CHINESE ENVIRONMENTAL HISTORY NEWSLETTER

Issue 2:2, November 1995

From the Editor

This issue of the newsletter contains three thought-provoking articles. Kenneth Pomeranz has contributed what many readers may find a provocative piece arguing—with statistical data—that we must be more careful about the historical conditions to which we apply the term "environmental crisis." Specifically, he casts doubt on the idea that much of eighteenth-century China was already suffering such crisis. He also suggests that comparison of eighteenth-century China's situation with that of eighteenth-century Europe makes China look less peculiarly environmentally depleted than many writers have assumed.

Christian Daniels, by contrast, introduces tough issues of conscience for contemporary conservationists—but in a way that shows how understanding of the history of non-Han swidden farmers contributes to consideration of their rights today. Drawing partly on personal observation, he argues that the establishment of nature reserves has denied non-Han people access to resources necessary for maintaining their traditional way of life, and sapped the commitment to environmental preservation that they themselves showed in times past. He suggests that the best hope for the future lies in compromise: relaxing some of the restrictions in their favour will not only serve the cause of justice but help win back their hearts for conservation.

There is a Chinese precedent for combining environmentalist commitment with sensitivity to the needs of minority peoples. The Confucian scholar Niu Yunzhen, while a Gansu county magistrate in the mid-eighteenth century, envisaged that although one forest area in his jurisdiction should be closed completely, and commercial logging in another carefully controlled, the local non-Han people's need for access to a third important conservation zone should be met through short-term open periods. He consulted the Aboriginal Office head (presumably a non-Han traditional leader) in drawing up his conservation plans; heeded the latter's comments on the non-Han people's needs; and imposed no restrictions on woodcutting and charcoal-burning in designated forests of importance for the non-Han people's livelihood, but in no special need of state environmentalist protection.*

The third article in this issue of the newsletter is a short but intriguing piece by Philippe Forêt on the "humanizing" of the Antarctic landscape by the First Chinese Expedition to Antarctica. Readers are invited to consider what may be learned by contemplating the superimposition of geomantically-loaded names like "Wanglong yan" on a landscape already "humanized" British-style with the names "King George Island", "Nelson Island", and "Drake Passage."

Chinese Environmental History Newsletter 2:2, November 1995

Contents

There is one sad thing about the specially-written contributions to this issue, viz. that, despite their excellence, there are only three of them. The newsletter is encountering a common problem of new publications: the number of people willing to write for it in no way matches the number who have enthusiastically hailed its appearance. In fact, if all those who have expressed tentative interest in writing for the May edition are indeed able to find time to do

so, the next issue should be a bumper one. However, please do not let them have all the glory; your newsletter needs YOU!

Finally, the editor hopes it is not too obnoxious to ask hard-copy subscribers to express their faith in the future of the newsletter by renewing their subscriptions. Subscriptions notionally fall due on January 1st, although the editor will refrain from sending runners out to beat late payers. Nor will she send reminders. The newsletter will be sent to all who have renewed by April 30th. Subscription information is at the end of the newsletter.

The Chinese-language version of the present issue is being prepared by Liu Wenyun of MIT. Thanks are due both to her and to Peter Perdue (MIT) and Wu Kegang (University of Liverpool) for invaluable assistance.

Note

[*] He Changling and Wei Yuan, comps., *Huangchao jingshi wenbian* (1827; reprint of 1873 edn., Taibei: Shijie shuju, 1964), 38:10a–b.

Noticeboard

Conferences and Workshops

International Conference on Historical Geography, Peking University, July 15th–20th, 1996

This conference is sponsored by The Committee on Historical Geography of the Chinese Geographical Association. Papers may be proposed in all areas of historical geography; especially welcome, however, are proposals relating to historical geographical theories and methods, the historical geography of China, and the sustainable development of Beijing. 600-word abstracts are due by December 31st, 1995. The conference fee is US$200.00, plus $100 for excursions in and around Beijing. Those wishing to attend should write as soon as possible to:

Professor Han Guanghui
Centre of Historical Geography
Department of Geography
Peking University
Beijing 100871
(Fax: 861-2501187)

IGBP-PAGES/PEP-II Nagoya Symposium on Palaeo-climate and Environmental Variability in Austral-Asian Transect during the Past 2,000 Years. Nagoya University, Nov. 28th-Dec. 1st, 1995

This conference, open to the international scientific community, will address "climatic reconstruction from tree rings, ice cores, historical documents, terrestrial deposits, lake sediments, corals" and other proxies. The proceedings will be published during 1996. For further information, contact:

Dr. T. Sweda
General Secretary, IGBP Nagoya Symposium
Nagoya University
Chikusa
Nagoya
Japan 464-01
(Fax: 81-52-789-4012)

Papers likely to be of particular interest to readers of this newsletter include—but are by no means limited to—the following. Please note that some titles may be tentative. The following list draws both on the provisional programme and on the authors' abstracts; in the case of discrepancies, the abstracts have been followed. Any resulting inaccuracy is regretted.

A. Abe (University of Tokyo), "Sensitivity of Austral-Asian Climates to Carbon Dioxide and Solar Forcing: a Preliminary Work by CCSR/NIES GCM"

An Zhisheng (Xi'an Laboratory of Loess and Quaternary Geology) and L. G. Thompson, "Palaeoclimatic Change of Monsoonal China Linked to Global Change"

D. Eckstein (University of Hamburg), "Reconstruction of Rainfall in Thailand over the Last Three Centuries"

Ge Quansheng (Institute of Geography, Chinese Academy of Sciences) et al., "Reconstruction and Relative Variability Analysis of Annual and Seasonal Precipitation Series in Fourteen Stations of China since 1736 A.D."

Guo Zhengtang (Institute of Geology, Chinese Academy of Sciences) et al., "High Frequency Pulses of East Asian Monsoon Climate during the Last and Penultimate Glaciations: Link with the North Atlantic"

Li Chunsheng (Henan College of Education), "Holocene Beachrock in Lianyungang, Jiangsu, and its Palaeo-geographic Significance"

Li Lung-an (Institute of Statistical Science, Academia Sinica) et al., "A Statistical Analysis of Taiwan Precipitation: Influence of ENSO and Volcanic Events"

Liew Ping-mei (National Taiwan University) et al., "Climatic Fluctuations during the Last Several Millennia Indicated by Lake Sediments of Taiwan"

T. Liu (Institute of Geology, Chinese Academy of Sciences and PAGES/PEP-II), "Loess and Global Changes: Significance of PEP-II Transect" (keynote address)

R. K. Mazari (Wadia Institute of Himalayan Geology), "Palaeoclimatic Scenario of Last 2,000 Years in Trans-Himalayan Upper Spiti"

T. Mikami (Tokyo Metropolitan University), "Climate of the Little Ice Age in Japan Reconstructed from Historical Documents"

Morishima Wataru (Tokyo Metropolitan University), "Interannual Variations of Summer Rainfall over the Asian Region"

Ren Guoyu (National Climate Centre, Beijing), "Pollen Evidence for the Increased Summer Rainfall in the Mediaeval Warm Period at Maili, Northeast China"

Y. Tagami (Toyama University), "Reconstruction of Climate in the Mediaeval Warm Period [in Japan]"

M. Tang (Lanzhou Institute of Plateau Atmospheric Physics), "On the Tibet Plateau as a 'Pilot Region' of the Climate Variation in East Asia"

Wang Shaowu et al. (Department of Geophysics, Peking University), "Global Temperature Changes during the Last Millennium"

Wang Sumin et al. (Nanjing Institute of Geography and Limnology), "Lake Record of Environment Evolution of Eastern Qinghai-Xizang Plateau in the Past 2,000 Years: A Case Study of Ximen Co"

Wen Qizhong (Guangzhou Institute of Geochemistry), "Climate Changes during the Last 2,000 Years in Xinjiang Region of China"

Wu Xiangding and Shao Xuemei (Institute of Geography, Chinese Academy of Sciences), "Reconstruction of Climate in the Changbei Mts., Northeast China, since A.D. 1600"

