CHINESE ENVIRONMENTAL HISTORY NEWSLETTER

Issue 3:1, May 1996

From the Editor

The newsletter, alive and well in its third year, proudly presents three articles, while a first contribution to the prospective "Teaching Ideas and Experience" section has been held over to the next issue. Submissions for the next two issues, whether brief research reports, abstracts of papers presented, or longer mini-articles, are eagerly encouraged. Contributions by graduate students are especially welcome. The word-limit for mini-articles has been raised to an absolute maximum of 4,000 words.

The first two articles in this issue both raise the unpleasant topic of disease. Carol Benedict establishes disease history firmly within the scope of environmental history by showing how the history of plague in late imperial China cannot be understood without pinpointing when, where, how, and why Han Chinese intruded into the wilderness areas where plague is enzootic. Benedict argues that, given the difficulties of "diagnosing" past disease outbreaks on the basis of descriptions of the symptoms, historians must take recent research on the ecology of plague in China into account when trying to establish that a particular past epidemic was or was not plague. Her article has important implications for historians seeking to identify plague epidemics in earlier periods of Chinese history, and challenges them first to determine what differences there were (if any) in the distribution of plague "reservoirs" in earlier times — no easy task.

Malaria is not the central focus of Robert Marks's article, but it plays an important part in the story that he tells. Marks is interested in the formation of the Pearl River Delta, in the far south of China. He argues that the delta was man-made in two senses; first, indirectly, through the deposition of topsoil dislodged by Chinese farmers from the hills of northern Guangdong and Guangxi, carried south by rivers, and channelled into the Pearl River Estuary as a result of flood control works in the Song; and second through the direct labours of farmers migrating south after the Mongol conquest and deliberately turning estuarine "sand bars" of riverborne sediment into fertile fields. Malaria helps explain the time-lag between the first arrival of Chinese settlers in the north part of the region, and their later activity in reshaping the south for agriculture. It took time for Han Chinese to overcome fear of malaria in the lowland south sufficiently to grapple with the environmental conditions that gave rise to it.

Our third contribution, by Elisabeth Grinspoon, is the first instalment of a two-part article revisiting the Xishuangbanna Nature Reserve and its effect upon the lives of local minority peoples. Grinspoon tells a story very different from that told by Christian Daniels in the last issue of the newsletter. Daniels, who reports on the experience of a Lahu hill-dwelling community, depicts the nature reserve as depriving minority villages of access to resources crucial to their way of life. Grinspoon, by contrast, did her fieldwork among the Dai, who are the largest of the minority peoples in an autonomous prefecture bearing the Dai name. This may account for the happier experience of the communities she visited in dealing with the reserve management bureaucracy. In this instalment, she tells us part of what she saw. Her closing paragraphs suggest an analysis converging at one point with that of Daniels, but examining the problem in a new and different framework. She will take up that analysis in Part II.

Chinese Environmental History Newsletter 3:1, May 1996 Contents

SUBSCRIPTION REMINDER (for hard-copy subscribers outside the PRC). Subscriptions for 1996 are now due. The standard rate has been reduced, and now stands at US$8.00 plus a voluntary $2.00-donation to help cover the cost of mailing to the PRC. Other details will be found at the end of the newsletter.

Noticeboard

Professional Associations

New Association for the Study of Asian Environmental History

A new association for the study of Asian environmental history was founded at the 1996 meeting of the Association for Asian Studies in Hawaii. Those interested in joining should contact:

Peter C. Perdue
History Faculty, E51-210
Massachusetts Institute of Technology
77 Massachusetts Avenue
Cambridge MA 02139
U.S.A.
E-mail: pcperdue@MIT.EDU

East Asian Archaeology Network

The East Asian Archaeology Network headquarters have moved. Enquiries about membership and subscription rates should be addressed to the Treasurer:

Prof. Sarah M. Nelson
Dept. of Anthropology
University of Denver
2130 South Race Street
Denver CO 80208
U.S.A.
E-mail: snelson@mercury.cair.du.edu
Fax: 1-303-871-2201

There are separate treasurers for China, Japan, and Korea. The address of the China Treasurer is:

Yang Jianjun
Liaoning Provincial Archaeological Research Institute
Liaoning Provincial Museum
Shenyang
Liaoning
China

Information for the network newsletter, *EAANnouncements*, should be sent to the editor (and network President):

Prof. G. L. Barnes
East Asian Studies
University of Durham
Durham DH1 3TH
England
E-mail: gina.barnes@durham.ac.uk
Fax: 44-191-374-3242

Copy deadlines are mid-January, mid-May, and mid-September.

See also under "Internet addresses" for listserver discussion group.

Calls for Papers

Biennial Meeting of the American Society for the History of the Environment, Baltimore, March 5th-9th, 1997

Paper and panel proposals are invited for the above meeting. Especially encouraged are proposals addressing the role of government and/or science in environmental affairs, although proposals on all aspects of human interaction with the environment over time are welcome. There is special eagerness for interdisciplinary, comparative, and international perspectives. Preference will be given to proposals for complete panels, although individual paper proposals will be accepted.

A proposal consists of six copies of each of the following:

1. A cover sheet with the full name and affiliation of each panel participant and the session and paper titles;
2. An abstract of up to 100 words setting out the purpose of the session;
3. An abstract of each paper (up to 250 words per paper).
4. A C.V. of up to two pages for each participant, including address and telephone number(s).

Postmark deadline for submission is August 1st 1996. Proposals should be sent to Jeffrey Stine, from whom further information may be sought. His address is:

National Museum of American History
MRC 629
Smithsonian Institution
Washington D.C. 20560
U.S.A.

Any CEHN subscriber looking for partners for a panel proposal is invited to make use of CEHN's e-mail distribution network after June 14th. The editor will forward suitably worded announcements including prospective panel title, the prospective convener's contact information (i.e. address, etc.), and a statement (any length within reason) of the rationale for the proposal.

Conference on Economic Development and Environmental Protection in China and Europe, Aachen, Autumn 1997

This conference will be convened by the China Research Group, Department of Sociology, Aachen University of Technology. The central focus will be on the relationship between economic development and problems connected with the destruction of the environment, with their social, economic and political consequences. There will be four

panels:

Panel One. The attitudes of people in China and Europe to environmental questions, focussing especially on the question of whether awareness of the environment is developing in China, and if so on what basis.

Panel Two. The problems of pollution arising from China's present rapid economic growth, focussing especially on how long the environment will be able to suffer such pollution, and related questions of sustainability.

Panel Three. Such problems as the rapid development of Chinese cities and the resulting pressures on water supply and waste management, the social effects of migration, and the use of scarce agricultural land for industrial purposes.

Panel Four. The extent of commitment to implementing existing legislation on environmental protection in China; the global implications of China's environmental problems; the applicability of European experience in learning to grapple with environmental problems; and assessment of the experience gained through German-Chinese cooperation on environmental matters and its significance for future European-Chinese cooperation.

The final session will be a panel discussion involving scholars, politicians, and representatives of business and of the European Union. Representatives from Chinese state organizations will also be present.

Potential participants, including advanced graduate students, are invited to submit a one-page paper-proposal before the end of July 1996. The organizers will select twenty-five papers whose authors will receive an allowance for travel, room and board. Papers may also be offered on a non-attending basis; some of those submitted by non-attending participants will be chosen for publication. Papers must be submitted by August 31st, 1997.

For further information and to submit proposals, please contact Manfred F. Romich, Institute of Sociology, China Research Group, Aachen University of Technology, Rochusstr. 2-14, D-52056 Aachen, Germany (e-mail mfrch@aol.com or romich@rwth-aachen.de).

Fifth Asian Urbanization Conference, London, August 26th-30th, 1997.

For information about submitting paper proposals, contact Graham Chapman or Ms S. Waring, Department of Geography, Lancaster University, Lancaster LA1 4YB, England (fax: 01524-847099; e-mail either g.chapman @lancaster.ac.uk or s.waring@lancaster.ac.uk).

Other Conference and Workshop Information

Xiongnu Archaeology Session of the World Archaeology Congress, Buryatia, August 12th-16th, 1996

Conference themes include not only "History and culture of the Xiongnu", but also "Regional patterns of nomadism", "Ecological problems of nomadism", and "The nomadic mode of life — adapting to the natural environment", etc.

Contact:

The Institute of Social Sciences, Siberian Branch
Russian Academy of Sciences
Ulitsa Sakhyanova 6
Ulan-Ude 670042
Russia
Tel.: 301-22-372-16 or 330-42
Fax: 301-22-632-44, Box 057

Wetland Archaeology Conference, Copenhagen, September 13th-18th, 1996

Contact: Mogens Schou Jørgensen
RAS
National Museum of Denmark
Frederiksholms Kanal 12
DK-1220 Copenhagen K
Denmark
Fax: 45-33-93-26-71

Economic History Seminar Series, Brisbane, August to October, 1996

A seminar series on Chinese Business History will be held at the University of Queensland, with a distinguished international array of guest speakers. For further information, contact Lai Chi-Kong, Department of History, University of Queensland, Brisbane, QLD 4072, Australia (e-mail: C.Lai@mailbox.uq.oz.au).

Abstract of Paper Presented at East Asian Archaeology Network Conference, Honolulu, April 8th-9th, 1996

(The papers at this conference were organized into two sessions, "Centers and Peripheries in East and Southeast Asia", and "Archaeology and History in East Asia." The paper summarized here was presented in the first session).

Agriculture on the Periphery and the Southward Expansion of the Chinese Empire

Magnus Fiskesjö, University of Chicago

How was South China incorporated into China? This problem is here explored from the perspective of agricultural transformations. The paper emphasizes the Chinese state's use, from Han times on, of agricultural colonies (*tuntian*) and the promotion of, above all, irrigated rice cultivation to expand the base of the taxation system that it built while colonizing and assimilating the southern peripheries. It is suggested that the traditional distinction between "raw" and "cooked" southern "barbarians" can be understood in terms of such a process, wherein the "raw" (often indigenous agriculturalists, notably those relying on various forms of swidden agriculture) are incorporated ("cooked") into the Chinese economy. Drawing on records and historical studies that reveal the mechanics of enforced assimilation of southern "Miao" peoples mainly in Qing times, the paper considers the implications for archaeology regarding both the late imperial period and the period of autochthonous state formation in late prehistory and the Bronze Age. The paper makes suggestions for an archaeology of southern

agroecosystems, including the transformation of settlement patterns, animal use, plant remains, and tool complexes, etc., as related to the processes of Sinicization and state formation.

