CHINESE ENVIRONMENTAL HISTORY NEWSLETTER

Issue 2:1, May 1995

From the Editor

This, the third issue of the newsletter, includes the second instalment of Christian Daniels's survey of the relationship between ethnohistory and environmental history in South-west China; a report on a scientific conference on the evolution of the East Asian environment held in Hong Kong in January; introductions to two database projects (one originally started within China by a pioneering Chinese scholar, the other, using GIS, involving collaboration among an impressive array of Australian universities); and a short account of an M.A. thesis on the significance of the royal hunt in the Shang dynasty. While it may confidently be predicted that not every reader will find every contribution equally relevant to his or her research interests, the mixed contents of this issue reflect the editor's belief in the necessity for thoroughgoing interdisciplinary awareness in the field of environmental history. As Fang Jinqi reminds us in his database report (below), although much significant progress will continue to be made by scholars working within the framework of a single discipline (or two or more related disciplines), the full potential of the subject cannot be realized without discussion and cooperation between natural scientists, and scholars of the humanities and social sciences. This newsletter encourages relevant contributions from all three communities, as well as reports of collaborative projects.

Appended to this issue is the directory of subscribers. Only persons who have explicitly subscribed to the newsletter are included. In the case of hard-copy subscribers, those who have requested a subscription but omitted to pay for it are not included on this occasion. (Hard-copy subscriptions within the PRC remain free for the time being). Supplementary lists will be published in subsequent issues of the newsletter.

The publication of the directory is intended to facilitate networking among subscribers, especially those with access to e-mail. Communications which may be of interest to all subscribers, or which are intended for a multi-disciplinary readership, can be sent to the newsletter editor for general distribution; at the same time, it will be possible for any subscriber to open conversations directly (i.e. without going through the editor) with the smaller number of people with related research interests (within or across disciplinary boundaries). In other words, we should (in theory) have the framework for electronic discussion among specialists *without* the inconveniences of the conventional "list" (which can, in some scholars' experience, be more of a distraction than a blessing!) In order to facilitate such decentralized networking, rough lists of subscribers arranged by main research areas have been appended to the directory.

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Although communications sent to the editor for general distribution can be informal, the editor reserves the right to edit, and to decline to distribute any which are irrelevant to environmental history (broadly defined) or which, in her judgement, violate normal standards of professional courtesy or integrity.

Thanks are due to Liu Ts'ui-jung and her students (Academia Sinica) for preparing the Chinese-language version of this issue, to Liu Shi-yung (University of Pittsburgh) for physical production of the Chinese-language version, and to Robert Marks (Whittier College) and Wu Kegang (University of Liverpool) for consultation services.

It remains only to wish all subscribers a rewarding and productive summer/winter (as the case may be), and to encourage the submission of contributions for the November issue!

Noticeboard

Conferences

Symposium on Ecotourism in East Asia, Taipei, May 1995

This symposium, sponsored by the Institute of Natural Resources, National Dong Hwa University, will be held on May 19th–20th, 1995. For further information, please contact:

Prof. Wang Hurng-Jyuhn
Institute of Natural Resources
National Dong Hwa University
Hualien
Taiwan R.O.C.
Tel: 038-662500, ext. 175
Fax: 038-662533

"From the Jomon to Star Carr: Hunter-Gatherers of East and West Temperate Eurasia." Cambridge and Durham (England), September 1995.

This international conference will be held at the Universities of Cambridge and Durham during September 1995. It will explore the following eight themes relating to the archaeology of Holocene hunter-gatherers in East and West Eurasia: "Historical Development of Jomon and Mesolithic Studies; Transition from Pleistocene to Holocene; Territoriality and Landscape Use; Technology and Material Culture; Society, Symbolism and Religion; Ecology and Subsistence; Intra-site Analysis; and Towards Agriculture." The conference organizers within England are Simon Kaner and Liliana Janik of the Department of Archaeology at Cambridge, and Peter Rowley-Conwy of the Department of Archaeology at Durham (46 Saddler St., Durham DH1 3NU, U.K. Tel. 0191-374-3632; 0191-374-3619).

Professional associations

American Society for Environmental History

The American Society for Environmental History (ASEH) was founded in 1977 to promote the interdisciplinary study of past environmental change. Its members come from many intellectual backgrounds: history, geography, ecology, anthropology, natural resource management, landscape architecture, and literature. To disseminate serious scholarly research, the Society publishes a quarterly journal, *Environmental History Review*, as well as a newsletter that keeps members posted about events and issues related to the field. It sponsors a biennial conference at which members gather to share their work. It also sponsors an e-mail discussion list, ASEH-L, to foster the electronic discussion of environmental history. The Society works actively to promote the study of environmental history in all disciplines, and encourages anyone who has an interest in the field to join and become involved in its work.

For their annual membership fee, ASEH members receive: a subscription to the quarterly journal, *Environmental History Review*; a subscription to the ASEH Newsletter; special rates at the Society's biennial conferences; notification of meetings and other events related to environmental history; and reference and referral services to scholars with related interests.

Membership is on a calendar year basis (i.e. January–December). Cheques should be made payable to ASEH, and must be in U.S. dollars, drawn on a U.S. bank. Students should provide a copy of their current student I.D. to receive the student rate. Subscriptions should be sent to:

American Society for Environmental History
Attn.: Arlene McKenna, Managing Editor
Center for Technology Studies
New Jersey Institute of Technology
Newark NJ 07102
U.S.A.

Annual subscription rates, in U.S.$:

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To subscribe to the e-mail discussion group, send the message "sub aseh-l <your name>" (excluding quotation marks) to listproc@unicorn.acs.ttu.edu#026#.

Publications

Teaching resource. Teachers of courses on environmental history, and on Chinese history with an environmental component, might wish to consider using Mark Elvin's article "Three Thousand Years of Unsustainable Growth: China's Environment from Archaic Times to the Present" for a stimulating overview of the issues. The article will be found in *East Asian History* No. 6, Dec. 1993, pp. 7–46;

copies of this issue may be ordered from The Secretary, Pacific and Asian History, Research School of Pacific and Asian Studies, Australian National University, Canberra, A.C.T. 0200, Australia, for U.S.$ 22.50 (including postage). The author, who owns the copyright, is happy to allow unlimited photocopying by members of academic institutions for teaching and research purposes. There is no need to submit individual requests for copyright permission.

Yunnan article off-prints available. Christian Daniels still has several off-prints of his article "Unnan Shō Seisō Hanna Taizoku no seitō gijutsu to shinrin hogo: genchi chō-sa ni miru sono rekishi" [Sugar Technology and Forest Conservation Methods of the Dai People in Sip Song Panna (Xishuang Banna), Yunnan] (see Daniels's article in this issue of CEHN). The article, which is written entirely in Japanese, includes thirty-four splendid original colour photographs. Those wishing to obtain an off-print should write to Dr Daniels at Institute for the Study of Languages and Cultures of Asia and Africa, Tokyo University of Foreign Studies, 4-51-21 Nishigahara, Kita-ku, Tokyo, Japan 114.

Pastoralists' problems. J.W. Longworth and G.J. Williamson of the University of Queensland have recently published *China's Pastoral Region: Sheep and Wool, Minority Nationalities, Rangeland Degradation and Sustainable Development*. The publishers' announcement reads, in part, as follows. "This book, based on extensive fieldwork spanning four and a half years, is about preserving and improving the livelihood of pastoral communities in northern and north western China. [It] deals with many aspects ... not previously discussed in the literature [on China]. Ecological damage to natural grasslands is one of the most serious but least well documented environmental issues facing humankind. This book provides first-hand observations on the nature and extent of the problem in northern and north west China. The authors demonstrate that sustainable development requires the instigation of policy-determined institutional structures and incentives as well as the provision of technical assistance." The book may be ordered from CAB INTERNATIONAL, Wallingford, OX10 8DE, England (e-mail M.LEGG@CABI.ORG), or DA Books, 648 Whitehorse Road, Mitcham, Victoria 3132, Australia (fax 03-873-5679). The price is £45.00 (U.S.$ 85.50).

Newsletter on Indonesia. The *Indonesian Environmental History Newsletter* is edited by Freek Colombijn and David Henley, and published twice a year by the EDEN (Ecology, Demography and Economy in Nusantra) research programme. It is obtainable from KITLV, P.O. Box 9515, 2300 RA Leiden, The Netherlands (tel. 71-272295; fax 71-272638).