T. Yao (Lanzhou Institute of Glaciology and Geocryology), "Asian Dust Transportation and Global Coupling System Revealed from Ice Core Record"

K. Yasue et al. (Hokkaidō University), "Reconstruction of Summer Temperature and Precipitation in Northern Hokkaidō back to A.D. 1700 Using Tree-Ring Maximum Density of *Picea Glehnii*"

T. Yasunari (Tsukuba University), "Changing Climate over East Asia during the Past 100 Years"

Zhang De'er (National Climate Centre, Beijing), "Palaeo-climate and Environmental Records Available from Chinese Historical Documents"

Zhang Peiyuan (Institute of Geography, Chinese Academy of Sciences) et al., "Analysis of Climate Data in Chinese Historical Documents"

Zhang Wanchang (Nagoya University) et al., "Ice Core Analysis for Reconstruction of the Past Environment on Highland Tibetan Plateau"

Zhang Xinshi and Zhou Guangsheng (Institute of Botany, Chinese Academy of Sciences), "China's Transects for PEP-II Studies"

Q. Zhao, (Institute of Soil Science), "A Preliminary Study on Red Earth and Changes of Quaternary Environment in South China"

Open Science Meeting on Land-Use and Land-Cover Change, Amsterdam, January 1966

The purpose of this meeting is to discuss a scientific plan focussing on global changes in land cover and land use. It appears that funds may be available to facilitate the participation of regional specialists (e.g. specialists on China). As more detailed information arrived when this newsletter was already in "page proof" form, please turn to the last page, under the heading "Stop press."

"Landscape, Culture, and Power in Chinese Society": University of California at Berkeley, March 8th-9th, 1996

This "two-day seminar" is sponsored by U.C. Berkeley's Center for Chinese Studies. For further information, contact:

Professor Yeh Wen-hsin
Center for Chinese Studies
2223 Fulton Street, Rm. 503
University of California at Berkeley
Berkeley CA 94720-2328
(Tel.: 510-643-6321)

Annual Meeting of the Association for Asian Studies (U.S.A.), Honolulu, April 11th–14th, 1996

The following panels and "round tables" seem the most likely to be interesting to subscribers to this newsletter. Any heroic soul who would be willing to compile a report on some or all of these panels etc. for the next issue of CEHN should please contact the editor. Numbers are the conference organizers' serial numbers; names are those of panel organizers unless otherwise indicated.

Friday April 12th, both morning sessions: 43 and 67, "Environmental Discourse in Asia: Appropriations and Transformations." Peter Brosius, University of Georgia.

Friday April 12th, second morning session: 51, "Contrasting Cosmologies: The Search for a Coherent World View?" Gillian Simpson, SOAS, University of London.

Friday April 12th, second morning session: 61, "Poverty, Gender and Environment: Empirical Assessments of Economic Liberalization in India." Ronald Herring, Cornell University.

Friday April 12th, first afternoon session: 84,

"Contemporary Tourist Destinations: Conflicting Imagery of Spaces and Places in Asia and the Pacific." Kathryn Besio, University of Hawaii, Manoa.

Friday April 12th, second afternoon session: 113, "China's Changing Borders and Contested Frontiers." Individual paper session.

Saturday April 13th, morning session: 122, "The Three Gorges Dam: Local and Global Perspectives." Irene Bloom, Barnard College/Columbia University.

Saturday April 13th, morning session: 124, "Tourist Guides and Urban Identity in Modern China." Susan Naquin, Princeton University.

Saturday April 13th, first afternoon session: 146, "Manchu Colonialism? Perspectives on Qing Policies in Mongolia, Tibet, and Xinjiang." Nicola Di Cosmo, Harvard University.

Saturday April 13th, both afternoon sessions: 161 and 182, "Environmental Conflicts and the Negotiation of Identities in South and Southeast Asia." Arun Agrawal, University of Florida, Gainesville, and Akhil Gupta, Stanford University.

Sunday April 14th, second morning session: 215, "Constructing Boundaries: The Historiography of Frontiers from Tang to Song." Susan Whitfield, the British Library.

East Asian Archaeology Network Conference, Honolulu, April 9th-10th, 1996.

This conference will be held in conjunction with the annual meeting of the Association for Asian Studies. For information and registration, contact:

Pak Yangjin
Dept. of Anthropology
Peabody Museum 57A
Harvard University
Cambridge MA 02138
(Fax: 617-496-8041;
E-mail: ypak@husc8 harvard.edu)

"Depicting and Describing Early China": Workshop Series, University of Chicago

For information on this new graduate research workshop, please contact Magnus Fiskesjo. E-mail: fisk@midway.uchicago.edu; address as in directory of subscribers.

Publications

Article on Hangzhou Bay, c. 1000-1800. Mark Elvin and Su Ninghu, "Man Against the Sea: Natural and Anthropogenic Factors in the Changing Morphology of Harngzhou Bay, circa 1000–1800." *Environment and History* 1 (1995): 3–54.

This study presents a preliminary reconstruction and analysis of the dramatic changes in the morphology of Hangzhou Bay over eight centuries. It uses remote-sensing images in conjunction with the analysis of sequences of old maps, drawing on present-day hydrological science where useful. The changes included two shifts in the mouth of the Qiantang River, and complete "redrawing" of both the northern and the southern coastlines in the inner bay. The article discusses the role of human activity in disrupting the previous balance between the tidal deposition of sediments originating further north, and their removal by river flow in conjunction with ebb tides. It argues that this balance was disrupted by the building of sea walls; the diversion of rivers; the storage of water in irrigation systems (which reduced peak discharge of river water into Hangzhou Bay); and hydraulic engineering on the Yellow River during 1578–79 (which increased the amount of fine-grain sediment being transported down the coast from the Yellow River's mouth after that river's southward shift in 1194).

The article also addresses the problem of "technological lock-in", arguing on one hand that the construction of complex hydraulic systems foreclosed options on alternative future uses of resources, and on the other, that shifts in the pattern of sediment deposition and erosion could sometimes bring about release from "lock-in." It draws broader conclusions about the importance of environmental history for the study of long-term economic history, as well as outlining certain analytical problems for future discussion.

Environment and History (ISSN 0967-3407) is published by The White Horse Press at 1 Strond, Isle of Harris, Scotland PA83 3UD, UK (fax 44 859 520 204). The subscription for individuals is $US 50.00 p.a.

Special Issue of *Zhongguo shehui jingji shi yanjiu* on the Highland and Lowland Economies of South-eastern China in the Ming and Qing Dynasties (1368–1911). The 1995, no. 2 issue of *Zhongguo shehui jingji shi yanjiu* (published at Xiamen University and available through Zhongguo Guoji Tushu Maoyi Zong Gongsi) is devoted entirely to the above topic. It contains eight articles, as follows: a general introduction (Yang Guozhen); a comparative study of economic development in the Huizhou highlands and the Lake Tai lowlands (Li Changgong); an analysis of the regional disparity between the economies of the upstream and downstream areas of the Min valley, Fujian (Chen Zhiping); a comparative study of the economic structures of the highland and lowland sections of the Qiantang river basin, Zhejiang (Guo Runtao); two papers analyzing the economic characteristics of the mountainous and coastal sections of the Jin and Jiulong river basins, Fujian (Lin Tingshui and Liu Yonghua respectively); a study of economic development in the delta of the river Han, Guangdong, and its tributary the Ting, Fujian (Liu Zhenggang); and a quantitative comparative analysis of the highland and lowland economies of Northern Taiwan (Zhou Xianghe).

Case-study in Demographic History in China. Li Zhongqing (James Lee) and Guo Songyi, eds., *Qingdai huangzu renkou xingwei he shehui huanjing* [The Demographic Behavior of the Qing Imperial Lineage and its Social Environment]. Beijing: Peking University Press, 1994. ISBN: 7-301-02593-9. Price 29.00 *yuan*. In Chinese, with English abstracts.

This volume presents thirteen papers by Chinese and American scholars. The following summary focuses on those papers most likely to be of interest to readers of CEHN.