Publications

(Thanks are due to the editor of *EAANnouncements*, from whose "Running Bibliography" section several of the titles entered here are drawn).

Christian Daniels and Nicholas K. Menzies, *Science and Civilisation in China*, Vol. 6, *Biology and Biological Technology*, Part 3, *Agro-Industries and Forestry*. Cambridge: Cambridge University Press, 1996. 750 pp.; US$150.00. This (physical) volume of Joseph Needham's great series comprises first, by Daniels, a history of Chinese sugar-cane technology; and second, by Menzies, a history of forestry in China, with a concluding comparative historical analysis of deforestation in China, Europe, and Japan.

Zheng Binglin, "Tang Wudai Dunhuang zhongzhi linye yanjiu" [A Study of Cultivated Forests in Dunhuang in the Tang and Five Dynasties Periods]. *Zhongguo shi yanjiu* 67 (1995, no. 3): 32–38. This article first uses literary sources to point out that the famous Buddhist cave-shrines and monasteries of Dunhuang, along with secular structures such as bridges and sluice-gates, must have consumed a vast amount of timber. It then asks where this timber could have come from, given that the Dunhuang area had no natural forests, that the limitations of available transport technology would have made it impractical to bring timber from the fairly nearby Qilian Mountains, and that, in any case, the species used — poplar (*yang*), elm (*yu*), and willow (*liu*) — were different from those growing in the Qilian Mountains. The author's answer is that the timber came from woods deliberately planted in the Dunhuang area, around the network of irrigation channels.

This idea finds support in monastic accounts. These include records of the issuing of grain, flour, oil, etc. for the consumption of persons (including monks) engaged in felling and transporting timber. Many of these records name the place where timber was being felled on that occasion, making it possible to confirm that the wood was of local origin. The author claims, also on the basis of entries in monastic accounts, that most plantations were privately owned, so that the monasteries had to buy the timber; indeed, tree ownership was a measure of wealth throughout the Dunhuang area. However, monasteries also planted their own woods, serving aesthetic purposes as well as practical ones. Other species grown in private orchards included mulberry, plum, and apricot.

C. Yeung and W. Li, eds., *Archaeology in Southeast Asia* (Hong Kong: University of Hong Kong, 1995) contains three papers which may be of interest to readers of Robert Marks's contribution to this issue of CEHN. These are: Gu Yunquan, "A Research in the Origin of the Pre-Qin Culture in the Pearl River Delta Area with Reference to its Economic Pattern" (pp. 57–70); Xiao Yiting, "The Sandbar Sites in the Estuarine Area of the Pearl River Should Not be for Seasonal Inhabitation Only" (pp. 111–17); and Zeng Qi, "Prehistoric Culture in the Estuarine Area of the Pearl River" (pp. 285–94). The several other China-related papers in the same volume include Pamela Rogers, "Subsistence Continuity in the Prehistory of South Coastal China"; Xu Zhifan, "A Study of the Pre-Qin Culture in the Ganjiang-Poyang Basin"; and a further article on sandbar site archaeology by Xu Hengbin.

Old Books and Reprints

The following are available from White Lotus Books, G.P.O. Box 1141, Bangkok 10501, Thailand (fax. 662-311-4575).

Louis de Carné, *Travels on the Mekong, Cambodia, Laos and Yunnan* (record of an expedition in the 1860s).

Francis Garnier, *Voyage of Exploration in Indochina*. 3 vols., published in 1873. Apparently deals with same expedition as the previous.

E. Lefèvre, *Travels in Laos, The Fate of the Sip Song Pana and Muong Sing (1894-1896)*.

The following is available from Asian Rare Books, New York (tel. 212-316-5334; fax 212-316-3408).

A. M. Le Palud, *The Yangtze Gorges in Pictures and Prose*. Shanghai: Kelly and Walsh, *c*. 1934. US$250 plus postage.

New Journal

Ethics and the Environment, published by Jai Press, Inc. According to the editorial introduction, this refereed journal is "an interdisciplinary forum for theoretical and practical articles, discussions, reviews, comments, and book reviews in the broad area encompassed by environmental ethics." Submissions should be sent, in duplicate, to the editor, Victoria Davion, at Department of Philosophy, Peabody Hall, University of Georgia, Athens GA 30602-1627, U.S.A. The subscription rate for individuals is US$75.00 for two issues ($90.00 for overseas surface mail). Subscriptions should be sent to Jai Press, Inc., Subscription Department, 55 Old Post Road, No. 2, P.O. Box 1678, Greenwich CT 06836-1678, U.S.A. In Europe, write to 118 Pentonville Rd., London, England N1 9JN.

Other Items of Interest

Pierre Brocheux, *The Mekong Delta: Ecology, Economy, and Revolution, 1860-1960*. $45.00 (hard) or $19.95 (paper). Center for Southeast Asian Studies, University of Wisconsin (4115 Helen C. White Hall, 600 North Park Street, Madison WI 53706).

Chang Chin-ju, "If Taipei Had Been Designed in the Tang Dynasty: Modern Problems, Ancient Strategies, City Memories." *Sinorama* 20 (1995): 6–28.

Chris Coggins, "Biodiversity and Environmental History: Research in the Meihuashan Ecosystem of Fujian Province." *China Exchange News: A Review of Education, Science, and Academic Relations with the PRC* 23, nos. 1–2 (1995): 23–28. Note: this issue of *China Exchange News* was a special number on "Collaboration in Preserving Biodiversity."

Norman R. Eder, *Poisoned Prosperity: Development, Modernization, and the Environment in South Korea*. Armonk, N.Y.: M. E. Sharpe, 1995. 224 pp. US$54.95 ($21.95 paper).

Jiang Zhaocheng, *Ming Qing Hang Jia Hu shehui jingji shi yanjiu* [A Study of the Social and Economic History of Hangzhou, Jiaxing, and Huzhou during the Ming and Qing Dynasties]. Reviewed in *Zhongguo shehui jingji shi yanjiu* 54 (1995, no. 4), pp. 86–87.

William Johnston, *The Modern Epidemic: A History of Tuberculosis in Japan*. Cambridge, Mass.: Harvard University, Council on East Asian Studies, 1996. 432 pp.; US$45.00. Distributed by Harvard University Press.

R. Kojima et al., eds., *Development and the Environment: The Experiences of Japan and Industrializing Asia*. $100.00. Tokyo: Maruzen, 1995. For information about ordering, e-mail maruzen@aol.com.

James Lee and Cameron Campbell, *Fate and Fortune in Rural China: Social Stratification and Population Behavior in Liaoning, 1774–1873*. Cambridge Studies in Population, Economy and Society in Past Time. Cambridge: Cambridge University Press, forthcoming (autumn 1996).

Todd T. Lewis and Theodore Riccardi, *The Himalayas: A Syllabus of the Region's History, Anthropology, and Religion* (teaching resource). US$25.00. Available from the Association for Asian Studies (U.S.A.), whose members are eligible for a $5.00 discount.

Sarah M. Nelson, ed., *The Archaeology of Northeast China Beyond the Great Wall*. Text by Chinese archaeologists. A recent publication by Routledge (Britain). 288 pp. £40.00 plus postage if applicable. For credit card purchase, telephone 01264-342923 (44-1264-342923 from overseas). The book may also be ordered from Ms. Pam Hounsome, Routledge, Andover, Hants SP10 5BR, England.

A. Terry Rambo, Robert R. Reed, Le Trong Cuc, and Michael R. DiGregorio, eds., *The Challenges of Highland Development in Vietnam*. Honolulu: East-West Center, 1995. 240 pp. $15.00. May be ordered from Publications Sales Office, East-West Center, 1777 East-West Road, Honolulu HI 96848, U.S.A. E-mail: ewcbooks@ewc.bitnet; fax: 808-944-7376.

For progress reports and other materials of the Sino-American Jiangxi (PRC) Origin of Rice Agriculture Project (SAJOR), see Richard S. MacNeish and Jane Libby, eds., *Publications in Anthropology* 13 (El Paso: Centennial Museum, University of Texas at El Paso, 1995). The papers in this volume include one on palynology and palaeoclimate in the Dayuan basin by Wang Xianzheng, Jiang Qianhua, and R. S. MacNeish.

Kären Wigen, *The Making of a Japanese Periphery, 1750-1920*. Berkeley: University of California Press, 1994. 358 pp.; US$42.50.

Volume 27.3 (March 1996) of the journal *World Archaeology*, published by Routledge (Britain), is dedicated to "Hunter-Gatherer Landuse" (ed. P. Rowley-Conwy). For credit-card purchase, telephone 01264-342713 (44-1264-342713 from overseas). Fax number is 01264-342807.

Yin Hongfu, ed., *The Paleobiogeography of China*. Oxford Biogeography Series, no. 8. Oxford: Oxford University Press, 1994.

Ka-che Yip, *Health and National Reconstruction in Nationalist China: The Development of Modern Health Services, 1928–1937*. 304 pp., US$34.00 plus postage. No. 50 in the Association for Asian Studies (U.S.A.) monograph series. Price for AAS members is $27.00.

Zheng Xiangmin, "New Summary Paper on the Paleoenvironment of the Southern Yangtze Delta for the Last 20,000 Years." *The Quaternary Research* 33 (1994): 379–84.

Fellowships

The Institute for Advanced Studies in the Humanities at the University of Edinburgh has visiting research fellowships available for periods of two to six months during 1997-99. Although there are no restrictions on the area of research (within the Humanities), environmental ethics is one of three areas in which applications are especially welcome. The fellowships are essentially honorary, but do carry certain privileges such as free medical care. The application deadline is December 1st 1996. For information about the application procedure, write to The Institute for Advanced Studies in the Humanities, University of Edinburgh, Hope Park Square, Edinburgh EH8 9NW, Scotland. Fax: 0131-668-2252; e-mail: IASH@ed.ac.uk.

