

Chapter 12

Airs, Waters, Places: Perennial Puzzles of Health and Environment

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In late eighteenth- and nineteenth-century Europe, few issues stirred more public and scientific debate than those of health and environment. At the forefront of concern about science, race and medicine were questions of whether Europeans could adapt to life in tropical environments. The foregoing essays reveal a fascinating array of stories, of historically situated knowledges, each seeking audience among discordant human interests and simultaneously seeking credibility as scholarly fields of expertise. From the cauldron emerged a hybrid field of enquiry called “medical geography”. And under this rubric, down the decades, several distinct and sometimes jarring voices sought academic and/or professional niches. This Epilogue shares some reflections on the variety of voices heard at the symposium and the contexts in which they made their cognitive claims.

The case studies span an extensive geographical range—from colonial Indonesia to the highlands of India, from the North American Mid-West to Caribbean islands and the Northern Territories of Australia. Yet several common themes emerge. There is a preoccupation with “the Tropics” and, in some cases, a virtual identification of medical geography with tropical medicine. There is also a commonly accepted definition of a scholarly genre called “Humboldtian science”—a field of enquiry which emphasized empirical observations, field- rather than laboratory-based experiment, large-scale generalization facilitated by innovative cartographic methods.¹ Central to all the essays is a fascination about the social construction of expertise—medical as well as geographical. Tensions are identified between “folk” and “scientific”

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¹ S F Cannon, ‘Humboldtian science’, chapter 3 in idem, *Science in Culture: The early Victorian Period*, New York, Dawson and Science History Publications, 1978, pp. 78–110. The term “Humboldtian science” is puzzling for historians of geography, especially when Carl Ritter is also labelled as a “Humboldtian geographer” (Brömer, Chapter 10 in this volume). Both Humboldt and Ritter display the cosmopolitan spirit which no doubt characterized the period, but geographers have generally seen a vital contrast between their respective world views and modes of discourse. Humboldt has been regarded as an advocate of scientific methods, field exploration, and the eventual combination of aesthetic, intuitive and artistic insight in grasping a sense of unity in diversity. Ritter has been renowned for his teleological approach to *Erkunde*: an armchair geographer, viewing the surface of the earth as a nursery for humanity to achieve its destiny—a (Protestant) Christian utopia eventually to be preached via geography—universally. It should be added that Jane Camerini (Chapter 11 in this volume) puts forward an argument against making Humboldtian science a central tenet in the understanding of the geography of Heinrich Berghaus.

knowledges and, among experts, the tensions between advocates of environmental sensitivity and “optimists” for technological mastery over environmental constraints. There is evidence of networking across vast distances among individuals of different cultural backgrounds, such as that afforded by the East India Company in the late eighteenth and early nineteenth centuries. Fresh light, too, is shed on colonial experiences and the ambivalent attitudes expressed toward peoples of hitherto unfamiliar culture, race and environment—the colonial Other often forcing a changed sense of identity and altered codes of social behaviour in the home country.²

Contextual approaches to disciplinary history have indeed opened up valuable new vistas for both geography and medicine. Ways of thinking about health and environment reflect and have reflected not only concurrent scientific paradigms but also political priorities and advances in technology. The acceptance or rejection of any particular approach depended quite as much on its socio-political appeal as on its epistemological claims. Now that such generalizations have become widely accepted by historians of science, might it not be worthwhile to return to the “approaches” themselves and examine critical differences among their cognitive claims? For quite distinct paradigms and associated theories have occupied mindscapes in both geography and medicine, their appeal not always explainable in terms of concurrent power interests. The contextualist approach adopted in most of the essays in this volume is one such: it implies that ill-health is explainable in terms of particular circumstances or events, and ultimately all diagnosis and therapy needs to be contextually appropriate. I suggest that there are at least three other distinct perspectives on medical geography discernible in the accounts: (1) holistic interpretations of health and environment (organicist), (2) spatial patterns of diseases and their potential spatial correlates (formist), and (3) mechanics of infection, diffusion and impact (mechanist).³ There are strengths and limitations in each of these approaches to diagnosis and therapy; each appealed to different audiences and fulfilled different functions through time. The value of this four-fold schema lies in the insight it yields on parallels between the histories of geography and medicine through the past few centuries.