An introductory overview of recent research on the traditional Chinese demographic system by James Lee points out the distinctive features of the Chinese system compared with its Western European counterpart, and argues the importance of understanding the different consequences of past demographic behaviour in China and Europe. James Lee and Wang Feng next present their analysis of fertility and birth spacing among 33,000 children of the Qing imperial lineage born in Beijing during 1700–1840. They find evidence of regular and deliberate use of spacing by lineage couples in the late eighteenth century. A corresponding study, by Lee, Wang, and Cameron Campbell, of infant, child, and youth mortality among the same children finds regular use of infanticide in the late eighteenth century, combined with evidence of considerable care to protect those children who were kept. The two studies argue that their findings necessitate revision of previous assumptions about, respectively, preventive and positive checks on population growth in China.

Lai Huimin's analysis of 2,000 male adoptions and over 100 petitions relating to adoption concludes that over 5 per cent of the imperial lineage's sons were adopted, with the proportion reaching 10 per cent in the periods 1790–1809 and 1880–89. Liu Sufen finds, on the basis of a study of over 20,000 marriages, that over the period 1640–1880 average age at marriage rose (from late 'teens to late twenties), while there was a decline in the proportion of lineage men marrying polygamously. Du Jiaji examines the role of the introduction and promotion of improved methods of preventing smallpox in reducing child mortality and thus facilitating lineage expansion.

The other papers in the volume are a study of social and economic stratification within the lineage (Guo Songyi); a study of access to office and titles of nobility for lineage members (Lai Huimin); four papers on the lineage's population records and the computer techniques used for data coding and analysis; and a concluding "state of the field" survey (Ding Yizhuang).

Resource on Contemporary Environmental Issues in China. *China Environment News*, published by the United Nations Environmental Programme and China's National Environmental Protection Agency, costs US$24.00 per year. It is available from:

Circulation Dept.
15A Xiaoxinglongjie
Chongwen District
Beijing
China 100062

Other Items of Interest

Archaeology, Anthropology, History—South Asia Network and Newsletter. A registration form for this newsletter is reproduced on p. 29 of *EAANnouncements* (the newsletter of the East Asian Archaeology Network). The full subscription rate is Rs. 30.00 p.a. (and the student rate Rs. 17.00 p.a.) plus Rs. 10.00 for bank charges if payment is made by cheque. Contact:

Nandini Rao
AH-SAN, c/o Dr. C. R. Reddy
1 D Cambrae East
Victoria Crescent
Commander-in-Chief Road
Madras 600 105
India

R. H. Barnes, Andrew Gray, and Benedict Kingsbury, eds., *Indigenous Peoples of Asia*. Published by the Association for Asian Studies (U.S.A.). US$40.00 or $22.50 (with discounts for AAS members).

Alfred W. Crosby, "The Past and Present of Environmental History." *The American Historical Review* 100, no. 4 (1995): 1177–89.

Elizabeth Van Wie Davis, *China and the Law of the Sea Convention*. Lewiston, NY: The Edwin Mellen Press, 1995. US$69.95.

East and Southeast Asian Anthropology, a new journal to be published by the Fairbank Center for East Asian Research at Harvard University. The editorial board consists of Harvard graduate students in anthropology, and one of the journal's objectives is to promote the dissemination and discussion of graduate students' research-in-progress. Submissions are encouraged. For further information, contact:

Erika Evasdottir
Dept. of Anthropology
Harvard University
11 Divinity Avenue
Cambridge MA 02138
(Tel: 617-493-7100;
E-mail: evasdot1@husc7.harvard.edu)

Education About Asia, a new, twice-yearly journal published by the AAS. Potential contributors should contact:

Lucien Ellington, Editor
Education About Asia

314A Hunter Hall
615 McCallie Avenue
University of Tennessee-Chattanooga
Chattanooga TN 37403
U.S.A.
(E-mail: lellingt@NETFRAME.utc.edu)

John Farrington and David J. Lewis, eds., *Non-Governmental Organizations and the State in Asia: Rethinking Roles in Sustainable Agricultural Development*. London: Routledge, 1994. US$74.50 or $25.00.

Madhav Guha Gadgil, *Ecology and Equity: The Use and Abuse of Nature in Contemporary India*. London: Routledge, 1995.

J. B. Harley and David Woodward, eds., *The History of Cartography*, Vol. 2, Book 2: *Cartography in the Traditional East and Southeast Asian Societies*. Chicago: The University of Chicago Press, 1994. US$195.00.

Richard E. Strassberg, trans., *Inscribed Landscapes: Travel Writing from Imperial China*. Berkeley: University of California Press, 1994. US$20.00 paper.

Wall and Market: Chinese Urban History News, a new, twice-yearly newsletter, edited by Kristin Stapleton, Shi Mingzheng, and Lee McIsaac. This newsletter will be published in both English and Chinese, and will be available both by e-mail and in hard copy. For subscription and submission information, contact:

Kristin Stapleton
Department of History
University of Kentucky
Lexington KY 40506-0027
(E-mail: kestap01@ukcc.uky.edu)

Jobs and Fellowships

Position in Environmental History at Yale. Yale has advertized a four-year renewable appointment in environmental history at assistant professor level (equivalent to lectureship in the British system), combined with directorship of undergraduate studies in the interdisciplinary Environmental Studies Program. Apply by 1st December to Prof. Robin Winks, Dept. of History, Yale University, P.O. Box 208324, New Haven CT 06520-8324, U.S.A. Three testimonials required.

Position in Environmental Studies at Gettysburg College, Pennsylvania. Gettysburg College has advertized a tenurable assistant professorship in environmental studies. Qualifications include a Ph.D. in environmental studies or a related field, with a focus on resource management and environmental policy. Apply by 8th December or as soon as possible thereafter to Dr. John Commito, Environmental Studies Program, Gettysburg College, Gettysburg PA 17325, U.S.A. Include C.V., statement on teaching and research goals, and names and addresses of three referees (at least one of whom can testify to teaching effectiveness).

Oxford Centre for the Environment, Ethics and Society. This "multi-disciplinary research centre" has advertized a one-year Sun Life Visiting Research Fellowship for 1996-97. The position is essentially non-stipendiary, although the advertizement mentions limited housing and research expense allowances plus dining rights at Mansfield College. For further information and application form, contact The Project Administrator, OCEES, Mansfield College, Oxford 0X1 3TF, England (e-mail ocees@mansfield.oxford.ac.uk) by December 15th.

Internet (WWW) Addresses

(Note. Final full stops are not part of the addresses.)

Australian Centre of the Asian Spatial Information and Analysis Network: http://www.asian.gu.edu.au.

International Institute for Asian Studies (IIAS): http://iias.leidenuniv nl.

The Association for Asian Studies (U.S.A.): http://www.easc.indiana.edu/~AAS. This will soon have job listings as well as other useful material.

Documentary Educational Resources (a "distributor of educational visual materials"): http://der.org/docued.

How Exhausted an Earth? Some Thoughts on Qing (1644–1911) Environmental History

Kenneth Pomeranz

University of California at Irvine

One of the central stories of Ming-Qing history is population growth; and population growth goes hand in hand with environmental degradation. If population growth is accompanied by at least some improvement in standard of living, the environmental impact is likely to be still worse. After all, what "development" means, in some sense, is that the ratio of capital to land grows even faster than that of labor to land; but before the major land-saving innovations of the industrial revolution (e.g. the use of coal rather than timber for the bulk of people's energy needs, and the creation of chemical fertilizers and pesticides that greatly raised per-acre crop yields), the capacity of labor and capital

to substitute for scarce land was quite limited. Land (in combination with water and sunshine) was essential for the production of all four of Malthus's "necessities of life": food, fiber (for clothing), fuel, and building materials. To some extent, combinations of labor and capital could make the same piece of land go further as a source of food and fiber through land reclamation, irrigation projects, etc. But even these kinds of land-improving projects had limited possibilities compared to what would be possible after the development of a chemical industry, and there was very little that could be done to increase the yield of fuel or building materials from a given amount of land.

