih and Su Der-long, “Delousing in Refugee Camps,” *CMJ* 53 (1938): 271-77.

²⁷² Sze, “Medical Care for Shanghai Refugees,” p. 80.

²⁷³ Ibid. The CMA received a grant from the American Red Cross for \$15,000, which financially underwrote its medical relief work in Shanghai. “News and Notes,” *CMJ* 53 (1938): 302-3

²⁷⁴ Salol was a white crystalline powder derived from salicylic acid and used medicinally as an analgesic and antipyretic.

²⁷⁵ Dover’s powder, named after the eighteenth century English physician Thomas Dover, was a preparation made of the powder of ipecacuanha, opium in powder, and sulphate of potash, and commonly used to induce sweating.

²⁷⁶ Digitalis is a drug derived from the species of plant commonly known as foxglove. It was used to increase cardiac contractility and as an antirhythmic agent to control the heart rate.

²⁷⁷ Sulfa drugs were the first antimicrobial drugs (predating penicillin) and used to treat bacterial infections.

²⁷⁸ “News and Notes,” *CMJ* 53 (1938): 304.

lectures and demonstrations in health education, as well as a Sanitation Service comprised of five sanitary inspectors assisted by a labor corps of selected refugees. "Each sanitary inspector [was] assigned to one of five districts and under their direction the refugees themselves [were] organized to carry out daily routine cleansing. Selected refugees [were] organized to form labor corps to undertake technical work such as construction of privies, installation of water and sewage, road building, etc."²⁷⁹

The overall effect of this concerted municipal program for addressing the medical and health needs of refugees was the expansion of the sphere of day-to-day interaction refugees had with western medicine. Although Shanghai possessed an outstanding proportion of the country's registered western-style medical doctors (22%), the vast majority of Chinese lived and worked outside the penetration of the biomedical gaze.²⁸⁰ The concentration of western-style doctors in Shanghai did not translate into a greater proportion of the urban population served by biomedicine, and whether on account of preference or cost, most Chinese continued to seek medical relief and health advice from indigenous sources like practitioners of Chinese medicine.²⁸¹ With the social upheaval and general displacement of the populace resulting from the outbreak of fighting, this disjunction separating western medicine from the Chinese population was upset. Mass inoculation, compulsory vaccinations, delousing, bathing, and feeding schedules were all concrete ways in which western medicine, backed by state power (in this case, the foreign concession of the Shanghai Municipal Council), intervened directly upon the lives of Chinese refugees. It is within this context of

²⁷⁹ "News and Notes," *CMJ* 53 (1938): 303, 397-8.

²⁸⁰ Zhu Xiru and Lai Douyan, "Wuguo xingyi rencai fengbu gaiguan" [Distribution of modern trained physicians], *National Medical Journal of China* 21.2 (1935): 145-53, cited in Lei Hsiang-lin, "When Chinese Medicine Encountered the State, 1910-1949" (Ph.D. dissertation, University of Chicago, 1999), p. 60.

²⁸¹ See, for example, Anonymous, "State Medicine for China," *The National Medical Journal of China* 14.2 (1928): 119-20, in which the author concedes, "the great majority of the Chinese prefer the old-style doctors even in places where facilities for consulting the Western trained doctors are at hand." Sean Hsiang-lin Lei points out how compelling the economic argument for seeking Chinese medical assistance would have been, because although western-style doctors offered free diagnosis, western drugs were too expensive to obtain for the average Shanghai resident. Lei Hsiang-lin, "When Chinese Medicine Encountered the State, 1910-1949," pp. 60-1.

organized third-party medical interventions into the daily lives of displaced Chinese that nutritional activism takes root.

Reaching out to the Children

In recounting her involvement with the Shanghai Refugee Children's Nutritional Aid Committee, Nellie Lee highlighted the gravity of the situation for refugee children. Having been stranded in Shanghai after the outbreak of war with Japan, she had the occasion to visit a Cantonese Refugee camp with 6,000 people, "crowded in the most miserable condition." What she witnessed compelled her to telephone "all the dairies in town for milk for the refugee babies." "I was very lucky," Lee writes, "and got several hundred pounds a day to distribute. From cow's milk I went into bean milk."²⁸² Her description in 1941 had been rather understated, and in contrast, her recollection of her wartime activities for the Mt. Holyoke reunion booklet in 1982 conveys a more detailed and dramatic scene. "I was working in Nanking for Dr. J. Lossing Buck when Japan invade (sic) China, so he moved his office to Shanghai's International Settlement. Then Japan bombed Shanghai's industrial area, hordes of women and children crammed into the International Settlement for refuge. Some of us living at the Y. visited the vast amusement park [that was] converted [into a] refugee camp. There, thousands, young and old were crying and yelling and bewildered. I was tak-to (sic) the crying babes, with mothers lamenting their dried breasts. I thought. Most of the milk consumers (Americans and Europeans) have left town. There must be surplus milk."²⁸³

Available sources can neither confirm nor deny Lee's particular account of the origins of the soybean milk distribution program. Contemporary reports from local newspapers and western medical journals provide only the straightest of details: the Shanghai Refugee Children's Nutritional Aid Committee was founded in November 1937. With an initial fund of \$6000 donated by local

²⁸² 5 September 1941 letter to Dr. Hackett, Mount Holyoke College Archives and Special Collections.

²⁸³ "Bean Milk for China's Refugee Children During the Sino-Japanese War 1937-1945," Mount Holyoke College Archives and Special Collections.

German residents, the Refugee Children's Committee instituted a program for producing and supplying refugee children under the age of six with specially prepared soybean milk. Even the extant correspondence from Committee members assume a tone of factual efficiency. "It was decided that the best and cheapest way to reach the maximum number of children would be to supply them with soya bean milk. This milk is very nutritious and with the addition of sugar and calcium is an excellent food for children. Beginning with one hundred pounds a day we have increased our output to 4,200 pounds a day which is supplied to 40 camps."²⁸⁴ In contrast to Lee's later reminiscences of "mothers lamenting their dried breasts," the official records of the Refugee Children's Committee seem quite mild.

Whatever the emotional tenor, the task was from the start formidable. Mrs. N. Enssle, the chairman of the committee, pronounced confidently to Major Arthur Bassett, chairman of the American Advisory Committee in Shanghai, "We supply all children under six years of age in our camps with a pound of hot milk a day, which is delivered twice daily under the supervision of a nurse. There are about 15,000 children in the Shanghai camps and it is our aim to supply them all."²⁸⁵ With additional funding support from the Shanghai International Red Cross and a monthly \$6,000 grant from the American Committee of the China Child Welfare, the Refugee Children's Committee outlined and implemented a city-wide program for producing, distributing, and administering soybean milk to refugee children.²⁸⁶

At the organizational level, the Refugee Children's Committee received its greatest support from western-style physicians and medical researchers. Individuals like Dr. W. S. Fu, the

²⁸⁴ 20 December 1937 letter from Mrs. N. Enssle, Chairman of Refugee Children Nutritional Aid Committee to Major Arthur Bassett, Chairman, American Advisory Committee, Shanghai, China Child Welfare, Box 4. F. 12, New York Public Library.

²⁸⁵ Ibid.

²⁸⁶ The Association for the Welfare of the Children of China was founded in New York City in February 1928 and later changed its name to China Child Welfare in 1930. Its purpose had been to raise funds for children's relief, particularly for orphans and victims of civil wars and famines, and promote a nation-wide program of child welfare in China. A sister organization, the National Child Welfare Association of China, was also established in Shanghai in 1928. China Child Welfare operated as an independent funding and philanthropic organization until 1944 when it was merged into the China Aid Council under the aegis of United China Relief.

superintendent of the Hospital for Refugee Children, Dr. T. A. Li, the former Public Health Commissioner for the Greater Shanghai Municipality, local pediatricians like Dr. H. Tao and Dr. H. P. Chen, and Dr. Hou Xiangchuan of the Henry Lester Institute for Medical Research all contributed to the organizational development and implementation of the Committee's plans. The high proportion of western-style medical physicians active in the Committee imparted a distinct cast to the organization's methodology and conceptualization of the problem of nutrition. The choice of nutritional supplement, the soybean-derived milk, reflected an on-going professional interest within the medical community in soymilk's nutritive properties as a food for young children.

With the sudden influx of refugees and the very real medical problems associated with a high density of people with little or no resources crammed into small, limited spaces, many of the physicians found themselves well-positioned to assume a leadership role in the emergency relief effort. Those physicians particularly inclined towards medical research discovered a unique opportunity to combine academic research with social action by exploring the logistics and complexities of applying medical knowledge born in the laboratory outside in the "real world." Hou's work, in particular, played a definitive role in establishing the scientific legitimacy and authority of the Committee's nutrition program. He applied his highly specialized training and clinical experience to creating viable nutritional standards for refugee diets. He adapted earlier research on soymilk to come up with a workable recipe that was both economical and appealing to children. He introduced the standard laboratory practice of testing the quality of soybean milk into the Committee's operations. And, by investigating the physiological effects of the milk upon refugee children—Hou alongside his assistants visited camps and conducted physical examinations to better understand the effects of soymilk upon the refugee child recipients—he reframed the work of Refugee Children's Committee as necessarily scientific, objective, and right.²⁸⁷

²⁸⁷ See Hou Xiangchuan, "Nutritional Supplements for Refugee Children" "Height and Weight Measurements of Young Refugee Children," and "Height Weight Measurements of Refugee Children given Soybean Milk," in *Nutritional Studies in Shanghai* (Shanghai: China Medical Association, 1939).

Historical Antecedent

An earlier example of nutritional activism with its unique blending of social and scientific praxes and precedent for the Refugee Children's Committee own work had been the dietary work conducted in connection with the North China famine of 1920-1922. In an effort to stave off the tide of mounting death and misery in the Yellow River district as well as parts of Shanxi and Shaanxi provinces, Chinese and foreign relief agencies joined together to form the Peking United International Famine Relief Committee in order to coordinate the production, distribution, and general administration of various forms of relief to approximately twenty million people. One of the distinctive features of their relief program involved the formulation of a diet that integrated three criteria: "utilize[d] cheap food substances available in the Orient," "could be transported during the winter season long distances from the nearest train and fed easily to men working on the Red Cross highways,"²⁸⁸ and bolster the general health of the recipient. In the words of Dr. G. Douglas Gray M.D.,

Millions of people will have to be fed till next year's harvest, and as large sums of money will be required, it becomes important to arrive at some method by which these people can be not only kept alive at the cheapest rate per head, but how they can be fed healthily. With so many of them in a low state of health, physical resistance to disease, is also lowered; and while by some kinds of foodstuffs their hunger can be appeased, we may find, in course of time, certain diseases are manifesting themselves in a widespread fashion with increased death rates.²⁸⁹

To determine an economical but nonetheless nutritious diet, physicians at the Laboratory of Food Chemistry at the Peking Union Medical College chemically tested and then calculated the relative nutritional values of the available foodstuffs, namely kaoliang, no. 5 flour, millet, soya beans, and peanuts. They identified the nutritive properties of each foodstuff, which at the time consisted mainly of protein, carbohydrate, and fat content, as well as the number of calories received per pound. While Douglas alludes to the importance of vitamins in his report, the extent to which the

²⁸⁸ Harley Clarke Embrey, "The American Red Cross Diet in the Famine Districts of China," *American Journal of Public Health*: 514-15.