Health and Environment: Organicist Approaches

Followers of Hippocratic medicine believed that the secrets of health lay in a balancing of the humours (fire—air—earth—water), and that health of the human body was contingent upon symbiotic relationships with the immediate environment. Hence the significance of geography—airs, waters, and places.⁴ In a world conceived as an organic whole—earth and world, geo-biosphere including humans and their

² See Harrison, Chapter 3 in this volume.

³ The idea of “root metaphors”, articulated by Stephen Pepper (1942) has yielded fruitful reflection in many branches of science, medicine, aesthetics and psychology. I have found the approach to be useful in examining fundamental differences among approaches to the history of geographical thought; A Buttimer, *Geography and the human spirit*, Baltimore, Johns Hopkins University Press, 1993.

⁴ Clarence J Glacken, *Traces on the Rhodan shore: Nature and Culture in Western Thought from ancient Times to the End of the Eighteenth Century*, Berkeley, University of California Press, 1967; R U Light, ‘The progress of medical geography’, *Geographical Review*, 1944, 34: 36–41.

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activities—definitions of health would take account not only of the body's adaptation to bio-physical milieux, but also of a person's involvement in social community and eventually identification with place.⁵ For eighteenth-century *encyclopédistes* matters of health were inextricably woven with matters of environment—not just the characteristic climate and vegetation of particular zones, but also the periodic events like volcanoes and El Niño.⁶ Organicist vision also enabled direct association of local and global, scientific and popular knowledge. Conevery Bolton Valenčius' paper (see Chapter 7 in this volume) insists on the importance of cultural traditions and folk beliefs, such as the analogues between bodily processes and the cultivation of land in the early-nineteenth-century American Mid-West. That such beliefs should characterize settlers on the North American "pioneer fringe" is not surprising, given the centrality of land and the prospects of agrarian ways of life which were envisaged. One wonders indeed whether immigrants to Australia's Northern Territories held similar beliefs, given that their livelihoods were related to mining and sugar cane plantations? Warwick Anderson's essay deals rather with the views of experts—geographers and medical professionals—as well as those of officials and boosters, battling over a white Australia policy during a period when environmental sensitivity was already regarded as "reactionary" in both geography and medicine.

The rejection of organicism—in geography at least—was not the result of any serious examination of the epistemological claims of any of its various theories or analytical models. Rather it was due to social antipathy against theories of environmental determinism, particularly when these were being used to support claims of racial superiority by territorially-expansive empires. The association of organicism with both of these politically inspired movements rendered everything about it unpalatable for at least three generations. Instead of environment, space became geography's chief focus; ecological concerns would be replaced by chorological. It took at least three generations before issues of health and environment, sense of place, landscape and identity, resources and sustainability of ways of life—central concerns of organicist geography—could again gain appeal.⁷

Atlases of Health and Disease: A Mosaic of Patterns

The mapping of disease and the spatial distributions of other phenomena deemed relevant to its explanation and eventual treatment was one obvious methodological common denominator between geography and medicine. Maps served the analytical aims of organicist geography too—as is witnessed indeed in the work of Humboldt

⁵ G Pyle, *Applied Medical Geography*, New York, Wiley, 1979; N Hudson-Rodd, 'Place and Health in Canada: Historical Roots of two healing Traditions', Ottawa, University of Ottawa, Department of Geography, PhD dissertation 1991.

⁶ Identifying meteorology as the "new science", Richard Grove notes, the Société Royale de Médecine set up a national network of observers in 1778.