Thus, environmental problems follow from either an Elvin/Huang picture of extensive growth with stagnant living standards or a more cheerful story, and there clearly were such strains as China reached new levels of population density in the eighteenth century.[1] It then seems logical to take some further steps. One is to suppose that the massive (and often sudden) ecological catastrophes of the mid-nineteenth to early twentieth centuries were natural consequences of the smaller, but mounting ecological problems of the late eighteenth century. A second is to link this ecological story firmly to the massive rebellions of the nineteenth century. A third is to assume that the eighteenth-century ecological problems, like the later ecological disasters, were unusually severe by global standards, and then to search for reasons why "China" (treated as a single society and culture) would have had particularly severe problems. Attempts to address this last question have looked both at cultural attitudes (such as an under-valuation of "wild lands"), and at imperfections in property rights *régimes* which made it too cheap to encroach on public resources.[2] While both these approaches have much to offer, it may help if we first clarify what phenomena they are supposed to explain. Were China's late eighteenth-century ecological problems really unusual in comparative perspective? Did they constitute a crisis severe enough that we should draw a straight line linking it with later disasters, which really *were* unusual in scale?

As a first step, the problem needs to be broken down geographically, at least as far as the macroregional level.[3]

Commercially Advanced Macroregions

Clearly the Lower Yangzi, China's most advanced macroregion, required by the eighteenth century far more of all four necessities than its own internal periphery could provide. (In that sense, it had stopped functioning as a classic macroregion, which should be more or less autarkic.) The solution, of course, was imports from various other macroregions (plus Manchuria) of grain, raw cotton, timber, and soybean cake, financed largely by exports of manufactured goods (chiefly textiles).[4] This was the one way that labor and capital could, in effect, substitute for scarce land. And Lingnan, the macroregion with its urban hub at Canton, was following the Lower Yangzi's lead, although its grain and timber deficits were not yet as large.

While these processes could not go on forever, it is not clear in exactly what sense these most advanced regions faced a "crisis" at the end of the eighteenth century. Li Bozhong's important work on timber supply, for instance, makes a compelling case that wood shortages probably hindered further industrial growth, both because fuel became expensive, and because the kind of construction that would have been necessary for a shift to factory production became very expensive.[5] But while clearly important, such *bottleneck*s standing in the way of a process that nobody was counting on to happen (and which might well not have occurred in any case) are very different from a *crisis*, in which people can no longer find affordable supplies of the food or fuel that they do count on. And as long as traders serving the Lower Yangzi and Lingnan were still finding new places where they could exchange cloth for timber or grain, such crises need not have happened. True, the most developed macroregions would eventually have run out of partners for this sort of trade, but that appears not to have been happening yet, even in the early nineteenth century. Areas like the Middle Yangzi were growing in population, generating smaller surpluses of food and timber, and producing more of their own cloth locally, but Manchuria and parts of Southeast Asia, for instance, were increasing their involvement in this trade. And since population growth in at least the core of the Lower Yangzi region appears to have levelled off by the late eighteenth century, it is not clear that the most advanced areas faced a real ecological crisis anytime soon.[6]

Less Developed Macroregions—and One Method of Estimating the Depth of their Problems

But what about areas that were not the Lower Yangzi or Lingnan, and could not pay for ecologically important imports by exporting manufactures? Conceivably such areas might have suffered more than areas that did have this sort of trade, even if they had lower population densities. Here we have at least two kinds of areas to think about: frontier regions, where large amounts of land were being converted from other uses to Han-style agriculture, and macroregions that had long been farmed, but were not as heavily populated or prosperous as the Lower Yangzi or Lingnan. For frontier regions, environmental degradation may well have begun with the eighteenth-century expansion of Han settlement, but we would not expect to see the full impact until much later. I therefore focus these remarks on macroregions where Chinese-style farming was centuries old.

It may be more feasible than we think to measure the environmental problems of such areas. Others are far better qualified than I to discuss possible uses of climatic data, and have done so in previous issues of this newsletter. I would, however, like to call attention to another possibility: reconstructing fuel and manure supply for various regions of China. The reader should bear in mind that crop residues formed an important part of rural Chinese fuel supplies.

Some Westerners have taken this in itself to be a sign of environmental degradation and/or lowered living standards, but this need not be true, as we shall see shortly.

Estimates of manuring levels for the 1930s are available in various South Manchurian Railway Company (Mantetsu) surveys of North China, John Lossing Buck's surveys, and other sources from the 1920s and 1930s. At least for the area I have studied (in Western Shandong, Eastern Henan, and Southern Hebei provinces) these seem roughly consistent with figures available elsewhere on number of people, farm animals, and cultivated acreage. Moreover, most of the data needed for fuel supply estimates are also available for the 1930s. The massive *shiye zhi* (industrial gazetteers) generated in the 1930s give county-level data on area under different crops, amount of forest land, population, and number of farm animals.[7] These data appear to be fairly reliable, at least for the provinces I have examined. A number of other sources—crop output data for 1929-37 in the Republican Period Archives (Nanjing), Mantetsu surveys, and some post-revolutionary surveys—exist with which to cross-check these figures. Most of the other data needed (e.g. amount that pigs ate, amount of combustible residue per acre produced by different crops) are available in surveys, or can be inferred within a reasonable range; and the calculations required to convert these numbers into estimates of available biomass energy are straightforward (see note 9 below).

To move from a 1930s estimate to one for the early or mid-Qing involves a) getting approximate figures for cropped acreage and population at the desired date, and b) relying on several assumptions first laid out by Dwight Perkins twenty-five years ago, which seem to have held up pretty well.[8] Perkins argued that the number of pigs had changed at roughly the same rate as China's human population between 1368 and the 1950s, and that the number of plow animals per acre of cultivated land had also remained roughly constant. He also made a strong case that grain supply per capita did not change much over this long period, which allows us to derive per *acre* yields in year Y by taking those from the 1930s and multiplying them by (Year Y population ÷ 1930s population) times (Year Y cropped acreage ÷ 1930s cropped acreage). Once we have estimated per acre yields in year Y, it seems reasonable to assume that the same trends affected per acre output of crop residues. Other quantities that need to be projected backwards—such as amount of land under buildings and roads—can also be guessed using population, and adjusting so as to bias the results against one's hypothesis (see note 10 below). The results are hardly perfect, but they provide a nice supplement to, and check on, the remarks of literati and officials on which we often have to rely.

A Case Study

To test the hypothesis of a North China ecological crisis *circa* 1800, I settled on one relatively small portion of the macroregion: Southwest Shandong, an area of twenty-seven *xian* (counties) with a 1930s population of roughly 8,100,000 and a probable 1800 population of about 4,900,000. Admittedly, the major reason for choosing this area was that I already had data in an easily usable form, but it also possesses certain advantages as a test case. As one of the most densely populated and least forested areas of the macroregion, it should have had some of the most severe ecological problems; and (like the Huaibei region it bordered) it certainly had a reputation that linked scarcity with endemic banditry and social unrest. In another study, I estimated the area's fuel supply in the 1930s at 0.09 tons of coal equivalent (t.c.e.) per person per year. This is a mere 27 per cent of the 0.33 t.c.e. per person that the Asian Development Bank considers a bare minimum for survival, and is roughly comparable to the fuel supply in the poorer parts of Bangladesh and parts of Sahelian Africa in the 1980s.[9] While the area did receive some imports of wood from other places during the nineteenth century, these seem to have been on a very modest scale, and the area did not import either food or fiber. Thus, if any portion of the North China plain was in serious ecological distress in 1800, it should have been Southwest Shandong.