Internet Addresses

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

East Asian Archaeology Network listserver discussion group on early East Asian archaeology and history. To subscribe, please send the following message to LSTSRV@CCAT.SAS.UPENN.EDU:

subscribe eaan

Add the word "end" as a second line IF your e-mail programme automatically appends anything (e.g. signature or address) to your messages.

To terminate your subscription, send the message

unsubscribe eaan

To send a message, please send the text to eaan@ccat.sas.upenn.edu.

Japanese Historical Weather Database, 1700–1890. M. Yoshimura (Yamanashi University) et al. have compiled a substantial database of climatic records extracted from Tokugawa and early Meiji diaries. Some of their findings have been stored in the NGDC/World Data Center—A Paleoenvironmental Data Sets, the Internet address for which is http://www.ngdc noaa.gov/paleo/paleo.html. To find the data, click on "IGBP PAGES"; then "PAGES Data Archive at WDCA"; then "historical"; then "japan." After that, click first on "japanindices.readme" for legend for the other files.

Epidemiology and History: An Ecological Approach to the History of Plague in Qing China

Carol Benedict

Georgetown University

[Note: Portions of this essay are adapted from Dr. Benedict's forthcoming book, Bubonic Plague in Nineteenth-Century China*, to be published by Stanford University Press during 1996].*

Plague, the disease reputed to have caused the Black Death in fourteenth-century Europe, has long been the subject of historical inquiry.[1] While most studies have focused on the history of plague in Europe, a number of historians have examined epidemics of plague that have occurred in the non-Western world (Arnold 1993; Dols 1977). Nor have historians of China overlooked this important topic. Indeed, plague has been named as the cause of widespread epidemics in at least three distinct epochs: the end of the Sui and the first two centuries of the Tang dynasty, *c*. 600–800 A.D. (Twitchett 1979: 42, 52; Wu 1936: 11); the late Song and Yuan periods, that is, from the twelfth to the fourteenth century (Fan 1986: 162–63; Wu 1936: 47); and the seventeenth-century Ming-Qing transition, *c*. 1636–44 (Dunstan 1975: 17–28; Fan 1986: 242–43; Lee T'ao 1958: 189–90).

Although historians have searched for plague in China's past, identification of the disease based on Chinese sources alone is very difficult. Classical Chinese medical concepts of disease etiology and pathology are so different from those of modern biomedicine that it is hard to identify any particular disease in the Chinese record using biomedical terminology. If, however, such information is combined with what is known about plague ecology in contemporary China, a retrospective identification can be made with much greater certainty.

In this article, I combine an ecological approach with historical analysis in order to describe two plague epidemics that occurred along the Qing frontiers in the late eighteenth and early twentieth centuries. Such an approach, which examines both the social and the biological factors involved in the spread of the disease, allows the historian to surmount some of the evidentiary difficulties presented by Chinese sources relating to the history of disease generally, and of plague in particular.

Evidentiary Problems in the Historical Identification of Plague

In contemporary biomedical usage, "plague" refers to a specific disease which is caused by the bacillus *Yersinia pestis* (Pollitzer and Meyer 1961: 433–501). Plague is an enzootic disease that primarily affects rodents and other animals and only incidentally affects human beings. Both animals and humans contract the infection from the bites of insects, usually rat fleas. The disease is directly communicable only if plague bacilli enter the lungs, causing the victim to develop secondary pneumonia and cough up blood or respiratory droplets containing *Yersinia pestis*. This rare form of the disease, pneumonic plague, is highly contagious and invariably fatal within one or two days if not treated. In the more common bubonic form, bacilli attack the lymphatic system, and highly visible "buboes" form in the groin, armpits, or neck two or three days after infection. Other symptoms include high fever, shivering, vomiting, headaches, giddiness, and delirium. Treatment with antibiotics in the early stages is now quite effective, but untreated bubonic plague kills between 60 and 90 percent of those infected within five days.

Disease historians rely upon two distinctive features of the bubonic form of plague — rat epizootics and buboes — to identify *Yersinia pestis* infections in the historical record. The fact that human beings generally contract the disease from the fleas of rodents means that descriptions of rat epizootics in primary sources may signal an outbreak of plague. The buboes that give the bubonic form its name are unusual, and mention of such symptoms in written records indicates that the disease may have been present.

While suggestive of plague, reports of such phenomena cannot constitute a definitive retrospective diagnosis, because the only sure way to determine whether plague is (or was) present in the human body is to conduct laboratory tests (Cunningham 1992: 209–44).

Obviously, such rigid scientific criteria make it extraordinarily difficult, if not impossible, to label any past epidemic "plague."[2] This is true even in European history, where there is some degree of linguistic continuity in the use of the term. The *post-facto* identification of plague using Chinese sources is even more problematic. Plague, as a distinct disease, did not exist in the Chinese medical lexicon until the late nineteenth century, when the contemporary name *shuyi* (literally "rat epidemic") came into use.[3] Instead, plague, along with other infectious diseases manifested in epidemics, was folded into the broad category of *yi*. *Yi* tends to refer to any illness that came on suddenly and affected a great number of people in a discrete geographical area, and is generally translated as "epidemic."

Serious methodological issues thus face any historian who attempts to find "plague" in Chinese historical records. These difficulties must be kept in mind when reading the existing literature on the history of plague in pre-modern China. Many historians link the widespread Chinese epidemics in the Song-Yuan period to the fourteenth-century "Black Death" in Europe, arguing that the Black Death originated in China (Wu 1936: 47; Ziegler 1969: 15). William McNeill (1976: 143–46) argues that an epidemic of bubonic plague which occurred in present-day Hebei Province in 1331 was the likely source of plague in Europe. Robert Gottfried is also persuaded that the Black Death came from China. He writes: "The first unimpeachable references appear in 1353, when chroniclers claim that two-thirds of China's population had died since 1331. Whatever the precise dates and circumstances, by the mid-fourteenth century, the Black Death had struck China. . . ." (1983: 35).

As John Norris (1977: 3–6) points out, the assumption that the Black Death originated in China rests upon a few European chronicles and the sketchy records of epidemics found in the eighteenth-century Chinese imperial encyclopedia, the *Gujin tushu jicheng* [Complete collection of writings and illustrations, past and present]. A handful of nearly contemporaneous European sources all refer vaguely to disasters in "the East" that preceded the outbreak of plague in Europe. Sources included in the *Gujin tushu jicheng* record a number of unspecified "epidemics" (*yi*) throughout the fourteenth century, yet there is nothing in these accounts to suggest that these epidemics were linked to the European Black Death.

Similarly, there is little evidence that plague was the cause of the many epidemics that accompanied the seventeenth-century Ming-Qing transition. Nonetheless, Fan Xingzhun (1986: 242–43) and another Chinese medical historian, Lee T'ao (1958: 189–90), argue that plague was responsible for the many epidemics that occurred in Zhejiang, Jiangsu, Shandong, Hubei, and Hunan in the 1640s. They cite gazetteer accounts and medical texts that they believe describe the characteristic symptoms of bubonic plague (spitting up of blood and enlarged lymphatic glands). Fan mentions that the official *Mingshi* (standard history of the Ming Dynasty) and the gazetteer of Dantu County in Jiangsu describe "packs of rats" that crossed rivers in large numbers prior to the outbreak of disease. He speculates that these reports refer to the widespread death of rats preceding an epidemic of plague.

In her pioneering study on the Ming-Qing epidemics, Helen Dunstan (1975: 17–28) has carefully reviewed the available evidence regarding the seventeenth-century epidemics. Like Lee and Fan, Dunstan found gazetteer accounts of plague-like symptoms and also of the migration of rats prior to epidemics. Yet she is far more skeptical about whether these impressionistic descriptions of symptoms and rats refer to plague, concluding that while plague *may* have been the causative organism, it is far more likely that the epidemics were caused by a different disease (possibly typhoid) or a mixture of diseases (especially typhus and amoebic dysentery).

Dunstan stands out, among those who have studied the history of plague in China, for her effort to understand the complex epidemiology of the disease. Unfortunately, information about plague ecology in China was unavailable in 1975, and Dunstan was thus forced to rely on studies of plague in Europe. This led her to assume, for example, that plague can only occur in the summer (because this is when it tended to occur in Europe), and she thus dismissed the many records of epidemics that occurred in other seasons. Similarly, she seems to have assumed that plague normally occurs only in the presence of rat vectors, especially the black rats (*Rattus rattus*) of Europe. In fact, contemporary epidemiological studies indicate that plague can and does exist in many areas of China, that it appears in all four seasons, and that it has many different animal vectors, including, but not restricted to, the brown and black rats of European fame.

Plague Along the Qing Frontier

Plague currently persists among wild mammals living in nine well-defined geographical areas of the People's Republic of China. Designated as "natural plague reservoirs," these wilderness areas exist in seventeen of China's twenty-six provinces and autonomous regions, affect 194 counties, and altogether cover an area of about 500,000 square kilometers (Ji 1988: 64–66, 475). There are more than fifty known plague-carrying mammals living in these nine areas, some forty different insect vectors, and seventeen unique strains of *Yersinia pestis* (Ji: 479–80).

Only two of China's natural plague reservoirs have posed a significant risk to human life in the past two centuries: the Manchurian Plain in northern China and the Western Yunnan Transverse Valley in the southwest. In contrast to the other seven reservoirs, all of which are still in

isolated areas, these are located in regions that experienced significant frontier expansion over the course of the Qing period. It is not coincidental that plague erupted in China during a period of unprecedented population growth and economic expansion along the southern and northern borders. Indeed, it was precisely the incursion by settlers and traders into areas that supported wild animal plague, combined with new transport linkages between peripheries and regional cores, that resulted in the spread of plague in both northern and southern China in the late eighteenth and early twentieth centuries.

The most famous plague epidemic in China occurred on the Manchurian Plain during 1910-11 (Nathan 1967; Wu 1936). The Manchurian pneumonic plague epidemic's origins lay in areas of Mongolia and Siberia where the Siberian marmot or tarbagan (*Marmota sibirica*) sustains a natural plague reservoir. Between 1907 and 1910, the value of marmot skins increased threefold because international furriers learned that marmot fur makes excellent imitation sable (Wu 1936: 31). By 1910, long-standing Qing bans on migration to Manchuria were no longer in effect, and thousands of Chinese trappers moved into the area, hoping to make their fortunes by selling the skins on the world fur market. Unlike Mongol trappers who avoided sick animals, the new arrivals trapped any animal they could find. Living together in crowded railway hostels, often with the pelts stacked close by, these neophytes unwittingly placed themselves at great risk.