²⁸⁹ G. Douglas Gray, "The Dietetical Value of Foods Used in Famine Relief," in *The North China Famine of 1920-1921 with Special Reference to the West Chihli Area. Being a Report of the Peking United International Famine Relief Committee* (Peking, 1922), p. 130.

desired diet could satisfy “recommended dietary allowances” was limited by the immaturity of the field itself.²⁹⁰ But insofar as physicians could determine, distribution of the available foodstuffs should adhere to a schedule of proportions like the following: millet, 8 oz per head per day; other grain, e.g., kaoliang or flour, 8 oz per head per day; peanut cake, 1 oz per head per day; soya beans, 2 oz per head per week; salt, 1 ¼ oz per head per day; and lime, 1 ¼ oz per head per day. Gray explained, “While these proportions may not generally be practical, the scale gives a good idea of diet which would keep the starving people in a sufficiently well nourished and health condition. In other words, when buying large quantities of grain, committees should try to secure kaoliang, millet and flour in about equal quantities, and smaller quantities of bean and peanut residue.”²⁹¹

The situation relief workers faced in Shanghai during the winter of 1937-1938 only mildly compared with the North China famine almost two decades earlier. In the latter, starvation and the utter absence of any kind of nourishment served as the primary motivations for distributing foodstuffs that were both high in nutrient value as well as financially viable within the local rural economy. Biomedical nutritional research helped to identify the proportional value of each grain and in this way assisted relief workers in establishing guidelines for distributing the foodstuffs. But the task was survival, not normal health. Nutritional health was not itself the objective of famine—nor should it have been—but for the Refugee Children’s Committee and later the China Nutritional Aid Council, nutritional health functioned as the primary rationale for their various endeavors.

Refugee Children’s Committee: Operational Data

To get a sense of the Committee’s activities and its scope, consider for a moment the quantitative dimensions of its work. Although a complete accounting of the Committee’s work from

²⁹⁰ The history of vitamins is tale rather firmly rooted in the twentieth century. Although peoples and cultures the world over have been battling and investigating the roots of its effects, vitamins whose appellation derives from Polish biochemist Casimir Funk’s blending of “vital” and “amine” in 1912, were only just gaining currency in popular and scientific circles in the early 1920s. Given the state of general and scientific understanding about vitamins, it should be unsurprising that although mentioned in passing, vitamins do not play a major role in the dietetics recommended for famine victims.

²⁹¹ *Ibid.*, p. 132.

November 1937 through March 1940 is impossible due to the incomplete state of existing records—in particular, we lack copies of internal documentation for the period immediately after Committee’s creation in November 1937 until February 1938—all is not lost. What does exist outlines the contours of a carefully calibrated program for the provision of nutritional supplements that had wide reach and exhibited attentiveness to the shifting social and political landscape of its work. (See Table 7 on the following page.)

Table 7: Distribution of Foodstuffs for Children

Date	Soy milk	Soybean cake (pieces)	Vegetable soup	Cod liver oil	Fruit (pieces)	Number of Recipient Camps*
March 1938	--	--				
April 1938	346,159 lbs	665,907				
May 1938	340,092 lbs	--				
June 1938	293,866 lbs	518,530				
July 1938	243,183 lbs	548,000				
August 1938	213,199 lbs	--				101
September 1938	181,418 lbs					81
October 1938	137,569 lbs	337,327				61
November 1938	119,470 lbs	387,600	14,342 lbs			65
December 1938	120,083 lbs	401,400	20,177 lbs	3,213 people +		55/NA/35
January 1939	94,246 lbs	316,740	27,354 lbs.	3,275 people		51/NA/28
February 1939	73,924 lbs	203,700	21,027 lbs	2,479 people		49/56/NA/24
March 1939	94,338 lbs	295,800	27,653 lbs	72,390 tsp. ☼	15,267	47/48/58/24
April 1939	89,131 lbs	277,500	27,750 lbs	58,352 tsp.	15,803	59/56/55/23/54**
May 1939	88,590 lbs	266,650	28,170 lbs	59,844 tsp.		55/56/49/20
June 1939	--	--				
July 1939	--	--	Discontinued			
August 1939	Shift to powder packets					
September 1939	--					
October 1939	--					
November 1939	65,429 packets	--		15,686 tsp.		40/NA/32
December 1939						36/NA/30
January 1940	69,885 packets	--		10,065 tsp.		34/NA/21
February 1940	62,241 packets	--		4,375 tsp.		32/NA/20
March 1940	61,684 packets	--		9,613 tsp.		32/NA/21

+ Number of persons daily.

☼ Total number of teaspoons for the month.

* Not all the camps received the same supplement. The first value in the sequence is the number of refugee camps receiving soybean milk, the next soybean cakes, the third vegetable soup, and the fourth cod liver oil.

** For April 1939, the RCNAC distributed fresh fruit in addition to their normal nutritional program. The number of recipient camps of the fruit is the fifth value included the box.

While it is impossible to say definitively how many children the Committee reached, how much milk was produced, and how many pieces of soybean cake were made for the period between

November 1937 to February 1938, we may infer from the April 1938 monthly report that output for soymilk and soybean cake production was probably not lower than 346,159 lbs of milk and 665,907 pieces of soymilk cake, and most likely higher, given the greater intensity of need during those winter months. The Refugee Children's Committee claimed to have served more than 15,000 children, and based on its extant monthly reports, this figure seems justified. Based on the same April 1938 monthly report, an estimated 11,166 children under the age of six received milk, while approximately another 10,000 over the age of six received soymilk cakes.²⁹² Moreover, the figure of 15,000 resonates strongly with what we understand for this period of mass displacement. Christian Henriot estimates that nearly a third of all refugees were children.²⁹³ Official and media sources of the time differed about the sum total of refugees in Shanghai, but even the lower end figures around one hundred thousand—the SMC registered a maximum of 161 camps housing 97,000 refugees for December 1937—would have translated into some 30,000 refugee children in Shanghai.²⁹⁴ The fact that the *News Bulletin* of the Shanghai International Red Cross reported a total 24,700 children under the age of fourteen for its October 1938 issue would seem to reaffirm the prominence of children within the refugee population.²⁹⁵ For the Refugee Children's Committee to have reached even half of this estimate was hardly a minor feat.

From April 1938 onward, the Committee's production figures gradually declined. But even as its production of soymilk and soy cakes diminished, their overall program to improve the nutritional health of refugee children did not. "During the last committee meeting, it was felt that in view of the prevalence of keratomalacia (vitamin A deficiency) in many of the children in refugee camps, it was decided that we make and distribute vegetable soup specially to provide vitamin A, and

²⁹² "April Report," 6 May 1938, China Child Welfare, Box 4, Fl. 12, New York Public Library.

²⁹³ Christian Henriot, "Shanghai and the Experience of War: the Fate of Refugees," *European Journal of East Asian Studies* 5.2 (2006): 231.

²⁹⁴ Henriot notes that statistical categories were inconsistent. Some camps differentiated between children and orphan, or, more specifically, babies, children, and student age. The range of ages associated with denomination of child also fluctuated. Henriot does not provide the Chinese associated with "children," but I have found references for *ertong* as those six and under, fourteen and under, and sometimes even sixteen and under.

²⁹⁵ Cited in Henriot, 232.

at the same time, to look into the matter of distributing cod liver oil. The scientific division worked out a soup consisting of turnips, sweet potato, cabbage, onion, bean residue, salt and calcium carbonate.”²⁹⁶ They added vegetable soup and cod liver oil as regular features to their menu of nutritional supplements in October 1938. From the time of inclusion until its discontinuation—October 1938 to July 1939, a total of ten months—average monthly production of vegetable soup, was 23,782 lbs. As a rule, half a pound of vegetable soup was given to children ages seven to fourteen.

The amount of cod liver oil distributed to refugee children is harder to calculate. According to the monthly reports, cod liver oil was initially recorded in terms of the number of child recipients, e.g., from October 1938 to January 1939, an average of 2,989 children received a teaspoon of cod liver oil monthly. From the February 1939 report onwards, the monthly distribution figure is listed in teaspoons. February 1939 reported 72,390 tsp of cod liver oil; for March and April, the amount had decreased to 58,352 tsp and 59,844 tsp respectively. By the end of the year, the amount of cod liver oil distributed had fallen to approximately 10,000 tsp. Given the inconsistency of information concerning the number of times cod liver oil was given to a single child, we cannot extrapolate an estimate for the number of children benefiting from the addition of cod liver oil to their regular diets.

Aside from the question about how many, it is worth keeping in mind that cod liver oil was not a familiar or common fixture of these children’s non-camp life. Those who received the teaspoon of cod liver oil were not necessarily eager for it. The on-the-ground staff distributing the nutritional supplements reported a variety of techniques that ranged from sleight-of-hand deception to bribery for inducing the children to swallow the oil. The October 1938 report envisions the distribution of cod liver oil in the following manner:

In order to encourage the taking of cod liver oil, we made the taking of cod liver oil a prerequisite before the vegetable soup is given. We have been to all the camps, the result has been about half of the children take the cod liver oil. We cannot depend on the camp managers to distribute cod liver oil as the experience of the Shanghai Municipal Council Public Health Department showed that they have not been

²⁹⁶ “October Report,” 11 November 1938, China Child Welfare, Box 4, F. 12, New York Public Library.

responsible. In order to see the work done properly, we must use our staff. At present we are experimenting in a few of the larger camps, giving cod liver oil with the vegetable soup three times a week. When the cod liver oil and vegetable soup is given, bean milk and bean cake are not given (cod liver oil and the vegetable soup is given to all of the children under 14 years of age). If this works out satisfactorily, we expect to increase the personnel and cover the whole refugee population.²⁹⁷

This highly optimistic description of its cod liver oil operations was soon matched by revision found in the subsequent month's report. "To make cod liver oil attractive each child will be given one piece of candy after every teaspoonful taken."²⁹⁸

Facilities and Personnel

To attend to the nutritional health of refugee children, the Refugee Children's Committee mapped onto the city's existing infrastructure a complex network of production, distribution, and experimentation channels. They divided the city into six districts, each with its own distribution center servicing the refugee camps within its domain. In addition to the six distribution centers, the Committee also operated a main office from the premises of 65 Moulmein Rd., which was also home to the Hospital for Refugee Children.²⁹⁹ They contracted with local bakeries like the Shanghai Wing On Baker to produce the soybean cakes. The grindstone used in making soybean milk was "donated by a generous Chinese friend." The delivery carts came from a local milk dairy whose plant had been bombed and even a truck from a local garage was procured.³⁰⁰

Although the documentary record for the committee's operations during the first six months of its tenure have not survived, it is clear from the extant monthly reports that the program maintained a permanent staff comprised of managers, assistant managers, inspectors, delivery coolies (by bicycles), bean milk makers, cleaners/sterilizers of milk containers, and female distribution

²⁹⁷ "October Report," 11 November 1938, China Child Welfare, Box 4 F. 12, New York Public Library.

²⁹⁸ "November Report," 12 December 1938, China Child Welfare, Box 4 F. 12, New York Public Library.