It is thus interesting that, even if one makes every possible effort to generate a worst case scenario, the region does not seem to have been so badly off ecologically *circa* 1800. A very conservative estimate of fuel supply works out to 0.62 t.c.e. per capita—almost double the Asian Development Bank's minimum, and almost 20 per cent above Braudel's estimate of French fuel consumption on the eve of the 1789 Revolution.[10] My extremely conservative estimate of the share of this region's land that was still forested in 1800 (13.2 per cent) is just a bit below estimates for France in 1789, which average at about one-sixth of the nation's territory.[11] Meanwhile, my estimate of available manure comes to anywhere from 5,600 to 8,900 kg. per cropped acre: about 18 per cent below the levels found in Mantetsu surveys, but 40 to 60 per cent above estimates of the fertilizer applied in some of the most agriculturally advanced regions of late eighteenth-century Europe.[12]

Possible Implications

The exercise above does not change the fact that early nineteenth-century China had various ecological nightmares brewing. Erosion in some highland areas—especially those that were rapidly deforested to plant New World food crops in the eighteenth century—was extremely serious. And at least two kinds of flood problem were becoming worse. Where too many small-scale local water control facilities had been built, usually by private parties undertaking reclamation (as in parts of Hunan and Guangdong), slowed-down rivers were rising ominously. And the largest state-run water control efforts—along the Grand Canal and Yellow River—were becoming bureaucratically and politically unsustainable, in part because Yangzi Valley tax-payers were increasingly resistant to paying for them (and later because of foreign

pressures as well).[13] At least one macroregion—the Northwest—was probably much worse off than North China.

Consequently, it would be foolish to remove ecological crisis from our picture of nineteenth-century China. However, we should keep a few possibilities in mind. First, the link between population-driven ecological stress in the eighteenth century and full-blown ecological crises later on may not be as direct as we think. Certainly politics and changing ideas about the role of the state were important intervening variables between population *per se* and the problems raised in the last paragraph: there were, for instance, political reasons why the Qing drastically reduced their efforts in Yellow River control after 1890, so that the twentieth century flooding in North China was often as much the result of politics as of ecology.[14] And the link to social unrest may be still more indirect: it is not yet clear how the geography of nineteenth-century rebellion maps against the geography of ecological crisis.[15]

Second, we should probably avoid thinking of *China* as a whole as having had an ecological crisis, or at least reserve judgment on whether it had a particularly bad one. It may be useful here to make a brief comparison with Western Europe, which, like China (and Japan, but not the rest of the world), reached unprecedented levels of population in the eighteenth century. A few areas of each (the Lower Yangzi and Lingnan in China; England, the Netherlands, and perhaps Northern Italy in Western Europe) were commercially very advanced, were desperately short of fuel, and needed trade to survive; but as long as they could sustain such a trade, they had the highest standards of living in their respective parts of Eurasia. (Actually, living standards in the most commercialized and urbanized parts of Japan may have been even higher than those in the Lower Yangzi and Lingnan, but these areas appear to have been encountering similar problems in "reproducing their ecological base."[16]) Each had a few sparsely populated "peripheral" regions (Southwest China, the Baltic) that could still export large amounts of ecologically sensitive goods, such as grain, wood, and livestock. And each had some large areas (North China, much of France and Germany) which would have had trouble sustaining new energy-intensive industries,[17] and within which some sub-regions could not even provide enough fuel for rural families to have fires, but which were not *generally* desperate or dependent on imports. Finally, each had a few areas (Northwest China, much of Spain) which had been seriously over-grazed or otherwise abused, and now faced genuine crisis.

If we provisionally accept this comparison, what then becomes odd is the ability of Europe's rich but ecologically vulnerable areas to move to a whole new level of energy use (and consumption generally) in the nineteenth century: they could do so thanks to coal and overseas empire, both of which the Lower Yangzi and Lingnan lacked. The resulting plenty in Europe made China look ecologically exhausted by comparison — and accelerated twentieth-century population growth has greatly worsened the picture. But before we read either nineteenth or twentieth century ecological crises back too far, or make them too empire-wide—and begin searching for *Chinese* characteristics to explain them—we should reconsider the possibility that the early nineteenth-century Chinese earth had a more "normal" range of ecological problems than a broad retrospective verdict of "exhaustion" might suggest.

NOTES

1. See Mark Elvin, *The Pattern of the Chinese Past* (London: Eyre Methuen, 1973) and Philip C. C. Huang, *The Peasant Family and Rural Development in the Yangzi Delta, 1350–1988* (Stanford: Stanford University Press, 1990). While the arguments of Huang and Elvin are not identical, they do converge on the point that China's growth in output after 1400 or so may have kept up with population growth, but did not substantially exceed it.

2. For a summary of the two approaches, with an emphasis on property rights, see Peter C. Perdue, "Thoughts on Chinese Property Rights in Land and Global Environmental Change," *Chinese Environmental History Newsletter* 1, no. 1 (April 1994): 6–8. For an interesting example of a cultural approach, see Nicholas Menzies, "Strategic Space: Exclusion and Inclusion in Wildland Policies in Late Imperial China," *Modern Asian Studies* 26, no. 4 (1992): 719–33.

3. Macroregions are large physiographic regions, not necessarily corresponding to political units, which, in the era before cheap land transport, were more or less economically self-sufficient, and were organized through a nested hierarchy of marketing centers; each had its own internal core in which wealth, population and high value-added activities were concentrated, and its own periphery, which had fewer people per square mile and supplied goods such as timber, stone, and/or wool to the core. China Proper was composed of eight such macroregions. For the best explication of this concept, including maps, see the essays by its creator, G. William Skinner, in G. W. Skinner, ed., *The City in Late Imperial China* (Stanford: Stanford University Press, 1977).

4. The coastal part of Jiangbei (the northernmost part of the Lower Yangzi, and one of its poorest sub-regions) did provide very large quantities of another export, salt. This was sent outside the Lower Yangzi through a heavily taxed trade organized as a government monopoly. Some of the income from those sales did return to the Lower Yangzi, creating an enormous concentration of wealth in Yangzhou, Jiangbei's major city. There are, however, reasons to doubt that this wealth circulated more broadly through the

macroregion, and Jiangbei remained a periphery, which, as Skinner would predict, does not seem to have imported large amounts of food, fuel, or fiber. On Yangzhou, Jiangbei, and the salt trade, see Antonia Finnane, "Yangzhou: A Central Place in the Qing Empire," in Linda Cooke Johnson, ed., *Cities of Jiangnan in Late Imperial China* (Albany: State University of New York Press, 1993): 117–149.

5. Li Bozhong, "Ming-Qing shiqi Jiangnan diqu de mucai wenti," *Zhongguo shehui jingji shi yanjiu* 1986, no. 1: 86–96; translated and abridged in *Chinese Environmental History Newsletter* 1, no. 2 (November 1994): 17–21.

6. Li Bozhong, "Kongzhi zengzhang yi bao fuyu: Qingdai qian zhong Jiangnan de renkou xingwei" [Preserving Prosperity by Controlling Population Growth: Demographic Behavior in Jiangnan during the Early and Mid-Qing], *Xin shixue* 5, no. 3 (1994): 33–36.

7. The *shiye zhi* can be found under Zhongguo Shiyebu, Guoji Maoyi Ju (compiler), with the title *Zhongguo shiye zhi*, [Province name] *sheng*.

8. Dwight H. Perkins, *Agricultural Development in China* (Chicago: Aldine Press, 1969), pp. 31, 71–2, and 297–307.

9. The results of the calculation are discussed in Kenneth Pomeranz, *The Making of a Hinterland: State, Society, and Economy in Inland North China, 1853–1937* (Berkeley: University of California Press, 1993), ch. 3. The sources and methods behind this calculation are spelled out in much fuller detail in Pomeranz, "the Making of a Hinterland," Yale University Ph.D. dissertation, 1988, Appendix F.

10. To depress fuel supply estimates, I calculated the amount of land under buildings and roads (and thus generating no usable biomass) in 1800 on the basis of a mere 20 per cent reduction from what was already probably an overestimate for c. 1930. Since the amount of land used this way should change at a rate which reflects the growth of population and trade, I would have been justified in cutting the 1930 figure by 40 per cent. In order to reduce the amount of forest land further (that is, after subtracting waste land, land under roads and buildings, and cropped land), I assigned 27 per cent of the region's land to pasture—enough to provide 50 per cent of the feed for the area's farm animals, and far higher than any available anecdotal evidence would suggest. (In the 1930s, grass land provided 7.5 per cent of the feed for the area's farm animals.) And I assumed that two-thirds of the forest was second-growth forest that was not yet mature, and thus would have a sustainable yield only half as great as a comparable area of mature forest. On French fuel consumption in the eighteenth century, see Fernand Braudel, *The Structures of Everyday Life*, vol. 1 of *Civilization and Capitalism, 15th to 18th Centuries*, trans. Sian Reynolds (New York: Harper and Row, 1979), pp. 365–67.