Other items of interest

Chinese Environment and Development (A Review of Physical and Human Aspects). Quarterly journal, edited by Shiu-hung Luk and Joseph Whitney, University of Toronto; published by M.E. Sharpe, Inc., 80 Business Park Drive, Armonk NY 10504, U.S.A. (tel. 800-541-6563).

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

David Dudgeon and Richard Corlett, *Hills and Streams: An Ecology of Hong Kong*. Hong Kong University Press, 1994, U.S.$ 18.00, paperback. "Documents Hong Kong's freshwater and terrestrial habitats in the face of intense human impact."

Conrad Totman, *The Lumber Industry in Early Modern Japan*. University of Hawaii Press, U.S.$ 35.00.

Malcolm Tull and A. R. Krishnan, "Resource Use and Environmental Management in Japan, 1890–1990." Included in the September 1994 issue of the *Australian Economic History Review*.

Environmental Degradation, Forest Protection and Ethno-History in Yunnan
(II) Traditional Practices of Non-Han Swidden Cultivators for the Protection of Forests

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Common opinion in China holds that swidden ("slash-and-burn") cultivation is a primitive, backward and barbaric form of agriculture which destroys woodlands and causes soil erosion. The Chinese anthropologist Yin Shaoting has eloquently refuted this prejudice in his 1991 book on Yunnan swidden agriculture, *Yige chongman zhengyi de wenhua shengtai tixi: Yunnan daogeng huozhong yanjiu* [A Highly Controversial Culturo-ecological System: Slash-and-Burn Cultivation in Yunnan].[1] He has demonstrated that swidden agriculture is not, by definition, inefficient in terms of labour productivity or destructive of the environment. He has also argued that historically it has functioned as an agronomic system well adapted to an

environment rich in forest resources, as long as population density levels remained low. These points have been made before by agronomists and anthropologists working on other regions, but Yin is the first scholar to have published a fully detailed exposition for China.

Yige chongman zhengyi de wenhua shengtai tixi is an exceptionally important book, which, together with its sequel published in 1994,[2] should be read by agronomists, anthropologists, ecologists and historians. Not only does it distinguish between the different types of swidden cultivation practised, elucidate the various patterns of crop rotation, and consider the effect of the tools used on the environment; it also makes some very pertinent comments on the future of swidden agriculture among the non-Han. The arguments and opinions presented carry great weight because they are based on data collected by the author in extended periods of field work conducted during the 1980s, and not available elsewhere. Here, I will draw on Yin's 1991 book to explain some of the traditional practices of swidden cultivators for protecting forests.

Yin shows that before collectivization during the 1950s, hill peoples regulated the way they utilized land resources. Villagers clearly defined the extent of the land belonging to their settlements, and classified it according to type of use. Common classifications included sacred forests; burial hills; scenery forests; water conservation forests; path protection forests; hunting grounds; and agricultural land. Swidden cultivators did not "recklessly slash and burn", as is often claimed. On the contrary, they made planned use of the environment. The first four categories of forest functioned as nature reserves, so let us look at each in turn.

1. Sacred forests. Members of hill-farming communities designated woodlands where the gods dwelled as sacred forests, and strictly forbade people from entering, except for making the annual sacrifices to the mountain and earth gods. Since the villagers firmly believed that trespassing on these sanctuaries for the purposes of tree felling, cultivation, hunting and gathering would bring them great misfortune, these forests generally remained pristine. Remnants of them may still be seen today in the patches of primary forest among villages in Lancang County and Xishuang Banna Dai Minority Autonomous *Zhou*, both of which lie close to the Burmese (Myan Mar) and Laotian borders in southernmost Yunnan.[3] The idea of sacred forests was not the sole preserve of swidden cultivators, as the Dai, the principal wet rice cultivators on the lowland basins in Xishuang Banna, also practised a similar form of conservation in their veneration of sacred hills. The ethno-botanist Pei Shengji has described their beliefs and practices, and shown how sacred hills have saved the local *fauna* and *flora* from human-induced destruction.[4]

2. Burial hills. The protection of burial hills, usually located far from the dwellings, was an important concern for villagers. The burning of burial hills by outsiders could lead to feuding, as such action was tantamount to violating a grave.

3. Scenery forests. This term refers to the trees and bamboo left growing around villages for beautification. These woods also had a cooling effect, and served as shelters against dust, wind and floods.

4. Water conservation forests. Vegetation cover for several hundred metres along both sides of gullies, and that around streams, brooks and springs utilized by human beings, received protection and was left untouched. Also, when clearing land, swidden cultivators did not cut the trees on ridges and in the hollows on slopes. They had two purposes in mind here. In the first place, the trees prevented fire from going up the slope and crossing over to the other side of the hill in the repeated burnings required to prepare the land for cultivation. After an initial firing, cultivators collected the half-burnt material into heaps and ignited it again to ensure that the ashes spread over the surface of the clearance as evenly as possible. Depending on circumstances, cultivators could repeat these secondary firings three or four times. The purpose of these controlled burnings was to create an ash fertilizer, and the trees retained on the ridges acted as a barrier against the spread of fire.

Secondly, however, the preservation of the trees on ridges and in hollows assisted water retention. Swidden cultivators understood that natural forest vegetation enhanced the penetration of precipitation into the ground and provided them with a constant supply of water for household use.[5]

Villagers and consanguineal clans laid down various rules and regulations which specifically prohibited the destruction of these four types of forest, and often organized groups to enforce them. For instance, among the Jinuo minority people in Xishuang Banna, youths over fourteen years of age were charged with the task of patrolling these forest reserves, and their head, who was appointed annually by the village elders, had authority to fine offenders, children and adults alike. The collectivization of land and other government policies implemented during the 1950s and 1960s destroyed the social system and religious beliefs upon which the conservationist attitude of many non-Han peoples was founded. This has brought about the disappearance of traditional policing activities by villagers, but remnants of these forests can still be seen in some border area villages today.

Yin emphasizes four techniques practised by swidden cultivators which had positive effects for the maintenance of the environment. First, land was divided out amongst villagers according to the customs of the different peoples: allocation by village or clan elders appears to have been common. Planned allocation of land ensured that cultivators alternated cropping and fallow in a rotation

system to allow for regeneration. Second, cultivators selected crops that were suited to the soil conditions of different locations. Third, most swidden cultivators were particularly careful to avoid killing the stumps of felled trees. They avoided disturbing the roots during cultivation, and even covered the stumps with leaves during dry periods to prevent them from becoming desiccated. Finally, some peoples had, and still preserve, a custom of reforesting to prevent the degradation of forest land. They planted fast-growing trees, or trees with a high commercial value, on fallow land for the purposes of fertilizing the soil and obtaining economic benefits. *Alnus nepalensis* D. Don (the *shuidonggua*, "water winter melon" tree), lacquer trees and pine trees were, and still are, the main trees cultivated.

Alnus nepalensis grows into a large tree within five years in places with sufficient rainfall, and is highly prized for its efficiency in returning fertility to the soil. The bacteria (an azotobacter called *bacillus radicicola* Beijerinok) on its roots have an exceptionally strong nitrogen fixing effect. This tree also bears a large quantity of leaves which, after falling, provide the soil with nutrients more rapidly than those of other trees. In the past, and at present, the Wa, Jingpo, Lisu and Dulong peoples have planted this tree, but their cultivation methods differ. For instance, the Jingpo in Kachang, Yingjiang County, mixed the seeds of *alnus nepalensis* and upland rice, and broadcast them together, while the Dulong planted seedlings of this tree together with other crops on land in the second year of cultivation after forest clearance. The growth period varied from four to eight years; the wood could be used for fuel, and the thick trunks as timber for houses and furniture.