²⁹⁹ The Hospital for Refugee Children had "originally [been] intended to operate for a trial period of three months to take over the work of the caring of the sick refugee children due to the closing of the Children's Hospital which was supported by the Greater Shanghai Public Health Bureau." "News and Notes: The Hospital for Refugee Children, Shanghai," *CMJ* 55 (1939): 193-4.

³⁰⁰ "Soya Bean Milk for Refugee Children," China Child Welfare, Box 4 F. 12, New York Public Library.

workers. The total number of employees fluctuated according to the conditions of the time; a reduction in the size of the refugee population and the closing of camps by municipal authorities being the main reasons for reducing the number of individuals in any particular position. The available records suggest an employment peak around July 1938, and from August onward, each month witnessed a certain degree of downsizing. The August Report noted that the fifteen soybean milk makers had decreased to nine, the distribution staff from 27 to 21. September proved even less positive with the elimination of an assistant manager, the reduction of the production team from nine to 5, and the further reduction of the distribution staff from 21 to eighteen coolies.³⁰¹

Selecting Soybean

In settling upon the soybean as the primary ingredient for creating a nutritional supplement to distribute to refugee children, the committee drew upon medical research as justification for its selection.³⁰²

Several years ago in Peiping experiments were made with soya bean milk and found that it is comparable to cow's milk in vitamin A and richer in vitamin B. It is deficient in minerals, particularly calcium and that is added to the milk. It has been experimented that a six weeks old infant was successfully fed to 9 months on soya bean milk, supplemented with cane sugar, cod liver oil, orange juice, rice porridge, spinach puree and sodium chloride. The mental, muscular development, and nutritional status in general appear to be as good as other normal infants reared on mammalian milk diets. It was found that a formula could be evolved which, with the addition of calcium and sugar, produced a bean milk which closely approximated the food value of cow's milk.³⁰³

That the soybean was already a feature of regional Chinese diets provided further validation. "The soya bean has long been popular in the diet of the Chinese. It can be prepared in many forms and it has been said that one can have a complete feast in which every dish is a soya bean dish but each one

³⁰¹ "July Report," "August Report," China Child Welfare, Box 4 F. 12, New York Public Library. In December 1938, there were six fulltime girls and one half-time girl helping distribute cod liver oil; by March 1939, they too felt the brunt of downsizing.

³⁰² For a more extensive and detailed account of the medical modernization of the soybean, please refer to Part II of this dissertation.

³⁰³ "Soya Bean Milk for Refugee Children," China Child Welfare, Box 4 F. 12, New York Public Library.

so different from the last as to make one feel so sense of duplication.”³⁰⁴ Custom alone, however, was insufficient for converting soymilk into a staple of a child’s diet, because although soybeans, and soy-derived food products, could be accounted for within “traditional” Chinese diets, they were not yet recognized by the public as nutritional mainstays for ensuring normal childhood development.

Since the mid-1920s, soybean milk had aroused attention in various sectors of the international medical community, because of its perceived potential to serve as a viable substitute for cow’s milk.³⁰⁵ General consensus upheld the belief that maternal breast-feeding “is the best prophylactic measure against the scourge of diarrhoeal diseases. In similar types of communities it has proved to be superior to supposedly adequate artificial feeding as is shown by the infant’s growth and development, physical and mental, and by his resistance to infection.”³⁰⁶ Mother’s milk, however, was not to be depended upon during an emergency situation, and as Lee highlighted in her description of the Refugee Children’s Committee’s early days, without human milk, alternatives had to be identified and organized to help infants and young children. Cow’s milk was the most commonly recommended substitute, but as B. S. Platt, an associate researcher in the Division of Clinical Research of the Henry Lester Institute of Medical Research stated, “The facilities afforded in China at the present time for introducing such substitutes for human milk are so limited that no useful purpose can be served by extended discussion.”³⁰⁷ Clinical researchers associated with the Peking Union Medical College (PUMC), Yenching University, and later the Lester Institute,

³⁰⁴ Ibid.

³⁰⁵ An emphatically positive assessment of soymilk’s nutritive properties appeared in the *Chinese Medical Journal’s* special issue on pediatrics (April 1936). The authors, H. W. Miller and C. Jean Wen, were physicians at the Shanghai Sanitarium and Pediatric Department of the Shanghai Clinic. Miller, a Seventh-day Adventist medical missionary, arrived in China in 1903 and began investigating the potential benefits of soymilk for human nutrition around 1925. He established the first modern soymilk plant in Shanghai in January 1936. <http://www.soyinfocenter.com/HSS/soymilk1.php>.

³⁰⁶ B. S. Platt, “An Approach to the Problems of Infant Nutrition in China,” *CMJ* 50 (April 1936): 415-16.

³⁰⁷ B. S. Platt, “An Approach to the Problems of Infant Nutrition in China,” *CMJ* 50 (April 1936): 417. Milk production was not highly developed in China and largely confined to urban areas. More work remains to be done about the topic, but a good place to begin is Susan Glosser’s “Milk for Health, Milk for Profit: Shanghai’s Chinese Dairy Industry under Japanese Occupation,” in *Inventing Nanjing Road: Commercial Culture in Shanghai, 1900-1945*, ed. Sherman Cochran (Ithaca, NY: East Asia Program, Cornell University, 1999), pp. 207-33.

examined not only the chemical composition of soymilk, and other soy-derived products, but also its place within local diets and its effects upon growth and development. Much of the experimental work utilized laboratory animals (rats and guinea pigs) as test subjects, but even as early as 1927, Ernest Tso (祝慎之 Zhu Shen zhi) of the Division of Pediatrics at the PUMC had already begun investigating the economical and physiological effects of a soybean milk diet on an infant six weeks of age. He carried out his examination and observation for eight months on Baby Yao (b. 27 August 1926), who had been born in the PUMC Hospital. Because the growth record of the child during the testing period compared favorably with “the average development of breast-fed infants,” Tso concluded that a diet mainly of soybean milk, “properly supplemented, . . . can be more or less comparable to cow’s milk in nutritive properties.”³⁰⁸

Tso’s research marked the beginning of a series of medical attempts in China to apprehend practical solutions to the problem of infant feeding. Soybean milk had been shown through various clinical trials like the one set-up by Ernest Tso to be a practical alternative, although not necessarily a perfect one. In at least one experimental feeding trial, the results of the soybean milk preparation under study produced tragic results that ultimately led to the deaths of the two infants involved.³⁰⁹ Most medical soybean research from the late 1920s through the late 1930s, however, did not culminate in such tragedy. Instead, the primary focus lay upon performing chemical assays comparing the nutritive properties of soybean milk and cow’s milk and running experiments upon animal

³⁰⁸ Ernest Tso, “The Development of an Infant Fed Eight Months on a Soybean Milk Diet,” *Chinese Journal of Physiology* 22.1 (1928): 33. Tso does not explain why Baby Yao was transferred to the Pediatric Service almost a month after his birth, nor does he elaborate upon the circumstances that led him to use Baby Yao for the experiment.

³⁰⁹ The particulars of this study are vague. Platt writes, “We found at the beginning of the present investigation, about three years ago [1933], that the undesirable smell and taste could be largely removed from soya bean milk by steaming in an open vessel. Fresh egg yolk was added to this product as a source of animal protein and lipoids and on account of its vitamin and mineral content. The final percentage composition was similar to that of human milk. The results of feeding this preparation in our cases was disastrous; one baby died apparently from acute intestinal obstruction due it was thought to an intussusception [a condition in which a part of the small intestine has become enfolded into another part of the small intestine] following the irritant action of the mixture. A second baby began to lose weight and ultimately succumbed in spite of immediate substitution of a milk diet. No further trials have been made on very young babies.” B. S. Platt, “An Approach to the Problems of Infant Nutrition in China,” *CMJ* 50 (April 1936): 419.

subjects. Researchers investigated the concentration of Vitamins B₁ and B₂, the bone building potency of soybean diets, protein digestibility, and nutritional differences associated with soybean milk made from roasted soybeans instead of the usual wet-grinding method.

Despite the prevalence of soybean products in local Chinese dietaries, researchers found little evidence that soybean milk was a fixture in Chinese infant and children's feeding practices. Dr. Ruth Guy, who worked at the First Health Station of the Beiping Municipality and was a member of the Department of Public Health at the PUMC, wrote, "It seems pertinent here to note that we have never found soybean "milk" naturally used by Peiping women to feed their children. This beverage is not made in the home in Peiping, but is sold by street vendors, as a hot, very weak solution of soybean protein and is usually drunk by old people in place of tea." Moreover, Guy stressed, "The [soybean] 'milk,' as reinforced for the feeding of young infants, is rather tedious and difficult to prepare. As dispensed recently by the various health stations, it is in demand, but is just as artificial in this community as cow's milk."³¹⁰

The artificiality of using soybean milk in infant and child feeding plans was not, however, an impediment to its development and propagation among the Chinese masses. One of the first issues addressed by Hou Xiangchuan involved the adjustment and refinement of a recipe for soybean milk that satisfied requirements on nutritious, economical, and practical levels. In a lecture before the Shanghai YMCA (Shanghai *Liang Qing She*), Hou characterized the soybean milk nutritional supplement as "up to nutritional standards (*yingyang biaozhun*)" because it was devised from research methods (*yanjiu xibifa*) and regulated ingredients (*guiding chengfen*).³¹¹ To substantiate his point, he delineated the compositional makeup of the various nutritional supplements: soybean milk, soybean cake, and soybean powder. For each he noted the main ingredients, their respective quantities, and the amount of added calcium. As for actually making the milk, Hou reported, "The preparation of

³¹⁰ Ruth A. Guy, "The Diets of Nursing Mothers and Young Children in Peiping," *CMJ* 50 (April 1936): 440.

³¹¹ Hou Xiangchuan, "Douzhipin wei ertong buzhu shipin zhi yanjiu (Soybean products in the research on foodstuffs to bolster the child)," *Yishi Zhoukan* (Medical Weekly) 6.1, included in SMA U1-16-908.

soybean milk was carried out according to the usual Chinese age-old procedure, namely that the soybeans were first weighed and then washed thoroughly in several changes of clean water.”³¹² After soaking the beans for ten hours, they and the water were put through a stone mill and ground into a thick creamy paste. The paste was transferred to a clean muslin bag from which the liquid milk was filtered. Water amounting to eight times the amount of soybean was regularly added during the process of filtration. After which, “[t]he milk so obtained was boiled for about 20 minutes and then put into distribution cans ready to be distributed.”³¹³ The recipe Hou used was adapted from Ernest Tso’s research. But in contrast to the soybean milk Tso used in his feeding trials with Baby Yao, Hou added calcium lactate.³¹⁴ To help diminish the “beany taste” often associated with soybean milk, Hou added molasses and native brown sugar. With these adjustments in place, Hou argued that the Refugee Children’s Committee had achieved a nutriment that was both nutritiously rich (*zhiyang geng wei fengfu*) and tasty.³¹⁵

From the Laboratory to Society: Translating Nutrition into Action

When the Refugee Children’s Committee began its program of supplying soybean milk and other nutritional supplements to refugee children in November 1937, it marked a turning point in the nutrition debate among Chinese intellectuals. Prior to the 1930s, the question of nutrition was largely scholastic and conceptually bound by the scarcity of empirical data, which commentators understood as the scientific bedrock of biomedical nutritional knowledge. Understanding the state of nutrition in China meant implementing nutritional and anthropometric surveys, and conducting limited clinical trials and laboratory-based chemical and biological assays. The most important task facing interested

³¹² Hou Xiangchuan, “Nutritional Supplements for Refugee Children,” in *Nutritional Studies in Shanghai* (Shanghai: Henry Lester Institute of Medical Research, 1939), p. 14.