11. See, for instance, the summary by J. P. Cooper, "In Search of Agrarian Capitalism," in T. H. Aston and C. H. E. Philpin, eds., *The Brenner Debate* (Cambridge: Cambridge University Press, 1985), p. 139, n. 2.

12. The Mantetsu figures are discussed in Philip C. C. Huang, *The Peasant Economy and Social Change in North China* (Stanford: Stanford University Press, 1985), pp. 147–48; the European data are summarized in B. H. Slicher van Bath, "Agriculture in the Vital Revolution," in E. E. Rich and C. H. Wilson, eds., *The Cambridge Economic History of Europe*, Vol. V (Cambridge: Cambridge University Press, 1977), p. 94.

13. See Pomeranz, *Making of a Hinterland*, pp. 153–211.

14. Ibid., pp. 182–265.

15. Elizabeth J. Perry's *Rebels and Revolutionaries in North China, 1845–1945* (Stanford: Stanford University Press, 1980) is an excellent but all-too-rare example of a work that examines these relationships carefully, and roots them in a regional, rather than national, ecological crisis.

16. Conrad Totman, *The Lumber Industry in Early Modern Japan* (Honolulu: University of Hawaii Press, 1995), p. 102.

17. Indeed, in the eighteenth century, even existing French ironworks could often run for only a few weeks a year. Braudel, *The Structures of Everyday Life*, p. 367.

Environmental Degradation, Forest Protection and Ethno-History in Yunnan

(III) Nature Reserves and Non-Han Swidden Cultivators

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Many non-Han swidden cultivators in Yunnan display apathy towards nature reserves, and still persist in hunting animals and felling trees within their precincts. In analyzing the reasons for their behaviour, Yin Shaoting has drawn attention to the following three factors.

First, after 1949 the Chinese government established

many nature reserves on land that originally belonged to hill-dwelling peoples. Since nationalization, the hill-dwellers' access to land has fallen far below past levels, and this has resulted in some villages being left without sufficient land to cultivate. Second, hill peoples have not benefitted in any tangible way from the prohibitions on felling trees, hunting and gathering in nature reserves. Third, nature reserves and prohibitions against shooting protected animals have actually created incessant trouble for them. Many now suffer severe losses in income from damage to agricultural crops by protected animals. To provide two examples from the data Yin collected in Jinuo Shan, Xishuang Banna, in 1982 elephants and other wild animals destroyed the whole crop—an estimated thirty tonnes—of the cash-earning plant *Amomum villosum* Lour. (*sharen*), the seeds or fruits of which are prized in medicine for their aromatic, tonic and stomachic properties, in the village of Baya Zhongzhai. In 1986, the loss of grain crops due to damage by wild animals in a mere seven or so villages in the county came to twenty-six tonnes. Although the regulations stipulate that peasants should be compensated for such losses, forestry officials seldom have sufficient funds at their disposal to do so.[1]

Data collected and observations made on my trips to Yunnan confirm the accuracy of Yin's analysis. As an example, let me cite the case of a Lahu village, Anma Laozhai (thirty-six households, population 180 individuals), which is located about 40 kilometres from Jinghong, on the fringe of the Naban Nature Reserve in Xishuang Banna. I visited this village together with four Japanese folklorists and historians on December 8th and 9th, 1992. Although our purpose was not to investigate the effect of nature reserves on the villagers, we saw at first hand the severe practical difficulties that beset swidden cultivators relocated without adequate compensation.[2]

Anma Laozhai has experienced two types of relocation during the past twenty-three years. The first occurred in 1972 when the villagers settled permanently at the present site (elevation: about 860 metres) under strong governmental supervision. Prior to this, the villagers had practised migratory swidden agriculture deeper in the mountains at higher elevations. A seventy-eight year old man recalled that he had shifted seven times before coming here. The Lahu are a Sino-Tibetan language speaking people who inhabit the mountainous areas of the Simao and Lincang districts in the sub-tropical zone of southern Yunnan; their population in this province amounted to 304,174 as of 1982. Renowned as tiger-hunters, the Lahu combined hunting and gathering with migratory swidden ("slash-and-burn") agriculture in the past. The ancestors of Anma Laozhai migrated from Lancang county in the Simao district to Menghai county in Xishuang Banna during the 1930s, and cultivated opium there until the late 1950s.[3]

Since the 1950s, the government has encouraged hill peoples to move down to lower elevations and settle permanently near roads in order to facilitate administration and the provision of services such as electricity, health care and schooling. After settlement, these Lahu newcomers immediately found problems with access to land. The land that they began to cultivate had historically belonged to the nearby Dai village, and this triggered off a demarcation dispute which did not end until 1983, when the government implemented new regulations which defined the boundaries of state forests and nature reserves, and allocated land for swidden agriculture to the hill peoples. The second "relocation" came in 1991, when the government declared the forests beside the village a nature reserve, and therefore out of bounds for hunting and gathering. Both "relocations" brought hardship and caused great changes to the villagers' way of life.

Each "relocation" has ended in reduced access to land for the villagers. Under the new regulations for the distribution of hill land, in 1983 each person (adults and children alike) was entitled to receive twenty-one *mu* of land for swidden cultivation. This figure was based on the premise that for subsistence one person needed to cultivate three *mu* per year; three *mu* would be cropped for three years with a fallow period of seven years, which would allow for rejuvenation. But it was not always possible to grant each person twenty-one *mu*, as the actual amount of land available for distribution varied according to local conditions. The policy of first designating woodlands for state forests and nature reserves drastically diminished the amount of land available for allocation to the hill peoples in some places.[4] In the lucky areas which had a surplus of hill land, such as Jinuo Shan, apportionments per person generally exceeded twenty-one *mu*, but in Anma Laozhai, a severe shortage of hill land dictated that each of the 150 residents (population as of 1983) received only six *mu*. Compensation through an increase in paddy land proved impossible due to the dispute with the Dai cultivators mentioned above. As a result, the Anma Laozhai villagers received only 0.8 *mu* of paddy land per person. In addition, since 1991 the villagers have lost their hunting and gathering grounds, and are afraid to burn off vegetation for fear of the fire spreading to the nature reserve. Now that they are sandwiched between a nature reserve above, and a Dai village in the valley below, there is little hope for improvement in their situation.

By no stretch of the imagination could this village be described as well off. The economic condition of the Lahu family we surveyed attests to this. The combined annual income of the household of Li Wangxing (age twenty-seven) who lives with his wife Zha Xiaoer (age twenty-eight) and two children, amounted to roughly 900 *yuan*. The 1990 average *per capita* income of Xishuang Banna was 1,176 *yuan* per year, so there can be no doubt that this figure is exceptionally low even by local standards, not to mention the national norm. Because his wife has come from another Lahu village about five kilometres away, she has no land in Anma Laozhai, so the family must live off Li's holding of one *mu* of paddy land, and eight *mu* of dry land.

Li's children were both born after 1983 and therefore received no land. Although the family's share is slightly larger than the average apportionment per person, this does not detract from the fact that the allotment for a single person (Li) has to be utilized to support four people. In addition, the family owned six pigs, forty fowls, and two water buffaloes. On the dry land, Li and his wife each year crop three *mu* with maize, and have planted the other five *mu* with rubber, citrus, and tea trees. The rubber trees cannot be tapped for another five years, so there is no prospect of immediate income from them. The one *mu* of paddy does not provide enough rice to feed the family, so Li sells his non-glutinous maize to the state in order to buy rice and other articles, and retains the glutinous maize for the family's own consumption.