The Lemo ren (a sub-group of the Bai people), who dwell in the Luobenzhuo district of Lushui County, and some members of the Nu minority people cultivate lacquer trees in cropping and fallow rotations. In February and March, the Lemo broadcast lacquer tree seeds on the slopes of high mountains, and in March of the following year they transplant the seedlings to fields at a lower elevation. *Alnus nepalensis* seedlings may also be transplanted at the same time in order to enhance soil fertility with their nitrogen fixing effect. Forty to fifty lacquer tree seedlings are planted per *mu* on relatively fertile land, while fifty to sixty are planted per *mu* on less fertile ground. In April or May of that year, maize and kidney beans (*phaseolus vulgaris* L.) are intercropped between the seedlings. Intercropping ceases three to four years later, when the trees have grown tall and come to shade the ground. Latex tapping commences after the lacquer trees have attained an age of eight years, and they yield about fourteen kilograms per *mu*. After about ten years of tapping, the trees are chopped down and burnt to fertilize the soil. At that point, planting begins all over again. Cultivators sell the latex, thus gaining an income from the land during the fallow period, and are still able to burn the tree for fertilizer at the end of the cycle. Although Yin does not specifically mention it, we can assume that mixing lacquer trees or other trees of economic value in with maize and other food crops is a good way of preventing the notorious erosion problems which Han Chinese farmers created when they began the permanent cultivation of New World food crops on hill slopes after the seventeenth century.[6]

The combination of tree farming with a slash-and-burn rotation system of cropping and fallow increases the degree of land-use intensification principally because it extends the period over which the land can be utilized: the planting of fast-growing, soil-fertilizing trees rejuvenates soil strength, and thus helps to shorten the fallow period. Stressing these, and all other advantages outlined above, Yin Shaoting recommends this type of commercial tree farming as the most effective method of increasing the incomes of swidden agriculturalists who have no other options open to them.

Let us not forget that lowland wet rice cultivators also practised reforestation. The Dai people of Xishuang Banna still cultivate fuelwood forests today. Each Dai family plants *cassia siamea* Lam. on the gentle slopes in the vicinity of its village, and uses this tree as a source of firewood. Seeds are sown on burned slopes in May to June at the beginning of the rainy season, and the first pollarding takes place four to five years later, when the trees reach a height of about fifteen metres with a trunk diameter of ten to fifteen centimetres. The tree is cut at a point about one metre up the trunk, and the upper foliage is used for fuel. Within five years, three to five new branches have sprouted to a height of eight to ten metres (trunk diameter of five to eight centimetres), and these are chopped down, leaving the stump as before. Thereafter, the new growth is pollarded every three years.

According to estimates given by Pei Shengji, a cultivated *cassia siamea* forest can be harvested in this way for about a hundred years, and yields sixty cubic metres of fuelwood per hectare at every triennial cutting. Pei calculates that each Dai uses 1.0-1.5 cubic metres of fuelwood per year, and that 0.1 hectares of this tree are sufficient to meet the fuel needs of one person.[7] From my own experience, I doubt whether Dai villagers are still able to provide for all their fuelwood requirements from their own *cassia siamea* forests today, though it cannot be denied that they still rely on them a great deal. Nevertheless, Pei is undoubtedly correct in saying that by providing a constant source of fuel, the cultivation of this tree over the past 400 years has reduced pressure on natural forests for energy.

In their traditional agricultural systems, swidden cultivators and the Dai strove to protect their environment, for they knew that in the long run they would be the ones to suffer the consequences of resource depletion. In spite of Yin's convincing data, one cannot help wondering why the hill peoples today lack their past enthusiasm for environmental protection. This will be the topic of the next installment.

[Final installment: "Nature Reserves and Non-Han Swidden Cultivators." Forthcoming in the November 1995 issue of

CEHN.]

REFERENCES

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

2. Yin Shaoting, *Senlin yunyu de nonggeng wenhua: Yunnan daogeng huozhong zhi* [A Farming Culture Formed by Forest: Slash-and Burn Cultivation in Yunnan]. Kunming: Yunnan Renmin Chubanshe, 1994.

3. The Xishuang Banna Dai Minority Autonomous *Zhou* was set up in 1953 by the People's Republic of China. The area under its jurisdiction roughly corresponds to that of its forerunner, the kingdom of Sipsong Panna, which was a polity dominated by Tai Lw people (a Tai language speaking people known as Dai in Chinese). The Tai Lw potentate of this polity ruled over the various ethnic peoples who practiced swidden agriculture in the highlands, as well as his own Tai Lw people who cultivated wet rice on the lowland basins. From the late thirteenth century, China established indirect control over Sipsong Panna by incorporating it into the *tusi* system. The Yuan dynasty conferred the highly prestigious title of *xuanwei shi* (Pacification Commissioner) on the potentate of Sipsong Panna, and the Ming and Qing dynasties, as well as the Republican government, all recognized his position. However, the PRC abolished the *tusi* system in the 1950s.

Under the *tusi* system, China allowed the Sipsong Panna potentate to govern the internal affairs of his polity in return for submitting to a tributary relationship with China. Despite submission to Chinese control, Sipsong Panna kept its identity as a Theravada Buddhist state that maintained strong political ties and cultural affinities with similar polities established by Thai-speaking peoples in northern continental South-east Asia. Chinese migration to Xishuang Banna really began only after the 1950s; this has enabled the various peoples there to uphold their traditional way of life until quite recently. It has also greatly contributed to the preservation of tropical rainforest along with all the *flora* and *fauna* for which Xishuang Banna is renowned today. This has made it a popular site for field-work by Chinese anthropologists, ethno-botanists, biologists, etc. The name Xishuang Banna, a Chinese transliteration of Sipsong Panna, is a vestige of this now deceased polity. At present, the Tai Lw (the Dai Minority People) still retain their position as the largest single ethnic people in Xishuang Banna.

4. Pei Shengji, "Some Effects of the Dai People's Cultural Beliefs and Practices upon the Plant Environment of Xishuang Banna, Yunnan Province, Southwest China", in The Ethno-Botanical Laboratory, Kunming Institute of China, *Collected Research Papers on the Ethno-Botany of Xishuang Banna* (Kunming: n.d., but the dates of the papers range from 1982-88), pp. 107–11; and Christian Daniels, "Unnan Shō Seisō Hanna Taizoku no seitō gijutsu to shinrin hogo: genchi chōsa ni miru sono rekishi" [Sugar Technology and Forest Conservation Methods of the Dai People in Sip Song Panna (Xishuang Banna), Yunnan], in *Shūjitsu Joshi Daigaku shigaku ronshū* 5 (1990), pp. 260–64.

5. It is also worth noting that pathways in and around villages were lined with trees, which provided shade and reduced dust. These were the path protection forests that Yin mentions.

6. Ho Ping-ti, in *Studies on the Population of China, 1368–1953* (Harvard University Press, 1959) early pointed out that the cultivation of New World crops such as maize and peanuts on hill slopes caused serious erosion in South China. In Japan, Chiba Tokuji has pursued the relationship between swidden agriculture, soil erosion and maize cultivation in South China in the eighteenth and nineteenth centuries. See e.g. his "Kanan sangaku chitai no yakihata kōsaku: Chūgoku bunken ni yoru rekishiteki gaikan to mondaiten no shiteki" [Swidden Cultivation on Mountain Land in South China: A Historical Overview According to Chinese Sources, and Issues for Further Research], in *Chiri kagaku* 3 (1967), pp. 1–9; and *Chiiki to minzoku bunka* [Region and Folk Culture] (Tokyo: Daimeitō, 1977), pp. 167–189.

7. Pei, op. cit., p. 112.

Report on the Fourth International Conference on the Evolution of the East Asian Environment, 1995

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Fifty-eight papers, arranged in seven categories, illuminating "The Evolution of the East Asian Environment" were presented at this international conference hosted by the University of Hong Kong during January 3rd–7th, 1995, under the auspices of the University's Centre of Asian Studies and Earth Science Unit. This conference was the fourth in a series that began in 1983 as an interdisciplinary examination of the East Asian palaeoenvironment, focussing on the later Tertiary and early Quaternary. One result of the initial conference was the publication of the *East Asian Tertiary/Quaternary Newsletter* published by the Centre of

Asian Studies twice a year under the editorship of Nina G. Jablonski, California Academy of Sciences, who was also a member of the conference organizing committee. Other members include the Chairman, Wyss Yim, University of Hong Kong; Edward Derbyshire, International Union for Quaternary Research; Liu Tung-sheng, Chinese Academy of Sciences, P.R.C.; David Workman, University of Hong Kong; and Cheng Chaoze from the Centre of Asian Studies (conference secretary). The Conference was sponsored by The Croucher Foundation and Mr. Li Ka-shing.

The span of time addressed by papers presented at the 1995 conference stretched far beyond the late Tertiary and early Quaternary. The proceedings of this conference will be published by the Centre, as have been all three previous sets of proceedings.