³¹³ Hou Xiangchuan, “Nutritional Supplements for Refugee Children,” p. 16.

³¹⁴ Should calcium lactate be unavailable or for reasons of economy, Hou advised substituting finely ground bone meal, calcium carbonate, or calcium hydroxide (slaked lime).

³¹⁵ Hou Xiangchuan, “Douzhipin wei ertong buzhu shipin zhi yanjiu (Soybean products in the research on foodstuffs to bolster the child),” *Yishi Zhoukan* (Medical Weekly) 6.1, included in SMA U1-16-908.

researchers was generating the necessary data in order to draw conclusions about how and what Chinese people eat affected their overall health.

As Mark Swislocki has remarked in his chapter on biomedical nutritional research in China in his recent dissertation that from the early 1920s, when a marked enthusiasm “for the opportunity to subject a wealth of new foodstuffs and bodies to scientific analysis” appeared within the biomedical literature published in China, until the early 1930s, researchers engaged with their subject matter largely within the confines of the laboratory.³¹⁶ In contrast to the “catalogues of nutritional properties of foodstuffs” available in North American and Europe, China was uncharted terrain. Both Chinese and foreign researchers tackled the question of the common Chinese diet with vigor. From the very first nutritional study in China on soybean products in 1922 to the later, more comprehensive studies—notable examples include William H. Adolph and Hsu Wei-hsin’s “Fuel Values of Every-Day Chinese Foods in Every-Day Units,” Ruth Guy and K. S. Yeh’s “Peking Diets,” and Wu Xian’s *Yingyang gailun* [*Principles of Nutrition*]³¹⁷—emphasis was placed upon delineating the specific nutrients, their proportions and quantities, by chemical analyses. By identifying the nutritive properties of common foodstuffs and testing its influence upon physiological processes like growth or physical stature through animal experimentation, Chinese and foreign researchers succeeded in translating a fundamental component of the Chinese everyday into the language of biomedical science.

By the mid-1930s, however, a shift had occurred in the researchers’ framing of viable research spaces. Swislocki characterizes the shift as frustration “with lab-based inquiries,” and indeed, for dietary research, the 1930s witnessed an increased interaction between researchers and local communities of various socio-economic levels and different geographic regions.³¹⁷ The ramifications of this intellectual and practical move outside the confines of the laboratory were crucial to the

³¹⁶ Mark Swislocki, “Feast and Famine in Republican Shanghai: Urban Food Culture, Nutrition, and the State,” (Ph.D. dissertation, Stanford University, 2002), p. 73.

³¹⁷ Other aspects of biomedical nutrition research, for example growth and auxological epidemiology, experienced parallel, but nonetheless different histories and were not constrained to the laboratory like dietary research on local foodstuffs. See Part I of this dissertation.

development of nutritional activism. Because researchers engaged with specific communities—factory workers in Shanghai, urban poor and middle and upper class households in Beijing—they were able to clarify not only what was eaten, but also make general assessments about the health of the people living on such diets. Moreover, with the insight gained about consumption patterns, nutrient values, overall caloric intake, regional differences in diet composition, etc., researchers began formulating what the right kind of diet would be that would satisfy the Chinese body's specific dietary requirements.

In the years leading up to the outbreak of war in 1937, nutritional researchers played a more active role in defining the standards of nutritional health for the country at large.³¹⁸ The Chinese Medical Association established the Committee on Nutrition in 1936 to investigate what kinds of parameters should be placed upon the Chinese diet so as to best promote good health.³¹⁹ Drawing from this growing body of nutritional knowledge specific to China, researchers and clinicians on the committee began discussions on how to “draw up a set of dietary recommendations for the poorer classes in China—for the peasant households in rural districts, and the ricksha pullers, factory workers, and other laborers in the cities.”³²⁰ The report is printed in both Chinese and English, and in terms of substance, there is little divergence between the two languages. The color of the statements varies, however, and one finds for the Chinese text, a greater emphasis upon the necessity for work on Chinese nutritional standards to not blindly conform (*mang long* 盲襲) to western ones. In the Chinese language preface to the report, T. F. Huang, M.D., Chairman of the Council on Public Health, writes, “The purpose of nutritional supplements is to improve the general state of one's diet

³¹⁸ For a more detailed account of how Chinese clinical physicians and medical researchers undertook to define normative standards for the abstract Chinese body, please see Part I of this dissertation.

³¹⁹ *Minimum Nutritional Requirement for China: Report of the Committee on Nutrition of the Council of Public Health of the Chinese Medical Association*, Special Report Series No. 10 (Shanghai: Chinese Medical Association, 1938), p. ii. The Committee on Nutrition was comprised of Dr. Wu Xian, Professor of Biochemistry at PUMC, Dr. William H. Adolph, Professor of Biochemistry at Yenching University, Dr. Hou Xiangchuan, Associate in Physiological Sciences at Henry Lester Institute for Medical Research, Dr. W. Y. Swen, Department of Economics at University of Nanjing, and Miss Huang Kwei Pao, formerly dietician at PUMC.

³²⁰ Ibid.

in accordance with nutritional principles. But because the state of the Chinese economy lags behind that of Europe and America, not to mention the differences in foodstuffs and social habits, it is inadvisable to blindly conform to western standards.”³²¹ In contrast, the English text focuses rather more upon the inapplicability of western standards. “On account of the differences in dietary habits and in economic levels, however, nutrition standards which have been worked out in Europe and America and are based in a large measure on milk and butter and other dairy products, are not applicable to Chinese conditions. Any effort toward the improvement of mass nutrition in China would not meet with success unless the following factors are taken into consideration: (i) the existing, low standard of living; (ii) the local habits in regard to food; (iii) the types of food available in different localities; and (iv) the present inadequacy of popular education in the country.” The divergence in emphasis is suggestive of local elite attempts to craft a particularly Chinese experience of modernity.

While Swislocki is surely right to point out the irony of biomedical nutritional research, particularly in Shanghai, i.e., “that as doctors and researchers increasingly attributed malnutrition to a confluence of social, cultural, and economic processes, they also defined the scope of their work and responsibility in biological and medical, rather than social and preventive, terms,” he overlooks the ways in which doctors and researchers also identified complementary avenues for exploring the social and preventive implications of their biological and medical work.³²² As local elites and members of civic organizations, doctors and researchers did not separate their professional research from their social lives.

³²¹ Ibid. “補救之道，端在改善膳食，以合營養需要為前提。惟是我國經濟成都，遠遜歐美，而食品原料以及人民習慣，與歐美迥不相同，自不宜盲襲歐美標準。”

³²² Moreover, his statement is misleading in its juxtaposition of medical/biological against social/preventive. Strategies for combating disease that adhere in theoretical outlook and methodology to biomedicine does not by virtue of its biomechanistic schematization of the body or its prioritizing of biological vectors in disease causation fail to also be social and preventive. Mandatory vaccination is a good example of a socially-oriented public health measure that aimed to prevent the occurrence of specific diseases like cholera or smallpox.

This quality of embeddedness evident in the intellectual and social activities of doctors and researchers point us towards two qualifications worth keeping in mind. Firstly, it is important to draw a distinction between the stated objectives of a research institute and the individual goals and ideals of its researchers.³²³ Although the Henry Lester Institute for Medical Research (henceforth “Lester Institute”) emphasized its institutional prerogative to stay above the fray and not “enter the field of social politics,”³²⁴ its various researchers often melded their own research work with more socially conscious projects. Bernard E. Read, Hou Xiangchuan, Ni Zhangqi (T. G. Ni 倪章祺), and Peter Mar, who were all researching members of the Division of Physiological Sciences at the Lester Institute, actively contributed to the medical relief effort mounted by municipal and civic organizations. Each drew from their experiences valuable scholastic material and data for scientific publication, and in this manner, their assistance with the medical relief effort that also heavily targeted social and preventive measures of health facilitated the production of scientific knowledge. Secondly, the discourse of malnutrition itself, which adhered narrowly to biomedical conceptions of nutrition that placed high priority upon specific kinds of deficiencies, shaped the kinds of social action available to local elites engaged in social and emergency relief.

Enterprising Researchers

The Lester Institute was not a charitable organization, but neither did it inhibit its research staff from pursuing alternate forums within which to conduct their various researches. The most direct application of their biomedical expertise is evidenced in the medical preoccupation with constructing a biomedically nutritious and economically sensitive refugee diet and minimum dietary menus for refugee camps. All the physicians mentioned above participated in crafting guidelines and recommendations for refugee camps. A single meal whose composition had been carefully calibrated to satisfy essential nutritional requirements could function as a prophylactic against the outbreak and spread of nutritional deficiency diseases. Hou Xiangchuan, who also acted as chairman of the SIRC’s

³²³ Swislocki, p. 89.

³²⁴ Henry Lester Institute for Medical Research (HLIMR), *Annual Report, 1935*, p. 33, cited in Swislocki, p. 90.

Subcommittee on Refugee Health and wrote extensively about refugee diets, related a complicated tale of precarious living for most refugees. “During August 1937 when the Sino-Japanese hostilities broke out in Shanghai the number of refugees gathered in empty houses and matshed camps rapidly exceeded two hundred thousand. Practically all of them had to be fed by charity. Most were given only polished rice gruel and a little salted turnip, others were given steamed bread and salted vegetables.” Initially, however, “many of [the refugees] however were able to purchase at least for a time additional foods like vegetables, fish or meat with the little cash which they carried with them upon evacuation.”³²⁵ But as hostilities deepened and personal cash dwindled, the food provided by the camps, which Hou characterized as “not up to the minimum dietary requirement,” failed to protect the refugees from nutritional disorders. Hou writes, “For fear of further outbreaks of nutritional disease, camp authorities were urged to provide a better diet for refugees. A diet consisting of several common and inexpensive foods similar to the Chinese dietary standard . . . was recommended to the organizations sponsoring the camps through the good offices of the Municipal Public Health Department.”³²⁶

The initial attempts were immediately confronted by economic exigencies. The dietary supplies recommended to Chinese refugee camps “for the prevention of outbreaks of nutritional disease and to fortify the people against epidemics” included 10 *liang* [oz.] rice, 2 *liang* soybeans (peanuts or other legumes), 2 *liang* onions (red peppers or turnips), 1 *bang* [lb.] green leafy vegetables, up to 10 *liang* sweet potato, 3 *liang* whole grain of wheat or millet, and 1/3 *liang* pork (or 2 *liang* a week).³²⁷ This dietary regime yielded 2111 calories, 62.6 g. of protein, and .88 g. calcium per person

³²⁵ Hou Xiangchuan, “Diet and Nutritional Deficiencies among Refugees,” in *Nutritional Studies in Shanghai*, Chinese Medical Association, Special Report Series no. 12 (Shanghai: Henry Lester Institute of Medical Research, 1940s), p. 1.