The establishment of the local nature reserve clearly has not benefitted the Anma Laozhai villagers in any way. It has forced them to abandon hunting and gathering practices which were once essential to their lifestyle. Although most households still possess muskets, the villagers with whom I spoke said that they no longer used them; the heavy fines for poaching make it simply not worthwhile. Also, the demarcation of the nature reserve has enforced permanent cropping and stationary housing on the villagers, thereby making it impossible for them to adopt their traditional strategy for solving problems of reduced living standards due to resource depletion, namely the simple act of migrating, or moving away from the source of hardship. The failure to distribute adequate land resources to compensate for losses experienced by the villagers has exacerbated marginalization. Younger villagers in Anma Laozhai are rapidly losing the past habits and values of their ancestors, but lack the means with which to adjust satisfactorily to mainstream Chinese society. Conditions such as these must inevitably affect the attitudes of local people to nature reserves. We cannot expect villagers whose lives have been disrupted in such ways to welcome conservation with open arms.

Some authors, such as Edmonds, have portrayed this type of situation as a conflict between preservation and utilization-exploitation, and have suggested that the solution lies in guaranteeing nature reserves an adequate budget with which to relocate affected people and arrange for their employment.[5] Edmonds's comments appear in his excellent, comprehensive book-length survey of China's environmental degradation and protection policies, which examines most of the past and current literature on the subject for the entire country. He is certainly right in suggesting that it is only when nature reserves have ample funds at their disposal that the problems can be remedied to the satisfaction of the people relocated and the conservationists alike. In addition, I should like to stress the need for sensitivity about relocation, and the necessity for productive programmes for dealing with the problems it generates. The case of Anma Laozhai indicates that the creation of nature reserves has definitely disadvantaged some ethnic groups.

Is there no chance of co-operation from relocated people? Yin Shaoting thinks that there is. He argues that the hill peoples, given their long tradition of forest protection, will come to understand the need for conservation if nature reserves can help them solve their economic problems. His suggestions include the training of some hill people as nature reserve staff; allowing villagers to gather mushrooms from nature reserve forests, and plant *Amomum villosum* on the wetlands located on the fringes of the reserves; and permitting them to protect their crops by firing blank shots around harvest time to ward off wild animals. Once again, Yin emphasizes that it is only after hill peoples gain something from nature reserves that they will take an interest in protecting the flora and fauna in these sanctuaries, and it is for this reason that he advises relaxing some of the regulations.[6]

Here Yin touches on the crux of the problem, for any long-lasting solution must take account of the historical background. Areas designated as nature reserves at present were never a *terra nullius*, or "no one's land." In the past, hill-dwelling peoples used them for hunting and gathering as well as swidden cultivation, and practised measures to prevent resource depletion. As we saw in the first installment, swidden cultivators in Yunnan have been continually forced to "relocate" themselves due to land alienation and Han-induced environmental destruction since the eighteenth century, if not earlier. To them, carving nature reserves out of their traditional lands is nothing but a changed form of land alienation, despite all of the professed good intentions for the protection of species. Viewed from this standpoint, what comes to the fore is not so much a conflict between preservation and utilization-exploitation, but one between the preservation of nature and the preservation of a human culture. Everybody talks of environmental degradation and the extinction of species, but few mention the degradation in life styles among hill peoples that accompanies the foundation of nature reserves. Surely it is critically important that the administration of reserves be based on a recognition both of the unique heritage and cultural traditions of hill peoples, and of the changes wrought on them by shifts in government policy in the past.

I am not for one minute suggesting a return to traditional migratory swidden cultivation practices. With largely increased populations and an already degraded environment, such ideas cannot be entertained. What I am trying to show is that nature conservation in Yunnan has been, and is still being, achieved at the expense of the hill peoples, and what I am suggesting is that standards of conservation may have to be sacrificed in some cases to render just compensation. In short, ideas of a strict "off-limits", no-access policy must be discarded. Although tourist-orientated nature reserves have been rightly criticized for destruction of resources,[7] this does not constitute a reason for denying displaced hill peoples special status with

regard to conservation. They should be permitted limited access to resources in nature reserves, for they too have a right to a decent livelihood. With proper administration and control, a balance could be reached between conservation and the interests of hill peoples.

At present, the government lacks the means to compensate hill people for crop damage by protected animals, not to speak of solving the severe relocation problems. Meanwhile, the hill peoples are left out on a limb. Their conditions could be greatly alleviated, and a positive interest in conservation fostered, by allowing them to utilize certain resources in the reserves, along the lines proposed by Yin.

NOTES

1. Yin Shaoting, *Yige chongman zhengyi de wenhua shengtai tixi: Yunnan daogeng huozhong yanjiu* [A Highly Controversial Culturo-Ecological System: Slash-and-Burn Cultivation in Yunnan] (Kunming: Yunnan Renmin chubanshe, 1991), p. 185.

2. For published accounts of conditions in Anma Laozhai, see the following reports in Christian Daniels and Watabe Takeshi, *Unnan no seikatsu to gijutsu* [Life and Technology in Yunnan] (Tokyo: Keiyūsha, 1994): Tamura Zenjirō, "Xishuang Banna shōsū minzoku no sonsai wo aruku" [Visits to Minority People Villages in Xishuang Banna], pp. 27–32; Watabe Takeshi, "Unnan chihō dentō seisan kōgu saihō shuki" [Notes on Investigating Traditional Production Tools in Yunnan Province], pp. 79–86; and the basic data given in the day-to-day record of the survey on pp. 449–50.

3. For opium growing, see Tamura, op. cit., p. 29.

4. For an account of distribution of land to hill peoples, see comments by Yin Shaoting at the Symposium on Swidden Agriculture among the Minority Peoples of Xishuang Banna, transcribed in Daniels and Watabe, op. cit., esp. pp. 417–19.

5. Richard L. Edmonds, *Patterns of China's Lost Harmony: A Survey of the Country's Environmental Degradation and Protection* (London: Routledge, 1994), p. 210.

6. Yin, op. cit., pp. 185–87.

7. Edmonds, op. cit., p. 210 provides concrete examples from nature reserves all over China of the serious damage caused by tourism and maladministration.

How the Chinese Discovered the Ice: China's First Expedition to Antarctica, 1984–85

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On 1 November 1995, Reuter reported from Beijing that China would send fifteen Young Pioneers to the Great Wall Antarctic Station for a seven to ten day research project. Teenagers from mainland China, Hong Kong, Taiwan and Macau would be welcome to apply. Several Chinese enterprises would give US$480,000 to finance the program, which Young Pioneers officials presented as the first of its kind in the world. Since the precise object of the research project has not been disclosed, we may assume that the purpose of the Pioneers' expedition may not be related to pure science.

This piece of news is a reminder of the strong link that has existed between environmental sciences, the Chinese state and national propaganda. China's first expedition to Antarctica, during the 1984–85 austral summer, was endorsed by the Party Central Committee, the State Council and Deng Xiaoping himself. Mr. Deng offered the expedition members an inscription on a plaque, which read: "Toward peaceful utilization of Antarctica by humanity." The diplomatic result of the building of the Great Wall Station (Changcheng zhan) on King George Island in January 1985 was China's promotion to the rank of consulting member of the Antarctic Treaty Organization. The People's Republic of China has been a non-claimant consultative nation with voting rights since the same year. A Chinese delegation was present during the discussions that led to the Protocol on Environmental Protection to the Antarctic Treaty (1991), although China's position on the Treaty's five specific annexes is unclear.

The size of the staffs of the two Chinese research stations, the Great Wall and Sun Yat-sen (Zhongshan) Stations, and the nature of their scientific activities around the year are not well documented, as the Chinese National Committee for Antarctic Research (CHINARE) seems to have published only a few data reports since its establishment in 1981. Ten years ago, on 14 February 1985, the First Chinese Expedition to Antarctica opened the Great Wall Station, which had been built within six weeks of the selection of the site. The research station is located on the southwestern coast of King George island and close to Nelson island, not far from a Chilean and a Russian station. For the first hoisting of the five-star red flag in Antarctica, Guo Kun, the expedition leader, chose a hilly place with two lagoons, which are described as forming an oasis (*lüzhou*). Along the coast, the rich biota must have provided convenient research topics.