There follows be a very brief summary of the conference papers, with an appended list of titles and authors.*

Geology and Palaeoclimatology

The first session included thirteen papers, the majority focussing on the geological formation of the East Asian environment, and the remainder on palaeoclimatic changes in East Asia. Lu Yaoru, from the perspectives of hydrogeology and engineering, presented a general paper on the geological environments of China, with emphasis on the anthropogenic factors that influenced their evolution. Ren Binghui discussed the extent of the last glaciation in the Tianshan Mountains, presenting evidence that the extent of these ancient glaciers exceeded that of modern glaciers in the area. A paper on Pleistocene Hengchun limestone in southern Taiwan was presented by Gong Shou-yeh and T.F. Yui showing that the area underwent two major sea-level change cycles due to the Quaternary glacio-eustasy, and was uplifted by the ongoing Penglai Orogeny.

Two papers concentrated on Japan. The first, by Ota Yoko and S. Odagiri, was an attempt to establish the late Quaternary chronology of marine terraces and the pattern and rate of tectonic deformation of a section of the coastal area in southwestern Tosa Bay. The second, by Miki Takashi, speculated on the genesis of the coloration of sedimentary rocks by examining stratigraphic occurrences in Kyūshū. Finally, there were three papers on Hong Kong in the geological part of the session. Bryan Ruxton and G. Taylor highlighted the unique tectonic formation of southern China, where the change from an active convergent margin to a passive margin shows active and passive components to have varied laterally, vertically, and through time. Lai Kuen Wai described the onshore Quaternary sediments and their chronology, and a team of researchers (J.A. Fyfe, R.J. Neller, R.B. Owen, I.C. Selby, and R. Shaw) showed the role of seismostratigraphy in mapping the offshore Quaternary sediments.

Charting palaeoclimatic changes using Middle Miocene flora of Inner Mongolia, Tao Junrong showed the decreasing temperature range from north to south in China during this period. Zheng Zhuo and Z. Lei gave the results of their research on vegetation and climatic changes from a borehole sample dating back 350,000 years B.P. from the Tianyang volcanic basin of Leizhou Peninsula, Guangdong. Wang Jian, H. Lu, and C. Shen were able to describe palaeoclimatic changes in China from 12,000 B.P., using the factor interpretation method. Zhu Zhaoyu showed the important role played by the Tibetan Plateau in environmental change, using a system of correlation of endogenic and exogenic forces based on palaeoclimate and neotectonics. Finally, Matsue Michiyo suggested, on the basis of the evidence furnished by the palaeovegetation, that the palaeoclimate was probably very cold in Lake Nojiri in central Japan during the late Pleistocene.

Dating and Marine/Terrestrial Correlation

Malcolm Head, W. Zhou, Z. An, and C. Tuniz discussed the results of their use of chemical separation and purification techniques to isolate original and introduced organic fractions of palaeosol samples collected from various loess plateau sites in China that had previously proved to be difficult to chronologize by radiocarbon dating. Wang Pinxian gave an overview of the drastic reorganization of environmental patterns in China and East Asia generally in the Cainozoic era. Wyss Yim, having pointed out the dearth of studies of continental shelf sediments for Quaternary marine/terrestrial correlation (as compared with progress made by using continental loess sequences or oxygen-isotope records of deep sea cores) filled the gap with a study of the role of continental shelf sediments off the coast of China in Hong Kong. A final paper by Li Sheng Hua demonstrated that optical dating can provide additional sedimentary information on Quaternary deposits, besides their age.

Environmental Change

Kumai Hisao reconstructed the palaeoenvironment of the Yatsugatake volcanoes in central Japan through palaeogeographic maps, and Kashima Kaoru demonstrated that diatom stratigraphy of coastal lagoons in Japan gave a high resolution record of Holocene environmental change. Vladimír Šibrava discussed the results of the International Geological Correlation Programme project no. 296 by reviewing environmental change in Southeast Asia and the Pacific during the Quaternary from a comparative perspective. Jan Carey argued the usefulness of East Asian potsherds as evidence for historical and prehistorical environmental change.

Papers on China included a contribution by Mao Shaozhi revealing new data on the South China Sea from recovered dinoflagellate cysts from the late Pleistocene. Zhao Songling and J. Liu demonstrated that exposed loess along the northern seacoast of China and buried loess below the sea bed were formed at the lowest sea level during the last glaciation. You Lianyuan revealed three main factors that controlled environmental change in the Yellow River,

using a seventy-year record of run-off and sediment discharge, and attempted to predict the river's future environmental change. Huang Guangqing and Wyss Yim examined storm sediments in the Pearl Estuary, and M.J. Tooley, Y. Zong and J.B. Innes identified past storm surge signatures from sediment columns in the Middle and Late Holocene. Two papers, the first on Taiwan by Wang Chung-ho et al., and a second on Hong Kong by Mervyn Peart and A.W. Jayawardena, examined drought using rather recent (19th-20th centuries) precipitation records.

Loess

Eight papers represented research on what is considered the most singular Quaternary soil deposit of China (or the world), the loessial plateau of the middle reaches of the Yellow River. Chronostratigraphic boundaries of geological events were described by Liu Tung-sheng, M. Ding and R. Feng, while Shen Chengde, W. Yi and T. Liu showed how high resolution ^{10}Be records found in loess provide a new method of dating. J. TenPas et al. argued that deconvoluted climate records of an area north of Xi'an prove that the palaeoclimate changed more rapidly than was previously thought. Zhao Songling and J. Liu presented an account of the late Pleistocene palaeoenvironment of the Bohai and Yellow Seas based on an analysis of marine seismic records. Han Jiamao contributed findings from his comparative magnetic study on samples representing three loess sites in China, while Liu Jiaqi and his team showed how they had established a time scale for Quaternary depositional sequences using magnetic events at Weinan. Wen Qizhong, G. Diao and R. Jia presented information on palaeoclimatic change of Luochuan Loess obtained through geochemical research. A study, by Michael Singer et al., of climatic change on the loess plateau relating to differences in pedogenesis concluded that interpretations based on climate and time as the main soil-forming factors may be problematical.

Palaeoflora and Palynology

The flexibility of plant genetics and the vastness of geological time were highlighted in an overview of palaeoendemic plants of East Asia by David Ferguson, Y. Liu and R. Zetter. Quantitative techniques were applied to Miocene diatomaceous deposits in Shandong by Wang Xianzeng and P. Deng, while Sun Xiangjun and his team concluded from the pollen record that steppe vegetation has been dominant for the last 100,000 years at the southern margin of the loess plateau. V.N. Koshal presented data on the palaeoenvironment of the Kutch basin of western India derived from his analysis of palynomorphs obtained during oil and natural gas exploration. Zhang Lansheng examined the farming-pastoral zone in southeastern Mongolia and its environmental evolution during the past 10,000 years.

The two last papers in the session focussed on Hong Kong. The first, by P. Catt, Wyss Yim and K.F. Yu, attempted to bridge the gap in knowledge of biogeographic data from marine boreholes in the Hong Kong region. The second, by Richard T. Corlett, underscored the high diversity of the original flora of coastal South China through examination of the consequences of human impact on the flora of Hong Kong.

Quaternary Coastal Evolution

Research on south China's coastal evolution was represented by four contributions. A paper by Huang Yukun, H. Zou and K. Zhang provided a chronology for seven periods of multiple sea-level changes in the Quaternary, as well as an examination of the role of neotectonics in shaping coastal morphology. Huang Zhengguo, Q. Cai and Q. Xu reviewed five indicators for determining lowest sea level during the last glacial period in the South China Sea, while Feng Wenke and Y. Shi demonstrated that on the shelf edge in the northern South China Sea lie remains of coastal aeolian deposits formed when the sea level was at its lowest in the last glacial period. Zhang Weiqiang, Z. Huang, and Q.Y. Tan concluded from their review of available evidence that, contrary to some hypotheses, there was only one submerged Zhujiang (Pearl River) Delta.