⁷ M Sorre, *Fondements biologiques de la géographie humaine*, Paris, A Colin, [1943] 1971; J M May, *Studies in Disease Ecology*, New York, Hafner, 1958; idem, *Siam Doctor*, New York, Doubleday, 1949; and American Geographical Society, *Atlas of Diseases*, New York, American Geographical Society, 1950–51, Plate 1, 'Poliomyelitis 1900–1950' (1950), Plate 2 'Cholera 1816–1950' (1951), Plate 3, 'Malaria Vectors' (1951), Plate 4 'Helminthiasis' (1952); Hudson-Rodd, op. cit., note 5 above.

and the Berghaus *Physikalischer Atlas* (1836–1845). While local and regional scale mapping of healthy and unhealthy places were not uncommon previously, e.g., in medieval *Cosmographica*, what was new in early-nineteenth-century approaches was the invitation to think globally—and ecologically—by setting the overall distribution of disease in the context of bio-physical conditions. Among the novelties with Schnurrer's *Charte über die geographische Ausbreitung der Krankheiten* (1827) and with those included in Berghaus's *Physikalischer Atlas* were the global scale of the enterprise and the “Humboldtian” use of isothermal lines to indicate spatial variations in climatic conditions.

The terms “medical cartography”, “medical topography” and “medical geography” are often used interchangeably by contributors to this volume. Distinctions between mappings of formist and organicist ambition, however, are vital: for the former, one seeks only to examine comparative distributions of phenomena in (undifferentiated) space, for the latter, one also maps relevant features of the bio-physical environment. Jane Camerini's scrutiny of maps in the *Physikalischer Atlas* provides an invaluable insight into this issue, noting also the other epistemic shifts in science and cartography which occurred during the late nineteenth century.

To regard the world as a *mosaic* of patterns—of climates, cultures and colonies—evoked various kinds of metaphorical imagination. How much did the outbreaks of cholera and yellow fever during the 1830s provide the stimulus for cartographic (and epidemiological) innovation? The pioneering surveys of cholera victims in sections of London during the 1840s and 1850s have received just acclaim.⁸ Highlighted in this volume is the Linnaean one, i.e., to regard diseases in terms analogous to plants, and even a “geographical taxonomy” of diseases, e.g., ubiquitous, temperature-dependent, regionally endemic, or found only in specific areas. Adolf Mühry's *Noso-Geographie* (1856) actually defined 40°F as a northern isotherm for malaria, and 74°F as a southern isotherm for typhoid. This Linnaean interpretation still did not explain why certain diseases occurred in particular places and not in others, and why epidemics occurred at particular periods and not in others.

Formist approaches *in se* could not supply explanations. Humboldt himself was quite critical of Linnaean (taxonomic) approaches—generically-based specimens shorn from their natural *milieux*. His own diagrams of altitude-related constellations of living forms afforded the sharpest possible argument against *ceteris paribus* thinking.⁹ Still it is to the “mapping” approach that one can genuinely ascribe politically-concerted campaigns against epidemics at various scales. The global surveys of disease patterns,¹⁰ urban surveys of disease and poverty,¹¹ and twentieth-century *chefs-d'oeuvre* of micro-scale mapping¹² have all helped to reveal the multiple

⁸ H F Judson, *The Search for Solutions*, New York, Holt Rinehart and Winston, 1980, pp. 42–4.

⁹ A von Humboldt, *Essai sur la géographie des plantes. Tableau physique des Andes et des pays voisins. 5e partie*, Paris, 1805, facsimile, Amsterdam, Theatrum Orbis Terrarum, 1971–73. See also Chapter 9 in this volume by Nicolaas A Rupke and Karen E Wonders.

¹⁰ A Hirsch, *Handbook of Geographical and Historical Pathology*, 3 vols, London, New Sydenham Society, 1883–86.

¹¹ B Seebohm Rowntree, *Poverty: A Study of Town Life*, London, Macmillan, 1901.

¹² G Melvyn Howe, *National Atlas of Disease Mortality in the United Kingdom (1954–58)*, London, Nelson, 1963; idem, *Man, Environment and Disease in Britain*, New York, Barnes & Noble, 1972.

geographic factors involved in disease, its potential prevention as well as its treatment.¹³

As long as diseases were regarded as endemic—somehow related to particular environments, their occupants and ways of life—there was ample scope for both organicist and formist approaches to medical geography. Outbreaks of cholera, for example, could be linked to crowded situations like festivals, and “intermittent fever” was apparently associated with “warm, damp soil”. An appropriate prophylaxis might be the typically geographic strategy of “zoning”—spatial segregation or quarantine. But this was not so eagerly welcomed in colonial situations where trade and commercial interaction were vital. Mosquitoes came to the rescue of colonial conquest, laboratory science, chemistry and pharmacology, and eventually more mechanistic approaches to medical geography.