On October 13, 1910, a migrant trapper in Manzhouli developed pneumonic plague. Unlike the bubonic form, which relies on rodents and flea vectors for its transmission to humans, the pneumonic form can be passed directly from one person to another by coughing or sneezing. The disease spread rapidly through the packed hostels and quickly killed some 600 men. Panicked trappers fled southward, carrying the disease along the newly developed Manchurian railway system to Harbin on October 27, Changchun on December 31, and Fengtian (Shenyang) on January 2, 1911. Ultimately, some 60,000 persons lost their lives in this epidemic.

The primary cause of the 1910–11 pneumonic plague epidemic was thus a complex mix of social and biological factors. Until the early twentieth century, isolated pockets of enzootic plague in Mongolia and Siberia remained largely undisturbed. Railroad construction, the market demands of the international fur trade, and the loosening of controls over Han immigration to Manchuria stimulated the large-scale movement of fur trappers into these wilderness areas. After pneumonic plague broke out among migrants, the newly-constructed Manchurian railway system allowed for rapid plague diffusion throughout the entire northeast. Once it arrived in the northeast, a new enzootic focus formed on the Manchurian Plain because the disease is easily transferred (via fleas) between the Daurian ground squirrel (*Citellus dauricus*) and the brown rat (*Rattus norvegicus*), the most common commensal rodent in northern China (Ji 1988: 64–66, 475). Human contact with either of these plague carriers poses the risk of human disease. This particular ecology of enzootic plague in northeastern China is the reason human plague has occurred frequently in Manchuria since at least the early twentieth century (Wu 1926, 1936).

In southwestern China, plague also appeared in human communities only after an expanding eighteenth-century population intruded into the natural habitats of plague-carrying animals. Between 1772 and 1830, Yunnan province experienced a devastating series of epidemics which began in the western part of the province and spread slowly eastward. In historical records of these epidemics, there are suggestive descriptions of rat epizootics and buboes, the two distinctive features of the bubonic form of plague. For example, an 1814 memorial by the Yunnan provincial education commissioner Gu Chun describes the characteristic symptoms of the bubonic form of plague: spitting up of blood, and buboes on the bodies of the victims.[4] Such specificity about symptoms is highly unusual in a Qing official report, and suggests that Gu found the symptoms particularly noteworthy. He underscores the eastward progression of the disease, mentioning that the area around Lin'an (in southeast Yunnan) was not affected until 1810 or so, but that other parts of the province had been experiencing the same disease, *yangzi bing*, for more than ten years. He mentions that doctors in the Lin'an area did not recognize the disease: this is significant because it suggests that plague was new to Lin'an. Finally, he describes a great number of deaths during the epidemic and says that there was no known medicine for treating those afflicted.

When this and other historical evidence is combined with what is known about plague ecology in contemporary Yunnan, little doubt remains as to whether plague was present in Yunnan in the late eighteenth century. Lijiang Prefecture, situated in the Hengduan Mountains in the far northwest of Yunnan, was the point of origin of the eighteenth-century Yunnan epidemics, and is now a known reservoir of wild animal plague. The "Western Yunnan Transverse Valley Plague Reservoir" covers some 230 square miles in the Hengduan Mountains, including Lijiang (Zhao 1982: 257–66; Zhao and Yang 1983: 108–9). Two plague-resistant species of wild animals in this mountainous region, the Oriental vole (*Eothenomys miletus*) and a kind of field mouse (*Apodemus chevrieri*) maintain ongoing enzootic infections. The area is also inhabited by the yellow-chested rat (*Rattus flavipectus*), a semi-wild rodent that is highly susceptible to the particular strain of plague present among the *Eothenomys miletus* and the *Apodemus chevrieri* species. The yellow-chested rat is classified as semi-wild because it prefers to live in the upper storeys or roofs of houses, but it also lives in vegetable gardens, fields, or the bush. During the harvest season it lives outside and eats ripe grain; most of the rest of the year it is found in human shelters.

The semi-wild nature of the yellow-chested rat helps to explain the mode of transmission of plague in western Yunnan. Plague is continually passed (via fleas) from wild animals to this rat, which then carries the disease back to human settlements near the wilderness area. People living in the Lijiang region are thus constantly in danger of coming into contact with plague-carrying rats.

Until the Qing period, the natural habitats of the Oriental vole, the *Apodemus chevrieri* field mouse, and the yellow-chested rat remained largely undisturbed. Lijiang was a peripheral area in an undeveloped and relatively unpopulated province. However, during the eighteenth century, the Qing state sponsored massive Han immigration into the province to upgrade and expand the southwestern copper industry (J. Lee 1982: 299; J. Lee 1993). As a result, Yunnan entered a demographic and economic boom that continued into the first decades of the nineteenth century. As Yunnan was transformed from an economic backwater into a dynamic regional economy, it experienced explosive population growth, rapid urban development, and expanded intraregional and interregional trade (ibid.).

During this century of growth, Lijiang came to be an important entrepôt for the Yunnan-Tibetan tea trade (R. Lee 1979: 50). As more and more traders passed through the Lijiang region, they inadvertently traversed an area where plague was enzootic, coming into contact with plague-infected rodents and their fleas. Settlers in the area were also at risk of contracting plague. Indeed, deadly outbreaks of the disease are recorded in Lijiang and the surrounding areas from 1772 until about 1825 (Benedict 1996: 19). In Dengchuan Department, on the northern tip of Erhai Lake, more than "ten thousand" people supposedly died in a 1787 epidemic (1901 *Xu Yunnan tongzhi gao*, 2:21a). In *c.* 1800, the village of Yangtangli in Dengchuan Department experienced an epidemic so devastating that it had not recovered fifty years later. Reportedly, "nine out of ten" houses were left empty by the disease (1853 *Dengchuan zhouzhi*, 3:11b).

As the remote areas of western Yunnan were increasingly linked to other parts of the province, plague spread gradually from western to central and southeastern Yunnan. Some thirty years after the initial appearance of epidemics in the west, Kunming and its surrounding area suffered a series of epidemics between 1803 and 1830 (Benedict 1996: 20). The 1810 Lin'an outbreak mentioned above was the first of several reported for that region until 1827 (ibid.). Thus, between 1810 and 1830, plague was present in many settlements located along Yunnan's major caravan trade routes.

Conclusion

When analyzing past epidemics of plague, it is necessary to describe the dynamic relationship between biological and social factors that were responsible for the appearance and spread of the disease. In both Manchuria in the early twentieth century and Yunnan in the late eighteenth, it was the combination of human agency (development of the frontier, population growth, and changes in transportation networks) and the interaction of humans with the natural environment (intrusions into the habitats of rodents capable of carrying and transmitting plague) that made possible the spread of plague. Outbreaks of plague were the undesirable side-effect of human encroachments into frontier regions where plague was enzootic, followed by the linkage of these remote regions with more densely populated core areas. Given the complex ecology of *Yersinia pestis* infections and the substantial evidentiary problems presented by Chinese sources, historians must study not only the historical record, but also the ecology of particular regions where past plague outbreaks are suspected. Only such an ecological approach can shed light on the etiology of a particular epidemic in the past.

NOTES

1. See Ann Carmichael (1986: 172–75) for an excellent bibliographical essay on the Black Death and the history of plague in Europe.

2. These issues present themselves not only to disease historians but also to epidemiologists working in the present. The nature of the epidemic that broke out in India in the fall of 1994, widely reported to be pneumonic plague, remained controversial even two months after the epidemic ended. Some scientists disputed that the disease was in fact plague because the plague bacillus had not yet been isolated in the laboratory. Others argued that it must be plague because the classic symptoms and pathology of the pneumonic form of plague were evident in those afflicted (*New York Times*, 15 November 1994: C3).

3. By the end of the nineteenth century, *shuyi* was being used by Chinese physicians to describe the disease identified by Western medicine as plague. See, for example, the 1891 treatise *Zhi shuyi fa* [Methods for curing plague] (Zheng 1936 [1901]: preface). Some late nineteenth-century gazetteer compilers used the term *shuyi* as well. See, e.g., 1899 [1876] *Shanglin xianzhi*, 1:10a.

4. For Gu's memorial, see First Historical Archives (Beijing), *Zhupi zouzhe*, *Wenjiao*, *Yiyao weisheng* (Rescripted Palace Memorials, Culture and Education, Medicine and Health), Group 4, Document 207/23 (Jiaqing 19/9/6).

WORKS CITED

Arnold, David. 1993. *Colonizing the Body: State Medicine and Epidemic Disease in Nineteenth Century India*. Berkeley: University of California Press.

Benedict, Carol. 1996. *Bubonic Plague in Nineteenth-Century China*. Stanford: Stanford University Press.

Carmichael, Ann. 1986. *Plague and the Poor in Renaissance Florence*. Cambridge: Cambridge University Press.

Cunningham, Andrew. 1992. "Transforming Plague: The Laboratory and the Identity of Infectious Disease." In Andrew Cunningham and Perry Williams, eds., *The Laboratory Revolution in Medicine* (Cambridge: Cambridge University Press), pp. 209–44.

Dengchuan zhouzhi [Gazetteer of Dengchuan Department]. 1853.

Dols, Michael W. 1977. *The Black Death in the Middle East*. Princeton: Princeton University Press.

Dunstan, Helen. 1975. "The Late Ming Epidemics: A Preliminary Survey." *Ch'ing-shih Wen-t'i* 3, no. 3: 1–59.

Fan Xingzhun. 1986. *Zhongguo yixue shilüe* (A Brief History of Chinese Medicine). Beijing: Zhongyi guji chubanshe.

Gottfried, Robert S. 1983. *The Black Death*. New York: Free Press.

Ji Shuli. 1988. *Shuyi* [Plague]. Beijing: Renmin weisheng chubanshe.

Lee, James. 1982. "The Legacy of Immigration in Southwest China, 1250–1850." *Annales de demographie historique* 1: 279–304.

———. 1993. "State and Economy in Southwest China, 1250–1850." Unpublished manuscript.