³²⁶ Hou Xiangchuan, *Meeting of Members of the Commission and Other Nutrition Experts: Note on Chinese Dietary Standards and Some Dietary Problems among War Refugees* (Geneva: League of Nations, Health Organization, 1939), p. 5.

³²⁷ SMA U1-16-1942. This menu also appears in Hou Xiangchuan, *Meeting of Members of the Commission and Other Nutrition Experts: Note on Chinese Dietary Standards and Some Dietary Problems among War Refugees*, and the unit measurements are rendered in ounces and pounds.

per day, but because “many of the sponsoring organizations were financially unable to provide such a diet, . . . polished rice and some salted vegetables remained the principal diet supplied to most camps.”³²⁸ The gap between recommended minimum dietary menus and the actual rations distributed demonstrate the many adjustments and compromises biomedical physicians made to balance the desire to maintain health and prevent the manifestation of nutritional deficiencies against economic constraints like inflation and limited resources. Hou’s original suggestion of 1/3 *liang* pork was quickly jettisoned.

Drs. Peter Mar, Ni Zhangqi, Bernard E. Read, and W. Y. Lee, who served on the Shanghai Municipal Council’s Relief Committee’s Temporary Subcommittee on Diet, met intensively on 20, 22, and 23 December 1937, and devised a minimum dietary for feeding 1500 people about 1600 calories daily.³²⁹ They concluded that “recommended diets” must take into consideration the available food stocks, the type of food kitchen and cooking used, and methods of distribution. With these factors in mind, they advanced a plan that consisted of two dishes: one with cereals and beans, the other a thick soup with green and root vegetables. They delineated alternative cereals (broken wheat and whole wheat barley or millet) that could serve as substitutes during times of limited rice stocks and identified the most common green (alfalfa, amaranth, beef tops, mustard, spinach, etc.) and root vegetables (beet root, carrots, onions, turnip, yam, etc.) to be used.³³⁰ Their inclusion of a variety of vegetable and cereal options reflected the recognition that difficult times required flexibility. The “recommended diet” was devised in such a manner that “any of the cereals, legumes, or vegetables

³²⁸ Hou Xiangchuan *Meeting of Members of the Commission and Other Nutrition Experts: Note on Chinese Dietary Standards and Some Dietary Problems among War Refugees*, p. 6.

³²⁹ SMA U1-16-1004.

³³⁰ Swislocki notes that once hostilities subsided in Shanghai’s neighboring provinces, rice was once again available from both domestic and international sources. The SMC had taken the precautionary measure of importing rice from Saigon such that as early as November 1937, even while the Japanese blockade of Shanghai’s waterways was still in place, there was rice in city. Swislocki, “Feast and Famine in Republican Shanghai,” pp. 109-37 and 165-6. See also Christian Henriot, “Rice, Power, and People: The Politics of Food Supply in Wartime Shanghai (1937-1945),” *Twentieth-Century China* 26.1: 41-84.

available [could] be applied. For one good meal a day.”³³¹ The rations actually issued to refugee camps by the SIRC during January 1938 were shorn to the bare essentials: 433g. cereal (2/3 rice, 1/6 soybean, and 1/6 whole wheat) and 50 g. cabbage. The estimated total caloric value of the ration was 1644 calories.

To gage the nutritional efficacy of the refugee diet, Hou and his colleagues conducted epidemiological surveys to assess the incidence rates of various diseases and investigations into the health of refugees. Chemical and biological assays of various Chinese foods had been undertaken since the early 1920s, but nutritional surveys, which evaluated both food and the resultant state of nutrition in the individual, didn’t appear in the medical literature until the mid-1930s. The refugee situation in Shanghai was certainly not the desired environment for scientific research, but few denied the substantive opportunities it afforded for medical specialists seeking to explicate the relationship between food and health within specific populations. Hou, Peter Mar, and Ni Zhangqi all obtained valuable access to refugees as participant subjects for their various studies. Their research did not go unrecognized by their institutional base, and indeed, was incorporated as part of the Lester Institute’s own litany of yearly achievements. Bernard E. Read summarized it best in his overview of the Division of Physiological Sciences for the Lester Institute’s 1939 *Annual Report*: “In 1939 an attempt was made to re-establish the work of the Division along normal lines. This was made possible by the united effort of all the staff in applying themselves to new routines and concentrating upon the fundamentals of certain new problems. Much time was devoted to assessing the results of observations made during the previous 18 months work among refugees, which had afforded an unusual opportunity for studying the nutrition of large groups of people.”³³²

Malnutrition as Nutritional Deficiency

Intensive interaction with refugees and camp administrators afforded a unique opportunity for Lester Institute researchers like Hou Xiangchuan to apply their biomedical expertise in such a

³³¹ SMA U1-16-1004.

³³² HLIMR, *Annual Report, 1939* (Shanghai: Henry Lester Institute of Medical Research, 1940), p. 19.

manner as to structurally change the parameters of day-to-day health. But even as they juggled the competing demands—nutritional efficacy versus economy, taste versus available supplies, etc.—they adhered strictly to a conception of malnutrition predicated upon the concept of nutritional deficiency. The word “malnutrition,” as the OED explains, only appeared in the lexicon in the 1860s, and its definition incorporates not only insufficient intake of food as a precondition, but also excessive intake, lack of essential dietary components, or mal-absorption. The Chinese counterpart, *yingyang bu liang* [malnutrition], or more specifically, *yingyang* [nutrition], emerged from the Japanese adaptation of the *kanji* term, *eiyo*, from classical Chinese to the European original.³³³ As a neologism that is reintroduced into China in the twentieth century by way of Chinese physicians who had studied in Japan, *yingyang* as nutrition was conceptually and historically framed by its translingual interaction with the biomedical field of nutrition—not Chinese antecedents within classical Chinese medicine.³³⁴ Lydia H. Liu has written, “These acts of *equating* ideas from the Chinese classics and concepts imported from the West are significant in that they introduced a level of mediated reality or change that came into existence only after the act of equating had been initiated.”³³⁵ This proves particularly true when we consider the associated translingual practices within the field of science and medicine.

³³³ 1930 seems to be the turning point in terminological trends. Up until 1930, *rongyang* was the more common loanword from modern Japanese when referencing the technical subject of biomedical nutrition. Although it still appears to be used in present-day Japanese, the more common term, which has since predominated in Chinese as well, is *yingyang*. See Lydia H. Liu, *Translingual Practice: Literature, National Culture, and the Translated Modernity, China, 1900-1937* (Stanford, CA: Stanford University Press, 1995) and Federico Masini, *The Formation of Modern Chinese Lexicon and Its Evolution Toward a National Language: The Period from 1840 to 1898* (Berkeley: University of California, Berkeley, Project on Linguistic Analysis, 1993).

³³⁴ The canonical handbook of etiology and symptomatology, *Zhu bing yuanchou lun* (諸病源候論, *Sources and symptoms of all disease*, 610) by Chao Yuanfang details a wide variety of food-related conditions and diseases, but most do not involve insufficiency or deficiency in the manner indicated by the biomedical notion of malnutrition. Indeed, one finds several instances in which ill health and disease are the direct results of excess and intemperance. This is perhaps not surprising given the priority within traditional medical thought placed upon balance and order. Nathan Sivin demonstrates this point by highlighting the fundamental connotation of *bing* 病 as “interruptions of the normal functions,” in which the corresponding antonym, *zhi* 治, which one generally translates as “to cure,” denotes “order,” as in “to overcome disorder.” Nathan Sivin, *Traditional Medicine in Contemporary China: A Partial Translation of Revised Outline of Chinese Medicine (1972), with an Introductory Study on Chang in Present-Day and Early Medicine* (Ann Arbor, MI: Center for Chinese Studies, University of Michigan, 1987), p. 99, n. 8.

³³⁵ Lydia H. Liu, *Translingual Practice*, p. 40.

The “level of mediated reality” introduced by *yingyang* as nutrition was fundamentally new and modern, but not necessarily foreign. As a designation for an individually localized state of health whose maintenance depended upon the proper and sufficient intake of food, proponents of *yingyang* ushered in a public space in which individual health was naturally and necessarily subject to outside intervention.

When the obverse is considered, i.e., malnutrition, we find the forms of social action mobilized in the fight to be narrowly directed towards deficiency diseases alone. Malnutrition, as explicated by men like Hou Xiangchuan, is the condition resulting from the general absence or insufficient intake of essential dietary components. Thus, their work on regional diets and local diets began with the assumption of minimal health, i.e., that which is sufficient to avoid the development of signs of nutritional deficiency diseases. They made no claims upon optimal health, good health, or healthy living, and they avoided discussion of the place of hunger within the matrix of causes contributing to malnutrition.³³⁶ But as nutritional activists, minimal health was too insubstantial to justify claims for improving the nutritional health of the populace. They recommended dietaries for refugees that addressed the aims of minimal health, which under the prevailing economic circumstances equated with subsistence, but for children, they made the qualitative leap to advance nutritional health as good, normal health.

This preoccupation with nutritional health as equivalent to good, normal health becomes particularly clear through the Committee’s attempts to demonstrate the physiological benefits attained through their dietary interventions. From November 1937 through the spring of 1940, at least four different medical studies were published in connection with the Refugee Children’s Committee’s work. Most of these were in the form of height and weight surveys of refugee children. The purpose for surveying the height and weight measurements of refugee children receiving

³³⁶ For a contrasting study of how the history of hunger converges with histories of governance, see James Vernon, *Hunger: A Modern History* (Cambridge, MA: Belknap Press of Harvard University Press, 2007) and Sharman Apt. Russell, *Hunger: An Unnatural History* (New York: Basic Books, 2005).

supplements was to “access the value of the supplementary foods given to the children.”³³⁷ Hou Xiangchuan explained, “The present studies were not planned and started as an experiment but arose from an urgent need to supply a nourishing cheap food to refugee children whose diets were inadequate for normal health and to infants whose mothers could not supply sufficient milk. This afforded an unusual opportunity for observing on a large scale by taking body measurements the possible nutritional value of soybean milk as a supplementary food.”³³⁸ Hou and his assistants visited 20 camps and measured 1,028 children. The measurements were repeated monthly for up to eight months and compared with the “large number of individuals unwilling to accept a new type of food, who could be measured and used as a control to show the comparative value of the extra feeding with soybean milk.”³³⁹ Hou found that the children receiving soymilk experienced an appreciable increase in weight as compared with the children refusing the milk. In terms of height, although there was a slight advantage of height among those receiving soymilk, the difference was “slight.” “Children over one receiving soybean milk,” Hou remarked, “appeared to grow a little faster than those not receiving bean milk. However the difference was only slight, and was less marked with the female children.”³⁴⁰ Weight trumped height in significance, and Hou concluded, “. . . soybean milk as a children’s dietary supplement was definitely beneficial . . .”³⁴¹

Moving Inland and the Question of Commercialization

During the spring of 1939, Nellie Lee, who oversaw the on-the-ground operations for the Refugee Children’s Committee, approached Julian Arnold, the commercial attaché of the US

³³⁷ Hou Xiangchuan, “Height and Weight Measurements of Young Children in Refugee Camps in Shanghai 1937 to 1938,” in *Nutritional Studies in Shanghai* (Shanghai: Chinese Medical Association, 1939), p. 27.