A contribution on India by R.K. Sukhtankar described the formation of the Maharashtra coast, and the importance of both Tertiary and Quaternary plate tectonics on this process. Saskia Jelgersma's study of the impact of sea-level rise on the coastal lowlands of East and Southeast Asia warned that human activities in the river valleys, deltas, shoreline, and offshore area (such as dam and reservoir construction, diversion of longshore sediment transport by engineering works, and over-exploitation of groundwater) pose an even more serious threat than sea-level rise due to the expected greenhouse effect. The last paper in the session, by Y. Zong and M.J. Tooley, pointed to the potential of Geographical Information Systems (GIS) in improving risk assessment in the East Asian coastal lowlands.

Evolution of Man

This controversial topic was well debated, with papers covering China, Java, and Nepal. Nina Jablonski contributed to the debate on the origins of modern human beings by indicating that pertinent data — such as those on palaeoenvironments and the movement of hominoids between continents in the Pleistocene — have been ignored. Wu Xinzhi argued the indigenous ancestry of modern East Asians, and concluded from a review of faunal and archaeological data that multiregional evolution rather than replacement was evidenced in China. Xu Qinqi presented a reinterpretation of the appearance of Peking man, Huang Peihua spoke on the environments of Peking Man and Hexian Man, and Pan Yuerong described the new analyses of evolutionary changes in *Laccopithecus*, the Asian small-sized ape. Charles Oxnard discussed the implications of evolutionary modelling of mitrochondial

DNA studies on the debate over the origins of modern human beings, and cautioned that alternative hypotheses, and the complexities of evolutionary phenomena, must be fully explored.

Donald Tyler presented findings on significant fossil finds from Java, and what may be an additional hominid genus in Southeast Asia. The last contribution, by G. Corvinus, examined archaeological evidence of the prehistoric populations of the Himalayan foothills in Nepal, showing the migration of prehistoric people from India to the Himalayan foothills as early as the late middle Pleistocene.

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For further information and enquiries concerning publication of the proceedings of this conference as well as the others in the series, please contact:

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NOTE

* The titles and emphases of the papers as presented were not always identical with those stated in the official abstracts. As I was unable to verify all changes, the following list is based on the abstracts. I apologize for any errors of omission or commission.

List of Papers Presented at the Conference

The institutional affiliations given below are taken from the list of conference participants. Unfortunately, this list typically includes only those authors whose names are stated first. No information was therefore available on most of the collaborating authors.

Geology and Palaeoclimatology

Lu Yaoru (Institute of Hydrogeology and Engineering Geology, Ministry of Geology and Mineral Resources, China), "Research on Geological Environments in China"

Ren Binghui (Lanzhou Institute of Glaciology and Geocryology), "A Study on the Extent of the Last Glaciation in the Tianshan Mountains, China"

Gong Shou-yeh (National Museum of Natural Science, Taiwan) and T.-F. Yui, "Glacio-eustatic and Neotectonic Controls of Deposition and Diagenesis of Pleistocene Limestones, Hengchun, Southern Taiwan"

Ota Yoko (Senshu University) and S. Odagiri, "Age and Deformation of Marine Terraces on the Ashizuri Peninsula, Southern Shikoku, Japan"

Miki Takashi (Kyūshū University), "Variegated Sequences in Kyūshū, Japan, and their Palaeoenvironmental and Archaeological Significance"

Bryan P. Ruxton (University of Canberra) and G. Taylor, "Active to Passive Margin in and near Hong Kong, and Landscapes in the Gap"

Lai Kuen Wai (Hong Kong Government), "Some Aspects of Onshore Superficial Deposits of Hong Kong"

J. Alan Fyfe (Hong Kong Government) et al., "The Role of Seismostratigraphy in Understanding the Offshore Quaternary Sediments of Hong Kong"

Tao Junrong (Chinese Academy of Sciences), "Palaeofloristic and Palaeoclimatic Changes during the Middle Miocene in Inner Mongolia, China"

Zheng Zhuo (Zhongshan University) and Z. Lei, "350,000 Year Record of Vegetation and Climatic Changes from a Volcanic Basin in the Leizhou Peninsula, China"

Wang Jian (Nanjing Normal University) et al., "Application of Factor Interpretation Method to the Palaeoclimatic Analysis of Pollen Data in China"

Zhu Zhaoyu (Chinese Academy of Sciences, Guangzhou), "A Coupled Climato-tectonic System: Tibetan Plateau and the East Asian Continent"

Matsue Michiyo (Takatsuki Kammuri Junior High School, Ōsaka), "Climatic Change and Palaeovegetation History during the Last Glacial in Lake Nojiri, Central Japan"

Dating and Marine/Terrestrial Correlation

Malcolm J. Head (Australian National University) et al., "Recent Advances in the Radiocarbon Dating of Organic Components of Palaeosols Using Accelerator Mass Spectrometry"

Wang Pinxian (Tongji University, Shanghai), "Late Cainozoic Evolution of Environments in China: Sea/Land Correlations"

Wyss W.-S. Yim (University of Hong Kong), "Continental Shelf Sediments off the Coast of China and Marine/Terrestrial Correlation"

Li Sheng Hua (University of Hong Kong), "Optical Dating of Quaternary Sediments"

Environmental Change

Kumai Hisao (Ōsaka City University), "Quaternary Volcanic Activity and Environmental Changes Associated with the Yatsugatake Volcanoes in Central Japan"

Kashima Kaoru (Kyūshū University), "Diatoms in Coastal Lagoons of Japan: A High Resolution Record of Holocene Environmental Change"

Vladimír Šibrava (Czech Republic), "The Quaternary and Environmental Change in Southeast Asia and the Pacific"

Jan Carey (University of Adelaide), "Reading Changes in Wetland Environments from East Asian Potsherds"

Mao Shaozhi (China University of Geosciences), "Quaternary Organic-Walled Dinoflagellate Cysts from the South China Sea and their Palaeoenvironmental Significance"

Zhao Songling (Institute of Oceanology, Academia Sinica, Qingdao) and J. Liu, "Origin of the Buried and Exposed Loess in Shelf Seas of Northern China"

You Lianyuan (Chinese Academy of Sciences), "Impact of Environmental Change on Run-off and Sediment Yield in the Yellow River, China"

Huang Guangqing and Wyss W.-S. Yim (University of Hong Kong), "Storm Sedimentation in the Pearl River Estuary, China"

M. J. Tooley (University of Durham) et al., "Diatom and Pollen Evidence and Holocene Storm Surge Signatures"

Wang Chung-ho (Academia Sinica, Taipei) et al., "Taiwan's Drought Periods Based on the Precipitation Records of the Past Century"

Mervyn R. Peart (University of Hong Kong) and A.W. Jayawardena, "Drought in Hong Kong"

Loess

Liu Tung-sheng (Chinese Academy of Sciences) et al., "Characteristics and Chronostratigraphic Boundaries of Quaternary Geologic Events in the Chinese Loess"

Shen Chengde (Chinese Academy of Sciences, Guangzhou) et al., "High Resolution ^{10}Be Records in Chinese Loess and Dating Applications"

J. TenPas et al., "Deconvolution of the Palaeoclimatic Record of a New Loess/Palaeosoil Section on the Chinese Loess Plateau"

Zhao Songling (Academia Sinica, Qingdao) and J. Liu, "Palaeoenvironment of the Bohai and Yellow Seas during the Late Pleistocene"

Han Jiamao (Chinese Academy of Sciences) "Rock Magnetic Properties of Loess and Environmental Change"

Liu Jiaqi (Chinese Academy of Sciences) et al., "A High Resolution Time Scale for the Last 150,000 Years at the Weinan Loess Section, China"

Wen Qizhong (Chinese Academy of Sciences, Guangzhou) et al., "Geochemical Evidence for Palaeoclimatic Change in the Chinese Loess"

Michael J. Singer (University of California, Davis) et al., "Pedogenesis as a Record of Climatic Change in the Chinese Loess/Palaeosol Sequence"

Palaeoflora and Palynology

David K. Ferguson (University of Vienna) et al., "The Palaeoendemic Plants of East Asia: Evidence from the Fossil Record for Changing Distribution Patterns"

Wang Xianzeng (Peking University) and P. Deng, "Quantitative Palynological Study of the Shanwang Formation, Shandong Province, China"

Sun Xiangjun (Chinese Academy of Sciences) et al., "A 100,000-year Pollen Record of the Southern Loess Plateau, China"

V.N. Koshal (Oil and Natural Gas Corporation Ltd., Baroda), "Palynofossils, Palaeoenvironments and Correlations of Subsurface Sediments of the Kutch Basin, Western India"