Lee, Robert. 1979. "Frontier Politics in the Southwestern Sino-Tibetan Borderlands During the Ch'ing Dynasty." In Joshua Fogel and William Rowe, eds., *Perspectives on a Changing China* (Boulder: Westview Press), pp. 35–68.

Lee, T'ao. 1958. "Chinese Medicine During the Ming Dynasty." *Chinese Medical Journal* 76: 178–98, 285–304.

McNeill, William. 1976. *Plagues and Peoples*. Garden City: Anchor Press, Doubleday.

Nathan, Carl. 1967. *Plague Prevention and Politics in Manchuria, 1910–1931*. Cambridge, Mass.: East Asian Research Center, Harvard University.

Norris, John. 1977. "East or West? The Geographic Origin of the Black Death." *Bulletin of the History of Medicine* 51, no. 1: 1–24.

Pollitzer, R., and Karl Meyer. 1961. "The Ecology of Plague." In Jacques May, ed., *Studies in Disease Ecology* (New York: Hafner), pp. 433–501.

Shanglin xianzhi [Gazetteer of Shanglin County]. 1899 [1876].

Twitchett, Denis. 1979. "Population and Pestilence in T'ang China." In Wolfgang Bauer, ed., *Studia Sino-Mongolica (Festschrift für Herbert Franke)* (Wiesbaden: Franz Steiner Verlag), pp. 35–68.

Wu Lien-teh. 1926. *A Treatise on Pneumonic Plague*. Geneva: League of Nations.

———. 1936. *Plague: A Manual for Medical and Public Health Workers*. Shanghai: National Quarantine Service.

Xu Yunnan tongzhi gao [Revised comprehensive gazetteer of Yunnan]. 1901.

Ziegler, Philip. 1969. *The Black Death*. London: Collins.

Zhao Yongling. 1982. "Jiashu shuyi" [Plague in commensal rats]. *Yunnan yiyao* [Yunnan Medicine] 5: 257–66.

Zhao Yongling and Yang Xiaodong. 1983. "Yunnan shuyi ziran yiyuandi fenbu de tantao" [An inquiry into the distribution of the natural plague foci in Yunnan]. *Yunnan yiyao* [Yunnan medicine] 2: 108–9, 113.

Zheng Xiaoyan. 1936 [1901]. "Shuyi yuebian" [A brief treatise on plague]. In Qiu Jisheng, ed., *Zhenben yishu jicheng* [Collection of precious medical writings], Vol. 7. Shanghai: Shijie shuju.

The Making of the Pearl River Delta

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The Pearl River Delta in Guangdong has long been known as one of the most agriculturally productive and economically developed parts of China, ranking second only to the Yangzi Delta in economic importance.[1] When I first began thinking about the historical processes by which the Pearl River Delta became so central to the development of South China, I had imagined first the natural processes by which the delta had been created, and then the slow but sure reclamation of the delta for agriculture. But I discovered that the story of the delta is much more complex than that.

For the first millennium after Chinese people moved into Lingnan (generally understood as Guangdong and Guangxi provinces) following the Qin conquest of this southern region (*c.* minus 220), what we now call the Pearl River Delta was still open sea, albeit a fairly shallow bay, and residents of Guangzhou, then called Nanhai ("the south sea") looked out onto a bay dotted with islands.[2] To be sure, silt carried downstream by the West, North, and East Rivers had been settling in the bay, slowly creating the upper part of the delta. But because the silt content of these rivers was exceptionally low, the natural processes by which the delta was being created worked extremely slowly. During the centuries from the Han (minus 202 to plus 220) to the Tang (618–907), the part of the Pearl River estuary that was later to become the delta barely changed, remaining mostly water.

By the Song dynasty (960–1279), however, enough of a delta had emerged south of Guangzhou to block the view of

the ocean, and by the Yuan (1271–1368) alluvial sand bars had appeared off the coast in Dongguan County where the East River emptied into the bay. Certainly, though, the largest increases in the size of the delta occurred from the Yuan on. Where virtually no change had occurred in the nine centuries after the founding of the Han, in the 300 years from 1290 to 1582 so much land had been created that what had been the island of Xiangshan became connected to the mainland. Both the change in the shape of the delta over time, and the rate of the change itself, are interesting and significant: what accounts for both?

In the title to this piece, I refer to the "making" of the delta. I chose the word "making" specifically to refer to the action of human beings, for more than anything else, people made the Pearl River Delta. Involved in this story are, in chronological order, the early settlement patterns and agricultural technology of Chinese in-migrants in northern Guangdong; the building of water control projects in the lower reaches of the West, North, and East Rivers from the Song on; the Mongol invasion of South China in the 1270s, and consequent displacement of the Chinese population from northern Guangdong to islands in the Pearl River estuary; and the creation of new lands in the Pearl River estuary by the refugees.

Early Settlement Patterns and Agricultural Technology

1. Slash-and-burn agriculture and its impact in dislodging silt. Slash-and-burn, the earliest and most rudimentary form of agriculture, was practiced in Lingnan until the techniques of wet rice agriculture spread there in the eleventh century. When Chinese migrated into Lingnan first in Han times, and later in greater numbers in the fourth century, they settled in the northern upland areas around Nanxiong and Guilin, rather than in the river valleys further south (the reasons for this will be discussed below). Burning off tracts of land, settlers broadcast millet, barley and wheat (and maybe rice) seeds onto the ash, and then harvested a crop for two or three years until the fertility of the soil was depleted. Abandoning the burned-off ground, the settlers then moved on, and a new tract was burned, the process starting over again.[3]

How much of the original forest the settlers burned off is not at all clear, nor is it clear whether the forest was given sufficient time to recover its composition of broadleaf evergreens before being burned off again, or whether the scrubby Mason's pine (*pinus massoniana*) took the place of the broadleafs. What does seem quite certain, though, is that the slash-and-burn agriculture practiced in the upper reaches of the drainage system opened the hills to greater erosion, and hence to a higher silt content flowing downstream in the West, North, and East Rivers.[4]

Until the eleventh century, much of this silt did not reach the Pearl River Delta, but rather was deposited in the flood plains in the lower reaches of the West, North, and East rivers. Much like the end of a garden hose under high pressure, the lower courses of these rivers flopped around from one outlet to another when monsoonal rains sent water gushing through the system, filling the flood plains with silt-laden water. When the flood waters receded, the silt was left behind. Clearly, the flood plains of the lower reaches of these rivers, especially the area near the confluence of the West and North Rivers, thereby acquired fertile soils with great agricultural potential. But they had two related problems: flooding and malaria. Before the upper reaches of the future Pearl River Delta could become the densely populated, agriculturally rich center of the Lingnan regional economy, the Chinese would have either to change the swampy environment of the flood plains of the West, North, and East Rivers, or else to adapt to that environment, for the South China lowlands were not hospitable to northern Chinese people.

2. The role of malaria in slowing southward migration. To Chinese from the north, all of Lingnan looked diseased. In the words of the Tang-era observer Liu Xun, as translated by Edward Schafer, "The mountains and rivers of Lingbiao [Lingnan] are twisted and jungly; the vapors concentrate and are not easily dispersed or diffused. Therefore there is much mist and fog to cause pestilence."[5] Some areas were thought to be particularly virulent, such as around Qingyuan up the North River from Guangzhou. As Gu Yanwu put it, referring to his reading of Song-era conditions "The country [in Lingnan] was wild and untamed. The climate (*qi*) was barely tolerable, dripping with more than a little malaria. The local people were not known to contract the disease, but people from the central plains were in danger as soon as they arrived. After a few days they began to suffer from fevers or chills."[6]

But it was also apparent to Chinese observers that malaria was not found in all areas of Lingnan. Toward the end of the twelfth century, for instance, Zhou Qufei could write: "Not all deep[ly forested] and wild (*shen guang*) places in Lingnan are necessarily malarious. For example, Qiongzhou on Hainan [Island] and, on the north side of the sea [i.e. on the mainland across from Hainan], Lianzhou bWo aQj, Leizhou, and Huazhou are described as *shen guang*, but there is little malaria." However, certain *shen guang* places in present-day Guangxi — Hengzhou, Yulin, Qinzhou, and Guiping — were all infested.[7] The area around Guilin seems to have been free of malaria: according to Fan Chengda (1120–93), "everywhere south of there is the home of malaria."[8] Northern Guangdong, in particular Nanxiong, Lianzhou a2r aQj, and Shaozhou prefectures, also was malaria-free. Local ecological factors, such as elevation, played the critical role in accounting for the presence of malaria in one area and its absence in another, even if we cannot now be sure exactly what those ecological differences were.[9]

The Chinese in-migrants to Lingnan understood neither the causes of malaria, nor the environmental link to the mosquito, but they did have enough knowledge of where the disease was and was not to guide decisions about where to settle and where to remain. Most came to Lingnan via either

the Meiling Pass or the Lingqu Canal, and then settled in northern Guangdong and Guangxi. This was in part because those were the first regions "south of the mountains" they encountered, and in part because those regions were free of malaria. Once settled, they tended to remain, and the primary reason given was fear of malaria in other parts of Lingnan. According to the genealogies of several lineages that trace their roots to Nanxiong, during Song times fear of malaria kept them from migrating elsewhere in Lingnan, even in the face of mounting population pressure in northern Guangdong.[10] In the south part of Lingnan, significant Han population densities were found not in the Guangzhou region, but along the largely malaria-free southwestern littoral, including the Leizhou Peninsula and the areas to its east and west.

Malaria by itself might have proved sufficient to keep Chinese settlers out of the lower reaches of the West, North, and East Rivers, but the fact was that these areas were swampy and difficult to farm whether or not they were malaria-infested. It is not that the region was unpopulated, for non-Chinese Tai peoples had inhabited it for millennia, and had probably acquired immunity to malaria.[11] Also, of course, there was the Chinese city of Guangzhou, which, being set upon a hill overlooking the Pearl River estuary, was probably free of malaria, as may have been the area just north of the city walls. But Chinese settlement of the nearby malarial valleys required levees to control flooding and drain swamps, opening the flood plains to Chinese-style settled agriculture. Human beings were about to alter the environment to make it more hospitable to them, and most likely inhospitable to the anopheles mosquito too; ecological change cut both ways.