³³⁸ Hou Xiangchuan, “The Height Weight Measurements of Refugee Children, Given Soybean Milk as a Supplementary Food,” in *Nutritional Studies in Shanghai* (Shanghai: Chinese Medical Association, 1939), p. 38.

³³⁹ *Ibid.*, 38-39.

³⁴⁰ *Ibid.*, 42.

³⁴¹ *Ibid.*, 43.

Consulate in Shanghai and a vocal proponent for the development of soybean products, about the possibility of expanding the Committee's work into the interior. She proposed establishing children's nutritional aid centers in "strategic places in China." In conveying her ideas to J. A. Mackay, the Chairman of the Finance committee of the China Child Welfare, Shanghai office, Arnold wrote, "She expressed a desire to pioneer in this work in the interior. Her idea is to set up a model station in Kunming and after having developed this to a proper degree of perfection, then spread the idea for the building up of similar stations in other interior places where they can be advantageously developed."³⁴²

In actual practice, the Refugee Children's Committee did not include nutritional education for the children it provided with soybean milk, soybean residue cakes, vegetable soup, or cod liver oil. As part of a larger emergency relief effort, the focus and emphasis had been upon preventing malnutrition, because "it was considered that the children most of all would suffer if some nutritious supplement was not added to the inadequate diet of the Shanghai war refugees."³⁴³ Success was measured in terms of production and distribution: the pounds of milk, the number of cakes, and the teaspoons of cod liver oil. But in a more global sense, when the Refugee Children's Committee sought to demonstrate the overall good they were providing society, the language they turned to was science.

Expanding nutritional work beyond Shanghai made sense, because the problem of nutrition did not begin nor end with the refugee crisis in Shanghai. And yet the refugee crisis had been important in establishing just what kind of social good could be accomplished through nutritional activism. Children under the age of twelve made up almost a third of the refugee population, and by distributing soybean milk, soybean residue cakes, vegetable soup, and cod liver oil, the Refugee Children's Committee played an active role in bolstering the health of refugee children. Having

³⁴² Julean Arnold to J. A. Mackay, 6 October 1939, China Child Welfare, Box 4 F. 12, New York Public Library.

³⁴³ Hou Xiangchuan, "Nutritional Supplements for Refugee Children," in *Nutritional Studies in Shanghai* (Shanghai: Chinese Medical Association, 1939), 15.

witnessed the deadly effects of an epidemic of measles, which had broken out among children in refugee camps in the winter months of 1937, physicians working at the camps associated the high incidence and high mortality of the disease to the “poorly nourished condition of refugee children.”³⁴⁴ A decrease in the mortality rate in January 1938 corresponded with the Committee’s increased efforts, and for many observers, this was compelling evidence of the good that can be achieved by attending to children’s nutrition.

With published surveys of the beneficial effects of soybean milk and almost two years’ experience in production and distribution, the next step was to develop its potential in non-emergency settings. In Arnold’s estimation,

As our Committee in Shanghai made very commendable progress in the manufacture and distribution of soy bean milk and soy bean cakes for children in the refugee camps, this presents an excellent opportunity for carrying this work into the interior of the country and making it a permanent factor in the rural economy of China. Thus, it would seem that we could make of this a valuable contribution, not only in emergency relief work for nutrition for refugee children, but at the same time educate the Chinese to the greater appreciation of the possibilities of the use of the soy bean for nutritive purposes among the children of the country.³⁴⁵

The desire to expand the Refugee Children’s Committee’s soybean milk work into the interior developed into a two-pronged plan: the formation of a national children’s nutritional aid council in Shanghai and the establishment of a nutritional aid center in Kunming with expectations for other stations at a later date. Nellie Lee oversaw this latter operation.

The Shanghai Committee

The first meeting of the China Nutritional Aid Council (henceforth “Nutritional Council”) was held on 26 February 1940.³⁴⁶ The Shanghai committee was intended to function as a “clearing house,” to coordinate the work on “soybean milk and accessory products” in the interior, “so as to prevent unnecessary duplication and secure a wide spread utilization of the work and studies thus far

³⁴⁴ Hou Xiangchuan, “Diet and Nutritional Deficiencies among Refugees,” in *Nutritional Studies in Shanghai* (Shanghai: Chinese Medical Association, 1939), 11.

³⁴⁵ Arnold to Mackay, 6 October 1939, China Child Welfare, Box 4 F. 12, New York Public Library.

³⁴⁶ The Children’s Nutrition Council’s Chinese name was *Ertong yingyang cujin hui* 兒童營養促進會.

accomplished.”³⁴⁷ In theory, it would expedite, correlate, and give “intelligent aid and direction” to the branch offices. It would oversee the allocation of available funds, gather together the available literature on soybeans and other relevant nutritional topics in China and abroad, and help prepare educational materials for distribution at local nutritional centers. In practice, its work was rather more localized and reflective of its situation in Shanghai. Its committee members emerged from the same pool of highly specialized and distinguished biomedical clinicians and researchers as had defined the Refugee Children’s Committee.³⁴⁸ But in contrast to its early incarnation, the Nutritional Council also attracted the participation of prominent business and industry figures from companies like the China Cotton Manufacturing Company, Yee Tsoong Tobacco Company, Percy Kwok & Co., China Chemical Works, Ltd., and Henningsen Produce Company. Although one cannot say for certain whether the committee’s trajectory resulted from the direct participation of members of the commercial sector, it seems highly likely that their presence at least influenced how the committee conceived of its primary goals.

The Nutritional Council’s Shanghai committee was committed to the goal of improving the general nutritional health of the Chinese people, but it defined nutritional health rather differently than its various branch offices. From its very beginning, the Shanghai committee framed much of its

³⁴⁷ Julean Arnold to J. A. Mackay, 15 February 1940, China Child Welfare, Box 4 F. 12, New York Public Library. Interestingly, the initial name for the committee drawn up by Julean Arnold was the National Committee for Promotion of Soybean Food Products—a title rather more flavored by economic possibilities and particularly suggestive given the direction of the Nutritional Council’s development.

³⁴⁸ Hou Xiangchuan had originally suggested that other specialists like Dr. Wu Xian, who was noted biochemist and chairman of the Chinese Medical Association’s Committee on Nutrition that had published its recommendations for minimum nutritional standards for the Chinese in 1938; Bernard E. Read, Director of the Division of the Physiological Sciences at the Lester Institute; Dr. T. F. Huang, Professor of Public Health at the National Medical College, Kunming; Dr. H. Y. Yao, Director of the Provincial Health Department of Yunnan and former graduate of PUMC; and Dr. Robert Lim, the Director of the Chinese Red Cross Relief Unit and Professor Physiology at PUMC, also be invited. Although none of these individuals’ names appear in later documents as contributors/participants in the committee’s work, the China Nutritional Aid Council in Shanghai attracted the involvement of Dr. Ernest Tso, Professor of Pediatrics at PUMC who first came up with a recipe for feeding fresh soymilk to infants; Dr. Sao-ke Alfred Sze, 施肇基, who had recently retired from the diplomatic service (1937), settled in Shanghai, and become active with the International Relief Committee and the Anti-Tuberculosis Association, which he founded; and Dr. Szeming Sze, eldest son of Dr. Sao-ke Alfred Sze, who later went on to play a major role in establishing the World Health Organization (WHO) as a specialized agency of the UN.

work and future plans as directed towards the “popularization of the soybean and bean cakes.”³⁴⁹ The reason behind the selection of the soybean as a kind of proto-superfood stemmed from the Nutritional Council’s commitment to “economical nutrition,” which Julean Arnold defined as “the utilization of the country’s agricultural resources to the best possible extent in meeting the needs of its masses.”³⁵⁰ Rather than devote resources towards the sole purpose of creating and running nutritional aid stations in Shanghai, the Shanghai committee focused on developing experimental research with soybeans and building relationships with the commercial sector. They emphasized the importance of devising production methods and equipment that could be easily used, moved about, and was cost efficient. One of the main projects enacted by the Shanghai committee involved the creation of a model unit for the production of soybean milk that could be distributed to commercial sites.

The Shanghai committee actively sought relations with the commercial sector in the hopes that private companies could be persuaded to manufacture and sell soybean milk in Shanghai. The committee would provide interested companies both the “correct formula” for making soybean milk, as well as the equipment with which to make the milk. This brand of nutritional activism advanced by the Nutritional Committee’s Shanghai committee conceived of social awareness and nutritional knowledge in commercial terms. To help inculcate a notion of good health—to develop and spread “soybean milk conscious[ness]”—the Shanghai committee began with the assumption of the public as consumer. To change dietary habits meant changing, or at least influencing, consumption patterns.

Beginning in April 1940, the Nutritional Council sought to establish a model unit for the production of soymilk in Shanghai.³⁵¹ With the financial backing of P. Y. Tang of the China Cotton Mfg. Co., the Nutritional Council solicited proposals and designs from its members on plant administration and soymilk production. There were four considerations influencing work upon the

³⁴⁹ Julean Arnold to J. A. Mackay, 15 February 1940, China Child Welfare, Box 4 F 12, New York Public Library.

³⁵⁰ Ibid.

³⁵¹ SMA U1-16-908.

model equipment: “(a) that the materials of the whole plant should be all procurable from the interior of China, (b) that the materials should be serviceable but not expensive, (c) the equipment should be power-saving and (d) that the plant should be unitary.”³⁵² Yang allocated space within his cotton mill for the model equipment, and despite varied technical problems, by May 1940, several trial runs had been made.³⁵³

The Council’s efforts to integrate their soybean work into the fabric of daily life led them to some interesting experiments. One of these focused on the jail population. The Nutritional Council approached the Shanghai Municipal Council’s jail authorities about the possibilities of setting up a model plant with an experimental laboratory at the Ward Road Jail. In the words of Major A. Bassett who presented this plan to the Council’s other committee members on 20 May 1940, “[T]he War Road Jail may be the ideal place where we can push our idea of giving adequate nutrition at economized finances.” Negotiations with Jail representatives quickly revealed a number of obstacles forestalling the adoption and implementation of the plan. The initial set-up costs were estimated to be at least \$2,000—far exceeding the Jail’s budgetary allocations.³⁵⁴ Moreover, “Dr. Vio also told Dr. Hou that at present, the gaol ration already includes about two ounces of soyabean to every inmate per day and that the diet in the gaol is always a difficult problem to handle, any radical changes may

³⁵² Ibid.

³⁵³ The process was not without several setbacks. According to the minutes of the fifth meeting of the CNAC in July 1940, the trial runs conducted at Tang’s mill revealed a number of problems with the designed equipment. “(1) It would be impossible to combine and inter-change the motor or power driving with the driving of manual labor into one device; and therefore it is necessary to design two models separately for local convenience and adoption, (2) The presser as originally designed was found to be a failure as the bean-residues so pressed would be subjected to too much handling and therefore makes [sic] the milk rancid, (3) The cooker proved quite satisfactory but upon the suggestion of other members of the Council, it was though wise to design a new one for three purpose, (a) boiling of milk, (b) sterilization of utensils and (c) baking of soybean residue cakes.” U1-16-908, Shanghai Municipal Archives.