Mechanics of Infection and Treatment

The 1880s mark a decisive break with the emergence of “germ” theories of disease. Experts in both geography and medicine celebrated the potential “liberation” from environmental constraints through the newly discovered technology of chemical processes. After the discovery, during the 1890s, that “intermittent fever” (malaria) could be transmitted by mosquitoes, the agents of disease became separable—conceptually and spatially—from their human victims. Their spatial extent, and campaigns against their diffusion, could be conceptualized in terms of causes and effects: the mosaic of epidemiological patterns could be metamorphosed—explainable and manipulable—in mechanistic terms.

For both geography and medicine this “revolutionary” discovery was to herald an abandonment of the field-oriented and ecumenical horizons of Humboldtian science to the more narrowly defined preoccupations of laboratory experimentation. The post-1890s also witnessed changes in the social production of expertise, and a profoundly altered set of relationships between doctor, disease and patient. This process, described by Latour as “Pasteurisation”, is one of the hallmarks of the “modernist” epoch in many aspects of life. For geography there emerged a clear separation of two distinct disciplinary agenda: that of elucidating connections between humanity and environment, and that of “explaining” the forms and functioning of “systems of spatial organization”. A view of the world as a mechanical system came to characterize late-nineteenth-century approaches to demographic, climatic, and geomorphological branches of the discipline. But it was not until the mid-twentieth century that the full impact was felt among the “human” branches of disciplinary expertise. Indeed, among the cutting edge fields of “regional science” after mid-century, medical geography emerged as an arena of enquiry into efficiency in the delivery of medical services. Models of supply efficiency were already available—their locational logics mirroring those of retail outlets or industrial complexes.¹⁴

¹³ Y Verhasselt, *Maps on Cancer Distribution*, Brussels, Vrije Universiteit Brussel, Geografisch Instituut, 1975; H Picheral, *Espace et santé. Géographie médicale du Midi de la France*, Montpellier, Imprimerie du “Paysan du Midi”, 1976.

¹⁴ Pyle, *op. cit.*, note 5 above.

Post-modernist reactions to the (relatively short-lived) hegemony of mechanistic thinking have taken various forms.¹⁵ In medical geography there is a growing awareness of environmental factors and also of cultural differences in attitudes toward health and disease. The current antipathy toward generalization and meta-theory, and the deep-lying suspicion of “global” rhetorics seem a far cry from the cosmopolitan ambitions of Humboldtian science.

Stories from the history of medical geography open doors on a wide variety of intellectual ventures. The papers reveal the close interplay between internal and external factors in the changing scientific understanding of health and environment. They also reveal the vast common ground which can be shared by intellectual historians, geographers, and medical experts. There are, no doubt, conclusions to be drawn from the relative strengths and limitations of various approaches to diagnosis and therapy. In the long sweep of history, perhaps the Hippocratic ideas of health as contingent upon harmonious relationships between humans and the airs, waters, and places which they inhabit were the most fragile, naive, and vulnerable of all, given the other (Promethean) ideals cultivated in that same Hellenic tradition. For the relatively short epoch of expansionism by Western powers Crosby’s epitaph does indeed seem fitting: “The humid tropics proved to be a mouthful for which Europe had the teeth, but not the stomach”.¹⁶ For Europe of the twenty-first century, teeth and stomach remain issues of health and environment for which medical geography may continue to afford insight.

¹⁵ D Harvey, *The Condition of Postmodernity*, Baltimore, Johns Hopkins University Press, 1989; P Cloke et al. (eds), *Approaching Human Geography*, London, Chapman, 1991; Buttimer, op. cit., note 3 above.

¹⁶ A W Crosby, *Ecological Imperialism: The Biological Expansion of Europe, 900–1900*, Cambridge, Cambridge University Press, 1993, p. 135.