How Song Flood Control Projects Prepared the Way for Settlement in the Yuan

Lingnan experienced two kinds of water control problem: too much water resulting in flooding and waterlogging, and too little or irregular supplies of water during the growing season; the summer monsoon rainfall pattern and the Lingnan drainage system accentuated both. When the monsoons brought rain to Lingnan, most fell in the four summer months, swelling the rivers. From the west, all the rain gathered into the catchment basin that emptied into the West River, and then spilled from Wuzhou down into Guangdong. From the north, all the rain gathered into the North River. The West and the North Rivers joined at Sanshui ("Three Rivers"), some twenty kilometers west of Guangzhou, forming the headwaters of the Pearl River Delta. From the east, the rain drained into the East River basin, pouring into the Pearl River to the east of Guangzhou.

The normal rainfall patterns thus poured huge amounts of water into the system in a very short period. Naturally, the flood plain from Zhaoqing (on the West River) down to Sanshui flooded every year, depositing ever greater amounts of silt eroded from the burned-off hills further upstream in Guangxi. As early as 809, levees constructed downstream from Zhaoqing prevented the West River from following the southern of two branches to the confluence with the North River, restricting the flow to the northern branch.[12] The levee not only opened a flood plain to agriculture, but also sent all the silt-laden flood waters further downstream, thereby increasing the pressure and flooding around Sanshui. Controlling the flooding at the confluence of the West and North Rivers thus was among the first large-scale water control projects to be tackled in Lingnan.

In *c.* 1100, work commenced on what came to be called the Sang Yuan Wei ("mulberry garden enclosure") dike along the West River, forty kilometers southwest of Guangzhou. When it was completed, it protected some 6,500 *qing* (about 100,000 acres) of land from flooding, and inaugurated a new era of agricultural development in that part of Lingnan.[13] About the same time that the Sang Yuan Wei was being built, sea walls along the coast in Leizhou Prefecture and in western Dongguan County were also under construction. In Leizhou, nearly 25,000 *zhang* (about 48 miles) of sea wall were constructed during the Shaoxing era (1131–62), creating some 10,000 *qing* (about 160,000 acres) of arable land by providing protection from periodic inundation by tides and typhoons, and no doubt eliminating the mangrove forests there as well.[14] In Dongguan, the 12,806 *zhang* (about 24 miles) Xianchao (Salt-Tide) dike was built in 1089, making 21,028 *qing* (about 300,000 acres) of land arable.[15]

According to statistics compiled by Ye Xian'en and Tan Dihua, in Song times 28 earthenwork dikes or embankments were built in the lower reaches of the West, North, and East Rivers, totalling 66,024 *zhang* (about 125 miles) in length, and protecting 24,322 *qing* of land (nearly 400,000 acres). During the Yuan an additional 34 embankments were built, adding 50,526 *zhang* (about 96 miles) to the length and 2,320 *qing* of land.[16] In other words, the embankments extended for about 200 miles (or about 100 miles of river if the dikes were on both sides of a channel), and protected about 20 percent of the cultivated land in Yuan-era Guangdong.

These flood control levees had the effect of pinning each river diked into a single course, so that rather than meandering and spilling into numerous courses during the monsoon season, rivers ran straight for the bay. The flood plains, of course, were then opened for agricultural production. But these waterworks begun in the Song had other environmental consequences as well. Draining the swampy backwaters that had remained after the flood waters receded altered the ecological conditions that had favored the malaria-carrying anopheles mosquito, rendering the areas so opened less deadly to Chinese originally from the north. Equally importantly, though, the flood control works channeled the silt away from the former flood plains and directed it further downstream to the headwaters of the Pearl River estuary. As a consequence both of the slash-and-burn agriculture in the hills and of the water control works, the amount of silt pouring into the Pearl River thus increased significantly from the eleventh century on. The changes to

the Pearl River Delta that the increased amount of silt precipitated are evident in maps of the delta. What is not evident, however, is that while more silt entered the upper reaches of the delta, it might have continued to flow further into the bay had it not been "captured" (as explained below) by pioneers who fled to the rocky islands in the bay in the aftermath of the Mongol invasion of the 1270s.

Present at the Creation: The Delta Lineages from Zhujigang

Many of the large, powerful families that came to dominate the economic, social, and political life of the Pearl River Delta by the Ming and Qing dynasties traced their origins to the Nanxiong area in northern Guangdong, in particular the town of Zhujigang.[17] Nanxiong had been the first area settled by Chinese, and the population swelled after the Jin invasion of North China in the 1120s sent refugees fleeing south; many of those who took up residence in Zhujigang, according to later chroniclers, were among the most wealthy and powerful from North China. Resources and wealth were thus concentrated in Zhujigang, at least until the 1270s and the Mongol invasion. Perhaps because the wealthy families of Zhujigang had settled there in the first place out of fear of northern invaders, when Khubilai's armies began moving south in the 1270s, many residents decided to flee in 1273-74, a couple of years before the Mongol armies pushed south to the Nanling mountains.[18] When the Mongol armies crossed the Meiling Pass in 1276, those remaining residents of Zhujigang who could flee did so; those who failed to flee probably died in the battles that devastated much of northern Guangdong. According to the traditions recorded in several genealogies, ninety-seven families (*jia*) with thirty-three different surnames (*xing*) fled south into the area that would become the Pearl River Delta.[19]

Fearing the Mongols more than malaria or adversity, and perhaps hoping to find additional, maritime escape routes, these families settled on the small islands that dotted the Pearl River estuary; many of the large lineages in Xinhui county, for instance, trace their origins to Zhujigang.[20] Even today, the relics of that settlement pattern can be seen in the towns situated on what once were islands but now are hills in an ocean of alluvial soil. Most expressive of this is the town of Shawan, which hugs the southern slope of the island/hill where the town of Panyu too was built; to its west was a mouth of the North River. Shawan means "bay of sand," which in 1276 no doubt it was.[21]

How much cultivable land was available to the settlers of places like Shawan in the fourteenth century is not known. No doubt some alluvium had been deposited by natural processes, perhaps accelerated somewhat by the slash-and-burn agriculture practiced in the hill regions around places like their former home of Zhujigang. As the water from the West and North Rivers flowed into the bay and around the islands, the current slowed on the "leeward" side, allowing the silt to settle. But the new residents in the bay were not content to wait for natural processes to create their agricultural land.

The Creation of *Shatan* (Sand Flat) Fields

In what became the Pearl River Delta, settlers created new fields from the sand bars that formed wherever the current slowed sufficiently for the transported sediment to settle, but mostly on the downstream side of islands, or on the outward side of river bends. Called *shatan* (sand flats), these fields were truly new, having literally arisen from the water. Unlike polders or enclosed fields which had been reclaimed from swamps or coastal flats, the *shatan* "grew" in the Pearl River, adding land where none had previously existed.

The particular topographical and hydrological conditions of the Pearl River estuary and the modifications to both caused by diking contributed to the creation of *shatan*. Before the Sang Yuan Wei and other dikes were built at the headwaters of the delta in the Song, the flood waters of the West and North Rivers had spilled over the river banks, depositing the transported sediment on the swamps bordering the river channels. Some of the silt was carried further down into what was then a bay, creating the delta. But when the dikes were built to prevent flooding, the river course was fixed, and the transported sediment did not settle until further downstream. In Ming and Qing times, this occurred mostly in southern Panyu, northern Xiangshan, Shunde, eastern Xinhui and western Dongguan counties, and it is in these counties that *shatan* first emerged.

Certainly, some of the *shatan* emerged by natural processes, but the majority were constructed. The method of creating *shatan* was relatively simple, but did require years before the land was usable. When a sandbar arose by natural means close to the water level, rocks were thrown around its perimeter not merely to fix the existing sand in place, but also to capture additional sediment. After a more substantial enclosure was built, the sediment was "transformed" by planting legumes (which fix nitrogen in the soil). After three to five years, the *shatan* would be ready for rice. According to the seventeenth-century writer Qu Dajun, a three-year fallow period would be allowed after the first three years of growing rice.[22]

Once one *shatan* was created, more silt would build up on its downstream side. This silt could be captured by the process described above to create further *shatan*, and so on until a whole series of *shatan* extended the cultivated land area to several tens of thousand *mu*. These connected *shatan* were called "mother and child" (*mu zi*) *shatan*, rendering metaphorical the relationship between the original *shatan* and those to which they had given birth. Continuing the Chinese metaphor, one could say that over time whole families or even lineages of *shatan* constituted the Pearl River Delta. But more to the point, the delta had been constructed by people working with natural processes, but in the unusual conditions created by the Mongol invasion of South China.

Curiously, the abandonment of northern Guangdong

farms in the face of the Mongol armies may have hastened the creation of *shatan* in the years or decades following. J. R. McNeill has shown that the soil of farms abandoned in the Mediterranean hill country after the fall of the Roman empire was subject to rapid erosion, contributing both to the degradation of the mountains and to the deposition of silt in the lowlands at the mouths of rivers.[23] A similar process may have occurred in Lingnan following the Mongol invasion, with increased erosion from abandoned northern Guangdong farms sending silt down the North River to the Pearl River estuary. But an important difference with the Mediterranean experience should be noted. In the lowlands of the Mediterranean, the silt was not captured and turned into new land, but rather formed swamps and marshes, creating the conditions for malaria and rendering the lowlands uninhabitable until swamp drainage projects in the eighteenth and nineteenth centuries eliminated this disease. In the Pearl River Delta, by contrast, the new settlers captured the silt and turned it into *shatan*, perhaps preventing the creation of conditions favoring malaria in the first place.

Conclusion

The Pearl River Delta thus was not created by purely natural processes, and had not been simply waiting for Chinese to migrate from the north and reclaim it for agriculture. Rather, the creation of the delta was the result of a complex causal chain. Chinese immigrants into Lingnan preferred to settle in the hills of northern Guangdong, fearful of the diseases in the river valleys further to the south. Their land clearing eventually increased the silt content of the rivers flowing south, but most of that alluvium never reached the bay, being deposited instead in the lower reaches of the North, East, and West river valleys. Only the construction of dikes and levees there in the Song directed the silt-laden waters into the upper reaches of the Pearl River estuary. Even then, that silt might have continued to flow further out into the bay had it not been captured by refugees from the north who had fled from the Mongols to the islands in the bay. The creation of the Pearl River Delta and its emergence as the densely populated, agriculturally rich core of Lingnan was thus a historically contingent rather than a naturally inevitable outcome.