Zhang Lansheng (Beijing Normal University), "Changes in the Farming-Pastoral Zone of Eastern Asia during the Last 10,000 Years"

P. Catt (James Cook University of North Queensland) et al., "Quaternary Palaeobiogeography of Hong Kong: Evidence from a Marine Borehole"

Richard T. Corlett, "Human Impact on the Flora of Hong Kong Island"

Quaternary coastal evolution

Huang Yukun (Zhongshan University) et al., "Quaternary Coastal Evolution in the Northern Part of the South China Sea"

Huang Zhengguo (Guangzhou Academy of Science) et al.,

"On the Lowest Sea Level during the Last Glacial Period in the South China Sea"

Feng Wenke (Mineral Resources, Guangzhou) and Y. Shi, "Last Glacial Coastal Remains on the Shelf Edge of the Northern South China Sea"

Zhang Weiqiang (Guangzhou Academy of Science) et al., "The Submerged Zhujiang Delta"

R.K. Sukhtankar (Shivaji University, Maharashtra), "Quaternary Evolutionary History of the Maharashtra Coast, India"

Saskia Jelgersma (Geological Survey of the Netherlands), "The Impact of Future Sea-level Rise on the Coastal Lowlands of East and South East Asia"

Y. Zong and M.J. Tooley (University of Durham), "Potentials of Geographic Information System for Sea Flooding Risk Assessment in the East Asian Coastal Lowlands"

Evolution of Man

Nina G. Jablonski (California Academy of Sciences), "Geographical and Life History Perspectives on Modern Human Origins"

Wu Xinzhi (Chinese Academy of Sciences), "On the Source of Modern East Asians"

Xu Qinqi (Chinese Academy of Sciences), "*Homo erectus lantianensis* in Chenjiawo, China: First Appearance of Peking Man"

Huang Peihua (University of Science and Technology of China, Hefei), "Living Environments of Peking Man and Hexian Man in China"

Pan Yuerong (Chinese Academy of Sciences), "Evolutionary Changes in *Laccopithecus* from Lufeng, Yuanmou and Yuannan, China"

Charles Oxnard (University of Western Australia), "African Eve? Asian Adam! The Implications of Evolutionary Modelling for Interpretations of Mitochondrial DNA Studies"

Donald E. Tyler (University of Idaho), "New Significant Fossil Finds from Sangiran, Java, Indonesia"

G. Corvinus, "Prehistoric Populations in the Hui Valley in the Himalayan Foothills in Nepal"

Database on the Environment and its Socioeconomic Impact in Historical China: an Introduction

Fang Jinqi

University of Wisconsin

Partly because of the frequent and bitter impact of dramatic environmental change and disasters, and partly because of their attitude towards nature, the Chinese have been recording environmental anomalies since the beginning of their history. Plentiful records both of such anomalies and of the main patterns of human activity in China are available for the last 2,200 years. These records are undoubtedly of great assistance for improving our understanding of past environmental change and human-environmental interactions.

Because the historical information is scattered in a wide range of sources, a number of Chinese scholars from historical to modern times have worked to assemble relevant records out of the vast storehouse of texts and documents. Some of them, like Prof. Xu Jinzhi, of the Institute of Geography at Nanjing, spent their whole lives on this work. They carried out comprehensive searches for particular types of record, and compiled the records in chronological order, organizing them by region as appropriate. The topics for which good searches have so far been conducted include floods, droughts, locust "plagues", frostbitings of crops, hailstorms, unusually cold or warm weather, tidal abnormalities, earthquakes, mass population migrations, and (for certain periods only) peasant rebellions.

The many booklets which contain the search results were usually published informally, and are only available in some major universities, institutes, and libraries of China (see e.g. Guojia qixiang ju, et al., 1975; Jiangsu dili suo, 1975). The difficulty of collating and using these scattered data collections creates the need for the present database.

Given the present context of intense public, scholarly, and scientific concern about environmental issues, it is especially pertinent to address the problem of communication and cooperation between academic communities which normally work in isolation from each other. In the case of the study of China's historical environment, there is an unfortunate fragmentation between natural and social scientists. The natural scientists (such as climatologists and physical geographers) have made a great contribution to the study of physical environmental change, including natural disasters (see e.g. Zhu, 1973; ZZDBW, 1982; Zheng and Feng, 1986; Gong and Hameed, 1991; Wang et al., 1991). However, they have generally not paid much attention to the impact of the changes on human society, or the impact of human activity on the environment. Meanwhile, the social scientists (such as historians and historical geographers) have paid attention to the study of

the human impact on the environment, and the economic, political, and cultural implications of environmental factors (see e.g. Perry, 1980; Perdue, 1987; Schoppa, 1989). But they tend to represent environment as a "passive" factor, stressing the ways in which it was changed because of changes in human society, such as government policy, population pressure, and so on. They have not been greatly interested in non-anthropogenic change.

It will not be necessary to argue the importance in Chinese history of physical environmental change, whether anthropogenic or otherwise, for readers of the *Chinese Environmental History Newsletter*. However, some less familiar examples of such change may be given. My own research has shown that of ten large and famous lakes recorded about 2,500 years ago, only one survives today, while three of the four largest modern freshwater lakes did not exist until 2,000 years ago (Fang, 1993). Not only (as is well known) has the lower Yellow River channel migrated frequently and wildly in the eastern China lowlands, but it can now be confirmed that fluctuations in the frequency of Yellow River floods have been dominated by climatic moisture change (ZZDBW, 1982). The water level in the middle reaches of the Yangtze River has risen more than 10–15 metres in the past 1,500 years (Fang, 1991). When the early Chinese recorded their history on bamboo slips, the large bamboo species used to make the slips (*maozhu*) grew extensively in the middle Yellow River region, but today, because of colder climate, it can be found only in the Yangtze River area or further south (Fang, 1994). The Great Wall of the Ming empire parallels isohyets, and generally conforms with the boundary between farmland and grassland. But the farmland-grassland boundary shifted southwards or northwards within a range of 200-300 kilometres in historical times as climate changed (Fang and Guo, 1992).

Few scholars are attempting to link the work of the natural and social scientists. In other words, there has been inadequate examination of the impact of "real" (physical) environmental changes on past human society in China. It is hard to blame either the natural scientists or the social scientists for this deficiency: the challenges involved in interdisciplinary research in this area are formidable indeed. However, a database combining key data from the research results of scholars from both communities may help to facilitate future interdisciplinary communication and research.

The Creation of the Database, and Preliminary Studies

I have been working on the database, without funding, since 1985. The basic objectives of the database project are: 1) to facilitate, especially for those who do not know Chinese, the use of environmental history data already collected by Chinese scholars, supplemented by additional data collected by myself; 2) to make possible mathematical (especially statistical and spatial) analysis and comparative studies; and 3) to link the work of natural and social scientists. Paradox has been selected as the database managing software, on account of its convenience for data import from or export to files in other formats. The database is compiled in English, although it will not be difficult to translate it into Chinese in the future.

The data first entered into the database were all ones already compiled by other scholars, as described above. As explained in Fang (1992), these data were stored in the database region by region, in chronological order, with numerical codes. The country was divided into sixty-eight regions for data entry purposes. This stage of the project resulted in the creation of 43,753 entries. While there has not yet been time to study the implications of this first set of data, a preliminary analysis of the reports of floods from the middle and lower Yangtze Valley shows that the further upstream from the river mouth a region is, the later frequent floods began to be reported. The study provides evidence for the hypothesis that the dramatic rise of water level in the middle Yangtze during historical times was a lagged response to the postglacial sea level rise (Fang, 1991).

After entering the above largely climatic and hydrological data into the database, I began to assemble additional data and records of other types. Besides using existing data collection booklets, I examined sources such as the dynastic histories, *shilu* [Veritable Records] and other government compilations, and a limited number of local gazetteers. The data collected so far include records of mass migrations (for both nomads and peasants), changes in lake water-area, reclamation of lake land, construction of artificial lakes, rebellions, famines, state worship of natural deities, government environmental policies, mass population death, water control projects, deforestation, unusual grain prices, and sunspots.