³⁵⁴ Although the Council’s regular meeting minutes do not elaborate about why the set-up costs were so high, I expect the expense derived from the Council’s insistence upon constructing its model plant within the premises of the Ward Road Gaol. The plant would likely have included a stone mill for grinding run by an electric motor—an expensive piece of equipment the Gaol would not have possessed. The Council wanted the prisoners to drink soybean milk; according to Gaol officials, the prisoner diet already included soybeans. What remains unclear is how the prisoners were fed their allotted two ounces of daily soybean. My guess is they were served soybean granules steamed to make *doufan* 豆飯—a less than appetizing, but nonetheless economical, variant of the possible ways to eat soybean.

result into a riot.”³⁵⁵ When those plans fell through, the Nutritional Council shifted course toward the commercial sector and decided that the model equipment designed and then tested on the premises of Tang’s cotton mill “ . . . has now arrival [sic] at a stage when the equipment should be properly installed and run on [a] business basis.”³⁵⁶

In pursuing commercial ties, the Nutritional Council hoped to “encourage such enterprising merchant[s] like the Fresh Fruit Drinks, Inc., to manufacture and sell soybean milk in Shanghai according to the Council’s formula so as to popularize and make the Shanghai people soybean milk conscious”³⁵⁷ This brand of nutritional activism upon which the Nutritional Council capitalized conceived of social awareness and nutritional knowledge in commercial terms. To help inculcate a notion of good health, one that was rooted in biomedical nutritional knowledge as represented by the soybean, the Nutritional Council began with the position of the public as consumer. To change dietary habits meant changing, or at least affecting, consumption patterns. Charity and philanthropic giving were overshadowed in this equation. Although the Nutritional Council did continue to provide some free milk, it was often in conjunction with another purpose, for example, an experimental trial of the soybean powder mixture Hou Xiangchuan was developing for the Council.³⁵⁸

The tensions between running a business venture and serving the public interest were apparent from the beginning. Can an organization that claims to serve the cause of social welfare also support private economic ventures? The Executive Secretary, K. H. Fu seemed to be of two minds

³⁵⁵ SMA U1-16-908.

³⁵⁶ SMA U1-16-908.

³⁵⁷ SMA U1-16-908.

³⁵⁸ SMA U1-16-908. As explained in the Minutes for 20 May 1940 and 15 July 1940, the Refugee Children Camp at 181 Jessfield Road had 400 children who had recently been fed with soybean milk supplements. The milk program there was stopped for lack of funding, but Hou proposed that since the camp was well run, “it should serve as a good place for a large experimental trial of the soybean powder mixture. By feeding 200 children with the powder and others not, it will be possible to observe the effect of the soybean powder supplement.” Funding for the experiment was obtained from the China Child Welfare (\$1900) and other sources (\$500), and as of 15 July 1940, the experiment had been initiated. Hou expected that “results of the experiment will be known after another two and half months’ time.”

when he commented to the chairman of the Nutritional Council, “Of course, I realize that neither the Sun Company project nor the Green Spot project conforms to our original aim, which was for the nutrition of the common masses. I am therefore, investigating at present whether it would be possible to start a center at the Robinson Road where the working class congests.”³⁵⁹ The agreement with the Sun Company gained the Nutritional Council not only a site for the manufacture of soymilk and soybean residue cakes—the model equipment developed by the Nutritional Council was transferred and installed onsite at its East Nanjing Road building—but also three separate counter spaces, one in the basement, another on the ground floor, and the third adjacent to the soda fountain, for the sale of the products. With its reputation as one of Shanghai’s big department stores, the Sun Company afforded the Council a unique opportunity to reach the commercial masses. But so long as that engagement was framed as a commercial activity, it remained open to debate the extent to which the Nutritional Council could also help educate the public about good nutrition, and the soybean’s role therein. Fu’s proposal that a nutritional clinic be set up to attend to the working class demonstrates an awareness of the possible conflicts of interest facing the Nutritional Council. “If the Sun Company project can make people to drink [sic] soy bean milk as a fashion and the Robinson Road project will make people to drink [sic] soya bean milk as a matter of good nutrition, then I believe that the two projects will supplement instead of defeating each other.”³⁶⁰

Interior Branch Committees

In contrast to the Nutritional Council’s Shanghai operations, the branch committees that arose in the interior pursued a rather different course, one that did not shirk the question of commercialization but that nonetheless placed it behind more pressing concerns about the very substance of nutritional activism. As an emergency relief organization, the Refugee Children’s Committee encountered few difficulties in determining who should receive their assistance and under what conditions should such assistance be given. But once Nellie Lee began working with different

³⁵⁹ K. H. Fu to Julian Arnold, 16 October 1940, China Child Welfare, Box 4 F 1, New York Public Library.

³⁶⁰ Ibid.

local communities to establish a viable nutrition program that emphasized the nutritive properties of the economical soybean, such questions moved front and center for deliberation. The branch committees, which were comprised of both relocated Chinese intellectuals as well as local elites, often articulated different objectives and set forth different proposals for addressing the issue of nutritional health. By late 1942 with the outbreak of full-scale war in the Pacific, the Nutritional Council had expanded its nutritional activities in southwest China across four provinces: Guangxi, Guizhou, Yunnan, and Sichuan. But in no way was there uniformity of program or of success in all four provinces. In each place, Lee and the local committees confronted a series of challenges that made the Refugee Children's Committee effort in Shanghai seem pale in comparison.

The difficulties she and the branch committees confronted arose in part from the problem of translation and transplantation. The Refugee Children's Committee had provided Nellie Lee with a solid bed of experience in the administration of a social relief program. In general terms, the objectives remained largely the same: to supply nutritional supplements to children in order to prevent or help ameliorate ill health and malnutrition. But once Lee moved into the southwestern provinces and began working with a local committee, the unacknowledged *a priori*s associated with an emergency situation became dramatically apparent.

Her work with the branch committee in Kunming provides a good case study for how nutritional activism had to change in order to address the particularities of local circumstance: what worked in Shanghai did not necessarily work as well elsewhere. There were two basic questions facing Lee and the newly formed Kunming Children's Nutrition Committee (Kunming ertong yingyang weiyuanhui): who should receive soybean milk, and how should they receive it. The answer to both of these questions seemed straightforward, but in practice yielded many shades of gray.

Kunming Children's Nutrition Committee

Insofar as the Kunming Committee was continuing the work first initiated by the Refugee Children's Committee, the target recipient was children. The Refugee Children's Committee had identified its child recipients within the refugee camp structure and organized them by age: those

under six receiving milk, those over six but not older than fourteen received the soybean residue cake. At each camp, arrangements had been made such that the refugee children were gathered together and placed in a queue to await the female nutrition workers' arrival.³⁶¹ In contrast, the Kunming committee explored the semantic frontier of differentiating children into groups like "undernourished street children," "underprivileged children," "malnourished children and infants," and "normal children."³⁶² The generic category of children was expanded to also include students, and while most of their efforts focused upon children under the age of twelve, the Kunming Committee were not doctrinaire and facilitated the development of a "bean milk cooperative" for undernourished students of the Southwestern University.³⁶³

The clarity of vision that accompanied an established spatial ordering could not be depended upon in Kunming.³⁶⁴ The city lacked much of the health infrastructure the Refugee Children's Committee depended upon to carry out its work. The Nationalist government's state health system, which had partitioned the country into a hierarchy of provincial and municipal health departments, *xian* (county) health centers with hospitals, *qu* (district) health stations, *xiang* (rural) health substations, and *bao* (village) health workers, had by 1937 only succeeded to establish three health centers in the entire province of Yunnan.³⁶⁵ By 1941, there were 77 health centers. This investment of human and

³⁶¹ The "February Report" dated 14 March 1940 includes the amusing aside describing recent successes with the dispensing of cod liver oil. "Girls distributing cod liver oil in the camps report that they can see the increasing number of rosy cheeks among the refugee children since this work started, and instead of running after them to take cod liver oil, more and more line up waiting for the distributor every day." Shanghai Refugee Children Nutritional Aid Council, China Child Welfare, Box 4 F 12, New York Public Library.

³⁶² "Field Worker's Report of Trip to Kunming and Kweiyang, July 10 – Oct. 9, 1942," China Child Welfare, Box 4 F. 2, New York Public Library.

³⁶³ As part of the Nationalist retreat into the interior, the Ministry of Education ordered the consolidation of Nankai University, National Peking University, and Qinghua University to form first the Temporary University at Changsha, Hunan and then from 1938 the Southwestern University (National Southwest Associated University). Thousands of students, teachers, and staff undertook the migration to the southwest, and in doing so, helped transformed the educational landscape of the less-developed hinterland.

³⁶⁴ Japanese air raids against the city increased once Japan had secured control of Indochina in September 1940.

³⁶⁵ Ka-che Yip, *Health and National Reconstruction in Nationalist China: The Development of Modern Health Services, 1928-1937* (Ann Arbor, MI: Association for Asian Studies, 1995). The *bao* health worker served at the community-level. The Nationalist government revived the *baojia* system in 1932 to coordinate its on-the-ground,

material resources into building the local health infrastructure came about in conjunction with the infusion of new people and talents, but the superficial improvement in number should not obscure the real hardships faced by those engaged in the effort. The Nationalist government's plans for binding the southwest territories more securely into the national fabric by implementing local reforms threatened the power of local warlords. Long Yun, the Lolo-tribesman warlord who had governed Yunnan since 1927 and was later confirmed by Chiang Kai-shek in 1938 as the governor of Yunnan, tolerated Nationalist oversight, but did not necessarily implement all the laws set forth by the Nationalist government. Moreover, because Kunming served as the terminus to the Burma Road, the Nationalist government had to tread carefully in its political and economic dealings to ensure that its only transportation link to the outside world was not endangered.³⁶⁶ Thus politically and practically, Kunming differed dramatically from Shanghai. Ka-che Yip has cited the "backwardness and poverty of much of the less-developed interior, the inflation and high cost of drugs, and the often makeshift circumstances under which health personnel had to operate" as just some of the difficulties to be confronted. In the words of Sze Szeming of the Chinese Medical Association, the people lived "very close to the good earth."³⁶⁷

City residents were not bound to a specific area like a camp, and children ranging in age from infancy to twelve years were not likely to be found all in the same place at the same time. To reach children in the community, the Kunming committee divided the city into four districts with seven distribution centers (5 churches, 1 hospital, and 1 clinic). Due to the city's poor infrastructure and committee's limited personnel, the Kunming committee voted in favor of a decentralized system with each center producing its own milk for distribution. This set-up was considered more advantageous, because "a small unit . . . can be an example to be copied in any small district or even

local health efforts. The *bao* level consisted of one hundred households (ten households comprised one *jia*; ten *jia* formed one *bao*).

³⁶⁶ The Burma Road links Lashio, Burma to Kunming. It stretches over 717 miles. Construction commenced on the road in 1937 and finished by December 1938 when the first supplies from Rangoon reached Kunming.