NOTES

1. The Pearl River Delta can be conceived of as the region bounded by an inverted triangle whose base is an east-to-west line running from the confluence of the West and North Rivers near Sanshui through Guangzhou (Canton) to Shilong on the East River in Dongguan County. The apex of the triangle is south of the line at Macao.

2. For the sake of convenience, place names in this article are generally given in their late imperial (Ming and Qing) form, regardless of the period or dynasty under discussion.

3. G. Fenzel, "On the Natural Conditions Affecting the Introduction of Forestry as a Branch of Rural Economy in the Province of Kwangtung, Especially in North Kwangtung", *Lingnan Science Journal*, 7 (1929):45.

4. This conclusion is reached by Chinese hydrologists in Chen Binyin, chief ed., *Zhongguo ziran dili* [The Physical Geography of China] (Beijing: Xinhua shudian, 1982), Vol. 4, *Dibiao shui* [Surface Water], p. 243.

5. Edward H. Schafer, *The Vermilion Bird: T'ang Images of the South* (Berkeley: University of California Press, 1967), p. 130.

6. Gu Yanwu, *Tianxia junguo li bing shu* [Strategic Strengths and Weaknesses of Various Places in the World] (preface dated 1662. Taibei: Siku shanben congshu guan, 1959), 98:28a.

7. Zhou Qufei, *Lingwai dai ta* [Explanations of Things Beyond the Passes] (12th century. Taibei: Shangwu yinshuguan, 1975), 4:2b-3a. The (Song) Lianzhou- Leizhou-Huazhou area apparently remained free of malaria until the nineteenth century. According to one report, "The earliest Customs Records for Pakhoi [Beihai] (1889) state that there was no malaria there and that there was not likely to be any outbreak since the Pakhoi peninsula consisted of dry sandy ground." Four years later, however, in 1893, there was a malaria outbreak in this region. See Ernest Carrol Faust, "An Inquiry into the Prevalence of Malaria in China," *The China Medical Journal* XL, no. 10 (1926): 938–56.

8. Translated and quoted in Schafer, op. cit., p. 132.

9. J. R. McNeill has found that in the Mediterranean, malaria did not extend higher than 500 meters above sea level. John R. McNeill, *The Mountains of the Mediterranean World: An Environmental History* (New York: Cambridge University Press, 1992), p. 350. More research is needed to determine the elevations in Lingnan above which malaria ceased.

10. Chen Lesu, "Zhujigang shi shi" [The True History of Zhujigang], *[Guangdong] Xueshu yanjiu* 1982, no. 6: 140.

11. On acquired immunity to malaria, see Dion R. Bell, *Lecture Notes on Tropical Medicine* (Oxford: Blackwell Scientific Publications, 1990), p. 9, and Alfred R. D. Davies and Brian Maegraith, *Clinical Tropical Diseases* (Oxford: Blackwell Scientific Publications, 1989), pp. 204–5.

12. *Zhongguo ziran dili*, Vol. 4, *Dibiao shui*, p. 183.

13. Wang Ping, "Qing ji Zhujiang Sanjiaozhou de nongtian shuili" [Agricultural Irrigation in the Pearl River Delta in Qing Times], *Jindai Zhongguo qugan shi yantao hui lunwen*

ji [Proceedings of the Conference on Regional Studies of Modern China] (Taibei: Academia Sinica, Institute of Modern History, 1986), pp. 569–71.

14. 1864 *Guangdong tongzhi* [Gazetteer of Guangdong Province], 118:1a–2b.

15. Wang Ping, op. cit., pp. 581-82.

16. Ye Xian'en and Tan Dihua, "Ming Qing Zhujiang Sanjiaozhou nongye shangyehua yu xushi de fazhan" [The Commercialization of Agriculture and Market Development in the Pearl River Delta during the Ming and Qing], *Guangdong shehui kexue*, 1984, no. 2:73.

17. For a brief discussion, see Li Zhuanshi et al., eds., *Lingnan wenhua* [Lingnan Culture] (Shaoguan: Guangdong Renmin chubanshe, 1993), pp. 183–92.

18. *Xinhui xiang tuzhi* [Gazetteer of Xinhui Township] (Hong Kong: Guangzhou xuehui, 1970 reprint of late Qing edition), pp. 84–85.

19. Chen Lesu, op. cit., pp. 144–49.

20. *Xinhui xiang tuzhi*, pp. 85–87.

21. Liu Zhiwei, "Zongzu yu shatian kaifa — Panyu Shawan He zu de ge'an yanjiu" [Lineages and the Opening of *Shatian*: A Case Study of the He Lineage of Shawan Village, Panyu County], *Zhongguo nongshi* [Chinese Agricultural History] 1992, no. 4:34–41. Professor Liu argues that the *shatian* of the He lineage of Shawan can reliably be traced back only to the late sixteenth century at the earliest, not the early fourteenth as implied in the oral traditions of the lineage's origins. Certainly most of the *shatian shatian* were added from the mid-Ming on, especially in the eighteenth century. But that does not invalidate the point that *shatian* began to be created after the Mongol invasion disrupted the previous settlement pattern by which most of Lingnan's Han population resided in the northern hills. Some of Professor Liu's findings have just been published in English as "Lineage on the Sands: The Case of Shawan," in David Faure and Helen F. Siu, eds., *Down to Earth: The Territorial Bond in South China* (Stanford: Stanford University Press, 1995), pp. 21–43.

22. Qu Dajun, *Guangdong xinyu* [New Things Said about Guangdong] (preface dated 1700. Hong Kong: Commercial Press, 1974) 2:57.

23. McNeill, op. cit., pp. 85, 191, 312, and 319–22.

The Political Ecology of Forest Conservation in Xishuangbanna
(I) The View from a Dai Village

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[Note. Ms Grinspoon carried out the research described in this article while an M.F. student at the Yale School of Forestry and Environmental Studies. The project was funded by the Tropical Resources Institute, the Center for International and Area Studies, and the East Asian Studies Department of Yale University. Ms Grinspoon will enter the Ph.D. programme of the above department of the University of California at Berkeley in August 1996. For the full address and her interim e-mail address, see update to the directory of subscribers.

"Mengguo" is not the real name of the village discussed in this article.]

Introduction

Tucked away in the remote corner of southwest China are some of the world's least studied and most diverse tropical rain forests. The Xishuangbanna Nature Reserve was established to protect these rain forests, known as "the bright pearl of the plant kingdom" in China, shortly after the Communist government came to power in 1949. The forests, however, continue to decline. The area covered by natural flora in the region dropped from nearly 70 percent in 1950 to only 20 percent in 1980, and this loss of natural forests has not only led to widespread soil erosion and floods, but also caused the near-extinction of some rare plants (*People's Daily*, 1986).

The Xishuangbanna Dai Autonomous Prefecture lies in southern Yunnan and shares borders with Laos and Burma. The climate is tropical, and rainfall is plentiful throughout most of the year. Tributaries of the Mekong meander throughout the area, which is covered by mountainous and hilly terrain. The largest ethnic group in the area is the Dai minority, who constitute about one-third of the 750,000 inhabitants of the prefecture, and have their own dialect and writing system. The Dai live in compact communities mainly in the river valleys, but also in the mountains.

While conducting fieldwork in the Xishuangbanna Dai Autonomous Prefecture during the summer of 1995, I lived with Dai minority families for two months near the perimeter of the Xishuangbanna Nature Reserve. This experience allowed me to begin to know these local communities and learn about daily life near the reserve. In addition to my work at the village level, I conducted interviews with government officials at the township-, county-, prefectural-, and state-level reserve management

units.

Using a political ecology approach in my research, I examined the structures and processes leading to the decline of Xishuangbanna's protected forests. The political ecology approach emphasizes the social relations within which actors are embedded, and the means by which these social relations affect resources use. It is assumed that the larger social structures and the political-economic processes will affect the actions of the local resource users (Blaikie, 1985; Peluso, 1992).

Before embarking on my fieldwork, I had hypothesized that an autocratic regime, such as that of China today, presumably would govern its nature reserves with a heavy hand. Surprisingly, I found that negotiations between village leaders and local reserve managers in Xishuangbanna are more interactive than in many countries. Through an examination of the process of negotiation between village leaders and local reserve managers, I first characterize these interactions in order to create a basis for understanding how the struggle over forest resources is played out at the village level in Xishuangbanna. Then, I place these interactions in the broader political-economic setting in which they are enmeshed. Although my initial concern is to examine reserve management in one county, this local example is intended to shed light on larger questions concerning the ways in which the changing state-society relations associated with the process of fiscal decentralization are affecting forest conservation efforts in post-Mao China.

As a strategy to build support for the reforms of the post-Mao era, Chinese Communist Party leaders used a fiscal decentralization policy popularly called "eating in separate kitchens." This policy was formulated to build support for the reforms through revenue-sharing contracts negotiated by the central government and provincial governments (Shirk, 1993). A few years after the central government initiated the reforms, most provinces adopted comparable systems of revenue sharing by setting up analogous contracts at the prefectural, county, and township levels.

The changing structure of China's fiscal system has had great consequences for the distribution of public financial resources both within and among local regions (Shirk, 1993). The reforms have led local governments to become increasingly self-reliant in meeting expenditure responsibilities, and have unleashed the entrepreneurial spirit of local officials. The new incentives for local governments to stress revenue mobilization, however, have placed pressure on local governments to generate funds. Local governments are, in turn, forcing work units, including those that are part of the nature reserve management bureaucracy, to show profits or at least become self-sufficient (Park et al., 1995).

A Village Case-Study of the Fate of the Rainforest in the Era of Market Reforms

"Mengguo" (the pseudonym that I have chosen for this village) is one lowland Dai community that borders the Xishuangbanna Nature Reserve. It has a population of nearly 450 people in less than 100 households. The village covers some 4,000 *mu* of forested hillsides, less than 500 *mu* of secondary forest, and about 40 *mu* of fuel wood forests. The village was split in half in 1963 by a new north-south paved highway running from Jinghong, Xishuangbanna's prefectural capital, to the Burmese border. The land near the western side of the road is covered with traditional Dai houses and slopes downward to a basin filled with rice paddies. The gentle slopes on the far side of the basin are communal village land covered by secondary rain forests and young rubber tree plantations. On the eastern side of the highway, houses are built on the steep hillside marked by a grand old *Ficus* tree.