Preliminary studies have been made of some of the search results. For example, a statistically close relationship has been detected between nomadic southward migrations and colder, drier climate, while wars between nomads and agriculturalists along the northern Chinese border occurred much more frequently in colder periods (Fang and Guo, 1992). Other analysis shows that although people indeed tended to reclaim more and more farmland from lakes as population grew, the fluctuations in lake water-areas still conformed with climatic fluctuations. Moreover, people tended to reclaim farmland from lakes in periods with drier climate and few flood reports, but abandoned land to repair artificial lakes in wet periods (Fang, 1989, 1993). The study based on the deforestation data confirms that the Loess Plateau was well covered by vegetation in early historical times when it was the political and economic centre of the Chinese world (Fang, 1994). Information on the dates at which some towns and villages were abandoned in arid north-western China shows that most of them were abandoned in periods with dry climate (Fang and Shi, 1990). Finally, examination of the data on state religious activities suggests that traditional Chinese ideas on cosmology were deeply influenced by natural

disasters and anomalies, while the worship of Heaven was religious in nature.

The historical records often suggest explanations for the phenomena described. For example, records of 1,461 rebellions have been entered in the database; 551 explanations are offered in the primary sources on the causes of 339 of these. Out of these explanations, 337 relate to natural disasters and/or environmental changes, which were involved in 211 rebellions. As for mass migrations of peasants, explanations of the causes of 897 migration events are found in the database. 463 of the migrations were directly attributed to natural disasters, while another 133 were attributed to nomadic invasions, which, as suggested above, were also partly related to colder and drier climate. In short, although analysis of the database records is still in its early stages, it is reasonable to expect that the database will greatly improve understanding of human-environmental interrelations in Chinese history.

The Future Development of the Database

After more than a decade's work (some of it assisted by the voluntary labour of good friends in China), the database now contains about eight MB of information, involving records of twenty-nine types of natural phenomenon or human activity. Because of the richness of Chinese historical sources, the database is still far from complete. Much data collection remains to be done. There is also a need to work on compatibility with other databases in this field, such as that of Professor Zhang Peiyuan's group at the Chinese Academy of Sciences. (Professor Zhang's database includes neither data on human activities nor many non-climatic data, but it contains far more climatic and hydrological data than my database). Finally, further preparatory work (including the compilation of a user's manual) is needed before the database can be made publicly available.

Unfortunately, the time has come when further progress on this project is jeopardized by lack of funding. I therefore wish to ask colleagues who are interested in work of this kind for support, cooperation, and suggestions as to how the project might be funded. I am open to the possibility of submitting joint grant proposals with prospective collaborators. My address is: Center for Climatic Research, University of Wisconsin, 1225 West Dayton Street, Madison WI 53706. E-mail: jqfang@facstaff.wisc.edu.

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APPENDIX

Outline of Database Contents

Technical note.

Paradox 3.5 from Borland International has been chosen as the database management system. This is a relational Database Management System (DBMS) for MS-DOS based microcomputers. A relational DBMS is one that follows the relational model of data management, by which data are presented as a set of tables. The tables consist of columns (or fields) for each type of information, and rows containing individual data entries. All tables may be connected by using primary keys.

Except for climatic hazards and anomalies, records for each type of phenomenon have been stored in one data table. Because all the categories of information are relatively independent of each other, no primary keys have been used to connect the tables. For the information on climatic phenomena, twenty-five tables are used, one for each province. Each province is divided into three to five sub-regions, and eight types of climatic phenomenon are included.

In order to save space, in the summary that follows field names that occur repeatedly (e.g. Accompan, HExplain) are, whenever possible, explained only on their first appearance. Similarly, the fields Year, Month, Place, Province, and Reference appear in most of the tables, and are therefore omitted in this list after the first five tables.

Summary of contents

Table 1: Origins of main crops
Table name: AGRORIGN
No. of records: 34
Contents (Table fields): CropNameL (names of crops in Latin); CropNameC (names of crops in pinyin); Archaeology (archaeological data on origins of crops); Date; Place (place(s) where archaeological samples collected); Document (documentary data on crop origins); Title (document titles); OrignPlace (original distribution places); Reference (source(s) of the information).

Table 2.i–xxv: Climatic calamities and anomalies (CLIMAHAZ)
No. of records: 43,753
Contents: 25 tables, each storing the data for one province. Categories of information stored: floods; droughts; locust plagues; unusually cold weather; hailstorms; famines; harvests; and unusually warm weather. Data on season of occurrence and severity of damage are included.

Table 3: Unusually cold winters (WINCOLD)
No. of records: 451
Contents: Year; Month; DisaType (type of disaster caused, whether death of trees, death of animals, or human deaths); Accompan (accompanying unusual phenomena); Place; Province; Reference.

Table 4: Dust falls (DUSTFALL)
No. of records: 252
Contents: Year; Month; Pattern (type of dust fall or disaster caused); Accompan; Place; Province; Reference.

Table 5: Epidemic diseases (EPDISEASE)
No. of records: 362
Contents: Year; Month; Bearer (type of sufferer, whether human beings, oxen, or other animals); DeathNo. (number of deaths caused); Accompan; Place; Province; Reference.

N.B. From here on, the fields Year, Month, Place, Province, and Reference are omitted in this list.

Table 6: Famines (FAMINE)
No. of records: 555
Contents: Degree (the degree of suffering, as indicated by one or more of the following: out-migration; selling of family members; deaths due to hunger; cannibalism; state efforts to raise relief supplies or funds from the rich); HExplain (explanation(s) of the cause(s) in historical documents).

Table 7: Frostbite (FROSTBIT)
No. of records: 253
Contents: Pattern (one of the following: snow fall in unexpected season; frost biting; freezing in unexpected season; unusual cold); DisaType.

Table 8: Grain prices (GRAINPRIC)
No. of records: 869 (561 for pre-Qing period)
Contents: Price; GrainTypeC (name of grain type in pinyin); GrainTypeE (name of grain type in English); HExplain.

Table 9: Migrations of Chinese farmers (HANMIG)
No. of records: 924
Contents: Nation (nationality of the migrants, whether Han or southern minority); SourcPlace (the migrants' place of origin); DesPlace (the place where they resettled); Direction

(direction of the migration); HExplain; Amount(k): number of migrants; Notes.

Table 10: Huai River floods (HFLOOD)
No. of records: 321

Table 11: Lake evolution (HLAKE)
No. of records: 622
Contents: Name (lake name); Time range [Time1, Time2] (time range covered by the record); Type (type of record, whether unclear; inexact indication of water area or lake change; exact indication of water area, length, or circumference, etc.); Trend (trend of lake change reflected by the record, whether formation; desiccation; shrinking; expansion; or unclear); WaterArea; Content (content of original record).

Table 12: Mass population death (MASSDEATH)
No. of records: (incomplete)
Contents: HExplain; DeathNo. (number of deaths); Accompan.

Table 13: Nomadic migrations (NODMIG)
No. of records: 276
Contents: Nationality; SourcPlace; DesPlace; Direction; Style (the style of the southward moving, whether with permission of the government in northern China, by force, etc.); HExplain; PC (peaceful migration following permission); Amount(k); Notes.

Table 14: Government relief provision (RELIEF)
No. of records: (incomplete)
Contents: Pattern; Amount; Causes.

Table 15: Government policy on environment and famine prevention (POLICY)
No. of records: (incomplete)
Contents: Objective (policy objective(s)); Content; Note (notes on the reason(s) for adopting the policy).

Table 16: Prayer for the breaking of natural calamities (PRAYER)
No. of records: 265
Contents: Pattern; Causes; Level (level(s) of the government at which prayer activity undertaken, whether county, sub-prefectural, prefectural, central, or non-governmental).

Table 17: Peasant rebellions (PREBEL)
No. of records: 1,440
Contents: Leaders (the main leaders); Location (place where rebellion broke out); Nation (nationalities of main participants); ND12 (natural disasters occurring within twelve months prior to the rebellion outbreak); HExplain; RGExplain (explanations concerning refugees who launched rebellions); Notes (notes on number of participants, their religions, slogans etc.).

Table 18: Silk production hazards (SILKHAZ)
No. of records: 102
Contents: Pattern.

Table 19: Unusually cold weather in summer (SUMCOLD)
No. of records: 597
Contents: Snow; Frost; Notes.

Table 20: Tidal abnormalities (TIDEHAZ)
No. of records: 891
Content: DisaType; Accompan.

Table 21: Main water projects of historical times (WATERPROJECT)
No. of records: (incomplete)
Contents: Objective; Leaders; Notes.