³⁶⁷ Cited in Ka-che Yip, *Health and National Reconstruction in Nationalist China*, p. 176.

in homes, and thereby help to facilitate the spread of bean milk.”³⁶⁸ Having determined the locations of the distribution centers, the decentralized nature of milk production, and the target recipient, the next step involved getting the children to those distribution centers to receive the milk.³⁶⁹ But the task of opening a distribution center proved rather difficult, and with the turnover rate in personnel particularly high, the committee fell behind its own schedule for opening each of the seven distribution centers.

Identifying locations from which to produce and distribute the soybean milk satisfied the basic question on the supply side, but not the demand side. To pique public interest and spur attendance, the Kunming committee had to find ways in which to build connections and establish relations with local communities. Thus, prior to the opening of each station, Nellie Lee and her staff visited the homes of the surrounding neighborhoods to raise awareness of their program, register the number and ages of children in the area, and request the attendance of children under the age of twelve.

Contrary to expectations, this strategy produced neither high nor consistent results. According to the committee’s Four Months’ Report for December 1939 – March 1940, “The general attendance was much less than expected; the most that came at one time seldom exceeded 150. Many were street children, too poor to go to school, but in some centers, more than half were school children. The attendance is very mobile, there is a constant change, for instance in one center, of the 371 children registered, only 13 reappeared the following month.”³⁷⁰ The variable attendance resulted in part, because of the philanthropic policy adopted by the committee. In choosing to first provide the milk free, the committee had hoped to acquaint the children with the nutritional significance of

³⁶⁸ “[Kunming] Children’s Nutrition Committee: A Four Months Report, December 1939 – March 1940,” China Child Welfare, Box 4 F 2, New York Public Library.

³⁶⁹ Although one is tempted to assume that with five of the seven centers at churches, the Kunming Children’s Nutrition Committee could have taken advantage of the community and any related programs afforded by the selected churches. But there is no indication of this, and indeed the contrary seems rather more likely, since the Lee and her staff spent much of their time reaching out and trying to attract children to the centers.

³⁷⁰ “[Kunming] Children’s Nutrition Committees: A Four Months’ Report December 1939 – March 1940,” China Child Welfare, Box 4 F. 2, New York Public Library.

soybean milk and cultivate a taste for it. As Lee explained, “The original plan was to give free milk to all as an advertisement, then ask for payment from those who can pay after two months of free milk.”³⁷¹ The problem with this approach became apparent when the free trial period had expired. “It was found,” Lee continued, “quite to the contrary as expected, those who took free milk for a period of time instead of being willing were reluctant to pay while new comers are more willing to pay.”³⁷²

But willingness to pay existed as only one of the other possible explanations for low attendance. Lee proposed, “With the little charity work done in this province, people are suspicious of the motives of giving something for nothing.” Later, she surmised, “It takes intelligence to learn and accept new things. The children who come for bean milk are largely from the poor and ignorant class who are generally indifferent to new things. Many well intended plans to help the poor are often not profited by those who need it most, like for instance the Birth Control Movement.”³⁷³ Lee and the Kunming committee had hoped that bodily practice in the form of drinking soybean milk would provide a sufficient basis for empirical knowledge of the milk’s nutritional benefits. So long as they found ways to attract the children to the centers, the milk itself would be its own best advertisement. Nutritional value and commercial value was assumed to be comparable and easily comprehensible, such that one naturally—the logic would seem to suggest—pays for that which one deems to be worth paying.

But as attendance diminished and reluctance manifested itself, what became apparent was the inequivalence and incomprehension surrounding the various activities. For the committee, the soybean milk they produced was produced precisely because it satisfied the biomedical criteria of being nutritious: it was high in protein, B-vitamins, and iron; and it was fortified with calcium

³⁷¹ Ibid. The Kunming committee created a graduated pay scheme, which they failed to implement, largely on account of the difficulties opening each distribution center. The pay scheme was attentive to the difficult economic straits facing the larger community within which they attempted to actualize their nutritional programs. Milk would continue to be free for the “destitute,” half free for the poor, cost price for “those who are better off,” and slightly above cost (“a little profit”) from those with higher incomes.

³⁷² Ibid.

³⁷³ “[Kunming] Children’s Nutrition Committee: February 1940 Report,” China Child Welfare, Box 4. F. 2, New York Public Library.

lactate.³⁷⁴ Committee members paid careful attention to the locational context, which they maintained conveyed the scientific and nutritional authority of their work and of the milk. The committee chose distribution centers at hospitals, clinics, and churches in order to “give people the confidence that bean milk is good for children.”³⁷⁵ Home visits too were meant to convey a personal assurance of the good the child would receive were he or she to visit the center for milk, while also helping to create a social network in which actions were accounted for and recorded. The Committee sought assistance from locals with the expectation that local residents speaking local dialects would better translate the nutritional value of adding soybean milk to a child’s daily diet. Lee explained, “It is better for the work to get people who speak the local dialect.”³⁷⁶ Echoing earlier efforts by the Refugee Children’s Committee, the Kunming committee also attempted to institute its own clinical studies on the nutritional benefits of soybean milk for malnourished infants in the hopes that positive, empirical results would help persuade the hesitant and the skeptical to send their children for milk. Each of these measures served to reassure organizers that their work as nutritional activists upheld the highest standards of demonstrable science and modernity. The committee’s attempts to build a social network of relations that thereby normalized their intervention into the daily dietaries of local residents rested upon claims of superior knowledge and transparency.

But in so far as the soymilk was a tool for instilling “bean milk consciousness among the people,” these details were neither obvious nor particularly comprehensible to the child recipient. Children did not recognize and understand the nutritional value of soybean milk, and neither did their parents. Nutritional value as embodied by the soybean milk drink did not lend itself to easy translation and comprehension, because in actual practice, it failed to communicate with the

³⁷⁴ The specific formula, which called for the proportion of soybean to milk to be one lb. to nine lbs., yielding a solid content of 5.5%³⁷⁴ and the calcium lactate added at 1/3 g. per pound of milk, was also testament of its scientific quality.

³⁷⁵ “Minutes of the First Meeting of the Kunming Children’s Nutrition Committee,” 28 November 1939, China Child Welfare, Box 4 F. 2, New York Public Library.

³⁷⁶ “[Kunming] Children’s Nutrition Committee: February 1940 Report,” China Child Welfare, Box 4. F. 2, New York Public Library.

exigencies of day-to-day living. In her explanation for why the Kunming Children's Nutrition Committee's first four months produced less than desirable results, Lee surmised, "The reasons for this is probably the lack of educational propaganda, children being at large are difficult to control, and the people from the ignorant class are less receptive." The assessment could hardly have been more negative, but it did permit Lee and the committee to reevaluate their entire nutritional program: its direction, its objectives, its methodologies, etc. They did not abandon the soybean milk distribution centers, but they came to realize "that in order to get people to learn to use bean milk, we must have an educational program or cooperate with agencies where there shall be some educational value."³⁷⁷ Lee continued, "We therefore closed some of the stations which we found were not successful and turned to cooperate with the Shanghai Medical College, Public Health Department, which was doing school health work among the municipal primary schools."³⁷⁸ Rather than trying to attract the children to the centers, the committee reoriented themselves and went to the children. They initiated a school service by providing soybean milk and soybean residue cakes to the school each morning "for many children go to school without breakfast." A nominal monthly fee, sufficient to cover the committee's production expenses, was applied for each child. Because the committee sought to demonstrate the efficacy of its nutritional work, they halved the fee for "undernourished children."³⁷⁹ They conducted a two month trial at five of the larger schools with student populations around a thousand, and finding it faring well, they began planning an expansion of the school service to cover the 26 municipal primary schools in Kunming.

Curiously, the main criticism Lee levied about the "ignorant class" and its refusal or reluctance to learn became the primary engine for nutritional activism and the larger campaign for improving nutritional health. Although the Committee's methods were initially roundabout and highly charged with the symbolics of moral exhortation, its primary assumption remained the same:

³⁷⁷ "Field Worker's Report of Trip to Kunming and Kweiyang July 10 – Oct. 9, 1942, China Nutritional Aid Council," China Child Welfare, Box 4 F. 2, New York Public Library.

³⁷⁸ Ibid.

³⁷⁹ Ibid.

as health specialists, they possessed the right to intervene on behalf of another's state of health, and the masses had the ability to learn to accept such interventions.

Conclusion

War disrupted the nutritional work of the Kunming Children's Nutrition Committee, but only temporarily. With the situation in the city becoming less and less tenable, the committee decided to invest their time and resources in developing rural clinics outside of Kunming and to relieve Nellie Lee from day-to-day responsibilities so that she could expand nutrition work in other areas. Their trials and tribulations had not been for naught. But setting up free soybean milk clinics was insufficient to the task of inculcating a different kind of nutritional health consciousness among the general public, and methods well-tested and successful in Shanghai largely failed when transplanted in the interior. From 1940 onwards, the Nutritional Council reconfigured its nutritional activities in southwest China to meet local circumstances and incorporate various forms of education into its campaign. In Ganxian, Guangxi, the branch committee established a "nutritional restaurant" that sold soybean milk, soybean residue cakes, bread, and a "simple meal of balanced diet at \$3 per person."³⁸⁰ In Chengdu and Chongqing, the branch committees experimented with specialized foodshops, tearooms and diet kitchens that provided public demonstrations of "proper cooking." Soybeans, as may be expected, served as the basis for the cooking instruction at the diet kitchens and the primary ingredient theme at the foodshops and tearooms.

Branch committees conducted educational campaigns, published pamphlets on dietary habits, the fundamentals of good nutrition, and the benefits of soybean based diets. They placed articles in local papers, arranged for broadcast times on radio stations, and scheduled lectures by physician and nurse members of the committee. In addition, they entertained plans for retraining local bean makers to the ways of nutritional soybean milk, and they worked with schools in order to integrate soybean

³⁸⁰ China Child Welfare, Box 4 F. 2, New York Public Library.

milk into the daily schedule of school children. They made accommodations for those too poor to pay for milk, and they added other nutritional supplements as circumstances permitted.³⁸¹

In pursuing the goal of improving the nutritional health of the Chinese people, particularly children, the Refugee Children's Committee and its successor organization, the Nutritional Council, never abandoned the particular characteristic of blending social and scientific praxis. Community work was always paired with experimental work, however rudimentary or schematic: physical examinations, height and weight surveys, and limited feeding trials to assess the nutritional benefits of giving soybean milk to malnourished infants. Nutritional activism as practiced by the Refugee Children's Committee and the Nutritional Council operated as a vehicle for the translation of biomedical nutritional knowledge with all its technical abstractions into social action. The translation was hardly perfect, and in practical terms, local contingencies often trumped the idealism and optimism of improving the nutritional health of the Chinese people through the consumption of soybean products. And yet, by situating nutrition at the core of their efforts, the Refugee Children's Committee and the Nutritional Council helped to redefine individual health through the lens of social action. They sought out local communities and attempted to build programs that utilized the physical body and its nutritional needs so as to bring everyone together under the umbrella of good health and nutrition. Their effort did not always produce immediate success, but it did achieve an incremental effect, one sip at a time.

³⁸¹ Both the Kunming and Guangxi branch committees dabbled with the complementary distribution of cod liver oil and vegetable soup, but the former had to be imported, and the latter depended upon available monies and local prices.

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