Majestic *Ficus* trees are left standing in Xishuangbanna even as the villagers transform their forests into rubber tree plantations and fruit tree orchards because the Dai people still believe in the powerful spirit of these trees. The *Ficus* trees that dot the landscape are a visible remnant of the Dai people's once strong belief in a polytheistic religion closely linked to the natural world. After the introduction of Hinayana Buddhism in about the tenth century A.D., the Dai practiced a form of Hinayana Buddhism interwoven with elements of their former tradition (Pei Shengji, 1982).

For the villagers of Mengguo, the eastern side of the highway and a stream running down the steep hillside delineate, respectively, the western and southern boundaries of the nature reserve. During the summer, deep-green rice paddies line the main river valley that runs through the reserve. Over one-third of Mengguo's village paddy land lies inside the reserve. The land was opened nearly a century ago when the village was located on land that is today part of the reserve. Although the village was moved from this land many decades ago, the reserve management officials still recognize the villagers' historic claims to cultivate this land.

The reserve managers even turn a blind eye to the villagers' opening up a little more paddy land each year. Today, the paddy land goes a couple of kilometers deeper into the reserve, past the site of the old village. The reserve managers have also permitted the villagers to plant maize on land extending up to thirty meters from their paddies. Moreover, because the villagers now spend so much time in the reserve planting rice and harvesting maize, they have built grass huts on their old land inside the reserve for use during these busy seasons.

In 1989, Mengguo's village leader received permission from reserve managers to construct a road into the reserve in order to give the villagers better access to their rice paddies. The road cost 10,000 *yuan* to build; this money came from the sale of timber cut from the last remaining hardwood stands on Mengguo's communal village land. The road has

had a large impact on land-use in the reserve. Every day, when the villagers ride their tractors out of the reserve, they bring with them cloth bags and rattan baskets filled with mushrooms, edible fungus, wild vegetables, and *dong* (a type of leaf used daily for wrapping food).

Sometimes the tractors are filled with logs cut from "windblown" trees (that is, trees supposedly downed by the wind). Villagers pay a small sum of money to the township reserve management for this low-quality timber. A large pile of these low-grade logs sat all summer below the concrete sign bearing the village name. The village treasurer explained to me, as he was chopping wood, that the logs sold for 65 *yuan* per tractor load. Sales of fuel wood are increasing dramatically. With the rise in tourism, restaurants in the nearby township need more firewood to fuel cooking stoves.

Villages also purchase high-quality logs (also called "windblown trees") from the township reserve management. The village leaders must pay the township reserve management officials several hundred *yuan* per cubic meter for these larger "windblown" trees. The township reserve management is allowed to sell "windblown" trees from the reserve, but it is doubtful whether all of these trees actually died from natural causes. The township officials are only permitted by law to charge 150 *yuan* per cubic meter. They must report any sales to the county-level management office, with which they are required to share half of any income. So, the township reserve management officials directly pocket about an extra 100 *yuan* for every cubic meter of wood they sell, which is a good incentive to allow the villagers to cut both windblown and live trees. The township reserve management office was given a stern warning to stop selling windblown trees, and the practice may have stopped by now.

From the time of the post-Mao land reform (early 1980s) until a couple of years ago, the Mengguo villagers had built their homes using the hardwoods from the village's collective forest. Villagers were allowed to fell trees in the collective forest for home building with the permission of the village leader, which was easy to obtain. During the 1980s and early 1990s, villagers built spacious houses similar in size and style to those of the lords who governed Xishuangbanna before the Communist revolution. Prior to 1949, by contrast, the villagers had built their houses using bamboo and *Cassia siamea*, a type of tree that the Dai have cultivated and pollarded for fuel wood and building material for centuries. In those days, the villagers were prohibited from building houses out of hardwoods not because these trees were scarce, but because it would have been considered an affront to the lords' authority to build a home similar to theirs. The villagers say that they did not even have iron axes or other tools that would have made felling such massive trees possible. It was not until the beginning of the post-Mao reform era that the villagers began to build such large houses. Every family except one has built a new house out of hardwoods since the end of the 1970s. As some families are becoming increasingly prosperous, they are building more impressive houses because house size is a symbol of prestige. Some of the newest houses in the village are bigger than those of the former lords ever were.

During this frantic period of house building, the villagers logged selectively, depleting the supply of timber on the collective village lands. However, the forests were not clear-felled until a series of timber sales was conducted in order to pay for infrastructure projects. These projects included construction of a water pipe to bring clean water from the mountains inside the reserve down to the village, the building of a road into the reserve, and, most recently, installation of a satellite dish and cable television for the village. In years past, these infrastructure projects would have been funded through the county- or township-level governments, but with increasing pressure to become self-sufficient, these local governments encouraged the village leaders to liquidate the standing capital in their forests to finance modernization projects which bring the local governments prestige.

The village's collective forest is now denuded of hardwoods. Entrepreneurial village cadres and the local reserve management officials have quickly filled the void by initiating the sale of "windblown" trees to supply the villagers with timber. Now villagers buy timber worth 6,000 to 10,000 *yuan* from the village leaders to build one house. Moreover, building a house was traditionally a communal village effort that was accomplished in a day. Now it has become an individual family enterprise that takes weeks and can involve considerable debt.

Although no one is supposed to live in the reserve, recently elderly villagers have begun to move back into the reserve, where they live in grass huts and raise chickens. Their adult children bring them rice, but they gather the rest of their food and fuel wood in the reserve. Living in the reserve, these old villagers often take care of grazing the cattle, as well as keeping an eye on their family's paddy land and plots of the highly valued medicinal herb *Amomum villosum*.

The resolution of conflicts over the villagers' use of reserve land for cultivating *Amomum villosum* exemplifies the interactions between reserve managers and village leaders. *Amomum villosum* (*sharen* in Chinese) is a close relative of cardamon, and is native to the forests of Guangdong. It has been used as a stomach remedy for 800 years in China and is a primary ingredient in over thirty traditional Chinese medicines still used today.

In 1963, the Yunnan provincial government began heavily promoting the cultivation of *Amomum villosum* to improve Xishuangbanna's economy and lift the local people out of poverty. During the 1970s, villagers planted the herb on what was then designated as commune land. After the end of the commune era, the land reforms of the 1980s redefined property rights and designated some land on which villagers had already planted *Amomum villosum* as nature reserve. The villagers' harvesting of *Amomum*

villosum fruits then became considered "stealing."

Reserve managers never attempted to prevent the villagers from "stealing" *Amomum villosum* fruits, but the managers did prevent them from opening any new areas for cultivation of the herb. In 1992, reserve managers began pulling up newly planted *Amomum villosum* on plots that the villagers had newly opened. The villagers, knowing that they had no legal rights to land in the reserve, did not complain to any local officials, fearing that they would be punished for their activities in the reserve.

One old man whose *Amomum villosum* plants were pulled up asked his son, a county official in Mengla, to try to deal with the problem. This official applied pressure on the township government officials to make sure that the local nature reserve management office did not interfere with the villagers' use of reserve land for planting the herb. Finally, the local township-level reserve management agreed to allow the farmers to replant the *Amomum vilosum* in exchange for a small fee for renting the land. They then discovered that the small fee was not worth the effort required to collect it.

Today the banks of almost every stream in the nature reserve are cultivated with *Amomum villosum* plants which have grown to over one meter in height. As one walks along these streams, the view is dominated by *Amomum villosum* on the ground and the pillar-like trees that seem to rise up to the sky. Rattan (*Calamus*) is wrapped like a tightly knitted rope around these huge trees. The sunlight glares above the dense canopy, but beneath it the intensity of light is low and, more importantly for the *Amomum villosum* plants, the humidity is high. These are conditions under which *Amomum villosum* thrives.

The township reserve management officials can profit greatly from the sale of medicinal herbs cultivated by the villagers in the understory of the reserve's rain forests. Through use of their personal ties, cadres who held power in the commune era now take advantage of the opportunities in the new decentralized system. Village cadres in the post-Mao era supervise many types of commercial transaction and local enterprise. They are charged with the responsibility of making sure that their village prospers in the new market environment. Local cadres and village governments are better equipped to deal with the complexities of the market because farmers do not have access to information about market demand and prices (Oi, 1989). Cadres and their friends have therefore taken on the role of middlemen selling the *Amomum villosum* and make many times the profit that the villagers themselves receive.

The reserve managers wisely recognize that they cannot build a wall around the reserve, so they must first make sure that the villagers' economic needs are satisfied before they can protect the local flora. By allowing the villagers to utilize the unique environment created by the old-growth forests, the reserve managers give the villagers real economic incentives to protect the reserve's trees. Cultivating *Amomum villosum* in the reserve, however, may not be an ideal solution to the problems of reserve management in Xishuangbanna. Over the course of three or four decades, cultivating *Amomum villosum* in the reserve will have a negative impact on biodiversity as the herb out-competes the young hardwood seedlings. When the older hardwood trees begin to mature and die, no young trees will be able to grow in their place. With fewer large trees for shade, the environment will become lighter and dryer. In the long run, not only will biodiversity be lost, but so will the environment suitable for *Amomum villosum* and the villagers' extra income.

[The second instalment of this article will be included in the November 1996 issue of CEHN]

WORKS CITED

Blaikie, Piers. 1985. *The Political Economy of Soil Erosion in Developing Countries*. New York: John Wiley and Sons.

Oi, Jean C. 1989. *State and Peasant in Contemporary China: The Political Economy of Village Government*. Berkeley: University of California Press.

Pei Shengji. 1985. "Some Effects of the Dai People's Cultural Beliefs and Practices upon the Plant Environment of Xishuangbanna, Yunnan Province, Southwest China." In *Cultural Values and Human Ecology*. Michigan Papers on South and Southeast Asia. Ann Arbor: University of Michigan.

Peluso, Nancy. 1992. "The Political Ecology of Extraction and Extractive Reserves in East Kalimantan, Indonesia." *Development and Change* 4 (23): 49–74.

Shirk, Susan. 1993. *The Political Logic of Economic Reform in China*. Berkeley: University of California Press.

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