In spite of its rigorous isolation, Antarctica has become

affected by the tensions between science, state and territory that have shaped environmental geography elsewhere. Competition for the settling of the strategically located King George island and Wrangel peninsula has become more acute as the number of countries that open scientific bases increases every summer. The justification for the building of these stations lies in the expressed needs of the environmental scientists who have investigated Antarctica's mainland, atmosphere and water. The rationales for international research in, for instance, palaeoclimatology or ionosphere chemistry, have illustrated the universalist pretensions of modern scientific culture. However, the geographical distribution of these stations, largely concentrated between Drake Passage and Weddell Sea, casts some doubt on the validity of the research done so far away from the Antarctic mainland. It would seem that most members of the Antarctic Treaty are at best engaged in research duplication on the sub-Antarctic environment.

It would be wrong to assume that Antarctica is devoid of humanized landscapes, even if the values shared by the scientific community appear not to be based on a culture specific to a particular ethnic group. Antarctica has in fact as many cultural identities as states that operate scientific stations. The Chinese state's construction of a station in a territory previously devoid of any cultural imprint (an event that would be impossible to observe in China) constitutes a splendid opportunity to observe the cultural values about space that an all-male team of Chinese scientists has transplanted to Antarctica. (The team's maleness affected the heroic representation of the expedition, and generated a positive appreciation for the natural and introduced male features—rocks, hill, flagpole—of the station). In the originally barren landscape of King George island, Chinese spatial values are indeed easy to notice and analyze.

But what are these values that have given a Chinese meaning to the site of the Great Wall Station? According to Guo Kun, the very first task of the expedition was the naming of the features of the settlement, as giving Chinese names to the lake, bay, and hills around the station made the installation "habitable." The attachment of toponyms to specific landforms indicates without ambiguity references to two landscape readings. The first reference is to the site of Hangzhou, the second to the geomantic landscape archetype. The location and the orientation of the Great Wall Station between Xihu, or "West Lake", and the coast is an invitation to compare the morphology of the site of the People's Republic of China's frontier outpost in Antarctica with that of the southern Song capital. Examination of maps of the two sites shows the same succession of features (hill, lake, settlement, coast) and the equivalent general orientation. The direction of reference that geomancy uses in China is south or the equator line; in the austral hemisphere the equator line is of course in the north. A geomantic settlement oriented toward the southeast, such as Hangzhou, would therefore find its mirror image in a site with a northeastern orientation, which is precisely the case of the Great Wall Station.

Located to the east of the Xihu lake, the geomantic site of the station is delineated (*bao*) by the semi-circular alignment of Qifeng yan or "Nesting Phoenix Rock", with Xishan bao ("West Hill Embrace"), Bada ling (the famous Great Wall pass, near Beijing) and Wanglong yan ("Watching Dragon Rock"). Qifeng yan protects the north of the site, and Wanglong yan its southeast. Both rocks serve as the attendants of Pingding shan ("Flat Top Hill"), which acts as the rear barrier hill of the site in the west.[*] Finally, the flagpole is located on an axis that we can trace from Pingding shan to the mouth of the creek that drains the Xihu lake. The axis bisects the site equally into two halves; buildings are built to the north of the axis, while the wharf, heliport and meandering roads are built south of the axis. The geomantic significance of this functional distribution is not clear, except maybe in the case of two buildings, the northern and southern oil depots, whose locations in relation to the axis are perfectly symmetrical. Perhaps because of the similarity of the shape of "Flat Top Hill" with that of the Jupiter geomantic hill, which is supposed to have steep rounded sides and a flat summit, and therefore with the Wood element that geomancers have associated with this planet, both oil depots have been located as far away as possible from Pingding shan and close to the attendants. Pingding shan would have provided Wood to feed a fire, and locating oil depots in the immediate vicinity of this hill would have been dangerous. This geomantic interpretation would have been weaker had the expedition members given a different name to Pingding shan, had they located a flat topped hill somewhere else, had Pingding shan not evoked for them a conscious association with Wood, and had fire not been the most serious hazard for their survival, as the destruction of the two oil depots would have meant the loss of heat, fuel and power.

Scientific rationale and political ambition directed the construction of the Great Wall Station of China in Antarctica. The colonization of the site of the station also illustrates two principles in Chinese spatial values, identification and transposition. The Great Wall Station is identified with the idealized locale of Hangzhou, and the geomantic landscape archetype is transposed to the new locale of the Great Wall Station. This combination allows the metaphorical annexation of a territory, that of Zhongguo Nanji or "Chinese Antarctica", while denying its formal inclusion in the Chinese sphere, which would be impossible in terms of the Antarctic Treaty. At the same time, this combination rejects the station site as a locale with its own references, such as ice, which covers more that 99 per cent of Antarctica.

NOTE

[*] The orientation of each feature does not need to be literal to allow a geomantic reading. *Wanglong* might mean looking toward the Dragon, and *qifeng* causing the Phoenix

to rest in a place for nest-building. The Dragon of Great Wall Station is in the southeast of the site, but its position would become due east if we tilted the site in order to have it face north (austral equivalent of Chinese south). The Phoenix of the station would then move toward the northwest (austral equivalent of southwest), and Flat Top Hill would slide to the southwest (austral equivalent of northwest) of the geomantic site.

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Thesis abstract

Demography and Development: Chinese Traditional Agriculture in Historical Perspective

Ph.D. thesis, Nanjing Agricultural University, 1995

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This dissertation analyses the development of Chinese agriculture under the pressure of population growth from remote antiquity to recent times, chiefly emphasizing technological and environmental aspects.

About 8,000 years ago, primitive forms of rice and millet agriculture originated at almost the same time in the middle Yangzi Valley and the Loess Highlands. In the Loess Highlands, owing to the distinctive soil and ecological conditions of the region, the original form of agriculture (swidden farming) evolved rapidly under the impulsion of population pressure. On the basis of analysis of vegetation cover and archaeological sites, we may infer that in the Cishan Culture (c. 6500–5000 B.C.), the period of fallow was approximately forty years. However, two thousand years later, in the Banpo Culture, the average fallow period was already less than ten years, and the cultivation of shrub-covered land was common. By the time of the Longshan Culture (c. 3000–2000 B.C.), the leading position was occupied by a system of short fallow-period agriculture on land covered predominantly by mixed grasses. At the same time, elementary forms of state organization emerged on the basis of the relatively intensive primitive agriculture of the Yellow River Valley. This in turn stimulated the further intensification of agriculture, leading to the formation of a technological system whose chief features were dryland agriculture and small-scale irrigation works.

With the coming of the Iron Age, there was a technologically induced spurt in population growth, and before long, the resulting population pressure had led to the creation of an early form of the traditional Chinese system of highly intensive agriculture in the Loess Highlands. As this system spread into the downstream area of the Yellow River Valley after the foundation of the empire (221 B.C.), not only was the technological system of dryland agriculture perfected, but, in the new ecological conditions, it became able to support higher population densities. During the Han dynasty (202 B.C.–A.D. 220), population densities in the downstream area of the Yellow River Valley were as high as 70 to 80 persons per square kilometre. However, after five centuries of intensive land use, soil fertility and other environmental conditions underwent severe degradation, and the agricultural ecosystem of the entire Yellow River basin became more and more unstable under population pressure. The resulting social crises led to four centuries of turmoil. In the end, however, the autocratic empire found a new foothold for maintaining its economic foundation in South China, the region of wet-rice agriculture. On account of the relatively high population carrying capacity of the wet-rice agriculture zone, population growth and the further development of agricultural technology took place in that zone from the sixth century till the fourteenth. The new techniques were highly labour-intensive. This applies not only to such intensive land-utilization practices as the rice-wheat double cropping system, the double cropping of rice, and the terracing of hillsides, but also to intensified fertilization and planting techniques.

With the great demographic growth from the fourteenth century on, especially in the seventeenth to nineteenth centuries, the population load carried by South China in turn basically reached peak level, given the constraints of traditional technology. Meanwhile, the nation-wide environmental crisis became everywhere perceptible. The disasters created by high population pressure on the fragile ecosystems of the Loess Highlands and the mountains of the South-west were especially severe. The accompanying social unrest served as the fuse leading to warfare and revolutions from the mid-nineteenth century on.

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