Table 22: Wind storms (WIND)
No. of records: 440
Contents: DisaType; Direction (wind direction); Accompan.

Table 23: Bans on wine-making (WINEBAN)
No. of records: 23
Contents: Cause.

Table 24: Winter thunderstorms (WTHUNDER)
No. of records: Data not yet entered
Contents: Accompan.

Table 25: Yellow River floods (YLFLOOD)
No. of records: 597
Contents: Pattern (apparent cause of flood, whether river bursting its embankments, channel migration, or military or other human interference); Distance (distance from the flooded area to Zhengzhou; negative represents upstream): Notes.

Table 26: Sunspots (SUNSPOT)
No. of records: 251
Contents: Record (record contents).

"ASIAN", "SIIASA", and "SIIRCEASA":

Introduction to The Australian Centre of the Asian Spatial Information and Analysis Network, The Spatial Information Infrastructure for Asian Studies in Australia, and The Spatial Information Infrastructure for Russian and Central Euro-Asian Studies in Australia

Lawrence W. Crissman

Griffith University

A consortium of Australian universities organised and led by Griffith University was funded from 1992 to 1994 under the Australian Research Council (ARC) Mechanism C (Cooperative Research Infrastructure) Program to establish a Spatial Information Infrastructure for Asian Studies in Australia (The SIIASA Project). Additional funding was obtained under the new ARC Research Infrastructure (Equipment and Facilities) Program in 1995 by the consortium, which now includes twenty-one universities.[1] 1994 funding was also obtained for an associated but separate Mechanism C application submitted by Griffith University in conjunction with the Centre for Russian and Euro-Asian Studies at The University of Melbourne and seven other Australian institutions to establish a Spatial Information Infrastructure for Russian and Central Euro-Asian Studies in Australia (The SIIRCEASA Project).[2] It also obtained additional 1995 funding under the new infrastructure program.

In order to provide an institutional framework for generating and coordinating the SIIASA databases, the Australian Centre of the Asian Spatial Information and Analysis Network (ASIAN) has been established at Griffith University. Units of the other universities in the SIIASA consortium have also been designated as elements of ASIAN. The aim of the SIIASA Project is to establish Geographical Information System (GIS) databases covering all of Asia, defined broadly to encompass parts of the Near East and the islands of the Pacific Basin, in addition to South, South-east, and East Asian Countries. The SIIRCEASA Project will set up similar spatial databases covering the now independent republics of the former Soviet Union.

The purpose of the SIIASA and SIIRCEASA Projects is the support of academic research utilising GIS spatial databases for the analysis of geographically distributed attribute data, whether they are demographic, sociometric, econometric, or of any other kind. GIS technology allows map features to be associated with disaggregated attribute data which can then be analysed in terms of their geographical contexts and spatial relations. Although not yet widely appreciated outside of geography and related disciplines, the GIS approach has the potential to revolutionise academic research methodology in most of the social sciences.

The China Geographical Information System Project, established in the Faculty of Asian and International Studies at Griffith University in 1989, was the pilot project for the SIIASA Project. Its 1:1,000,000 computerised map of the People's Republic of China based on the 1990 Land-use Map of China is nearing completion.[3] In addition to hydrology, transport routes, and cities and towns, it includes an elaborate set of land use polygons. County-level administrative boundaries for the entire country, which will be used initially for the spatial analysis of 1982 and 1990 census materials, are being extended back to October, 1949.

Historical data of interest exist at the county level for China going back well over 1,000 years, while historical changes in other Asian countries and the former Soviet Union can be documented with statistically useful information for at least fifty years, and in many cases for several centuries. Therefore, a time dimension to the SIIASA and SIIRCEASA databases is essential, and a database design that includes temporal as well as spatial referencing has been developed, and is being implemented.

Apart from China, the base map for the SIIASA and SIIRCEASA spatial databases will be the 1:1m Digital Chart of the World, to which local administrative boundaries will be added in order to analyse census and other attribute data. Larger scale spatial data will be incorporated where available and needed to service regional research interests. Individual research projects may contribute highly detailed local map information that would not be of great interest to other users, but which would benefit from being put into SIIASA's wider spatial contexts.

After they become fully operational during 1995, the SIIASA and SIIRCEASA databases will become accessible via AARNet (and the Internet) from suitably equipped computers throughout Australia and, eventually, the world. SIIASA and SIIRCEASA spatial information and analysis will eventually be marketed by the Australian Centre of ASIAN in order to support continued academic operations. In due time, the combined expertise of dozens if not hundreds of academics at all of Australia's major universities where significant research in Asian Studies and the former Soviet Union takes place will be accessible through the Australian Centre of ASIAN.

As the inclusion of spatial contexts and relations is essential for many development projects, and promises to revolutionise socio-political and econometric research, it would be surprising if clients outside of Australian universities did not, in the course of the next few years, become increasingly dependent on analyses derived from the SIIASA and SIIRCEASA databases operated by the Asian Spatial Information and Analysis Network.

Additional Information on the China GIS Project, the SIIASA and SIIRCEASA Projects, the Australian Centre of

ASIAN at Griffith University, and the eventual consultancy and contract research activities of ASIAN may be obtained from:

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NOTES

1. In addition to Griffith University, the institutions in the expanded SIIASA consortium are: The Australian National University, Science Faculty; Curtin University of Technology; Flinders University; James Cook University; La Trobe University; Macquarie University; Monash University; Murdoch University; Northern Territory University; Queensland University of Technology; The University of Melbourne; University of Adelaide; University of New England; University of New South Wales; University of Newcastle; University of Queensland; University of Sydney; University of Technology, Sydney; University of Western Australia; and Victoria University of Technology. There is a possibility that New Zealand universities may become involved with SIIASA in future.

2. The institutions in the SIIRCEASA consortium are: Griffith University (project leader); The University of Melbourne (major partner); Australian Defence Force Academy; The Australian National University, Faculty of Arts; La Trobe University; Macquarie University; Monash University; University of New South Wales; and University of Sydney.

3. The Land-use Map of China is a bound atlas consisting of sixty-four 1:1,000,000 map sheets. Prepared by an editorial committee sponsored by the Institute of Geography, Chinese Academy of Sciences, it was published in 1990 by the Science Press, Beijing.

Thesis abstract

The Royal Hunt of the Shang Dynasty: Archaeological and Anthropological Perspectives

M.A. thesis, University of Chicago, 1994

Magnus Fiskesjo

University of Chicago

Contemporary oracle bone divination inscriptions indicate that the kings of the late Shang dynasty (a late second millennium B.C. bronze age polity in northern China) attached great importance to hunting expeditions, which constituted one of the most frequent topics of Shang divination. The kings divined to ascertain the auspiciousness, or suitability, of their choices regarding hunting companions, and the destinations and timing of such expeditions. The problem of the role of hunts in the Shang world is identified as an important but so far inadequately explored issue in Chinese archaeology.

The first part of this study is a detailed examination of the two most important sources available for the study of the Shang royal hunts and their context: first, the archaeological remains excavated at the late Shang centre at Anyang, and, second, the Shang oracle bone inscriptions. In particular, the zooarchaeological remains from Anyang are discussed in detail, and situated within the larger archaeological context. Similarly, the oracle bone inscriptions are used to describe the various participants in the hunts, the methods used, and the reported quantities of captured prey. The methods revealed in these sources include driving the prey with the aid of foot soldiers, and by the use of fire. The latter method suggests a relation between the hunts and the clearing of new fields, also reflected in the increasingly prevalent use in the inscriptions of the word *tian* [field, to "take to the field"] as the main verb used for "hunting."

The potential of the archaeological record for the purposes of this study is constrained by methodological problems, particularly as regards the record of animal remains; possible improvements in zooarchaeological methodology for future research are therefore considered. The epigraphic texts, being the fragmented records of royal divination, are also limited, and these problems are also discussed. Despite the limitations, both types of source can reveal significant patterns, especially when used in conjunction. For example, both the archaeological and the epigraphic records suggest a strong Shang dichotomy of wild vs. domesticated animals: the captured prey were not used either as burial offerings or in ancestral sacrifices, for which the exclusive choice was domesticated animals (dog, cattle, and sheep). It also appears that non-Shang enemies

were dealt with as an intermediate category, described as "captured" (in warfare) with a term similar to that used for hunted wild animals, but evidently used in sacrifices at Anyang in the same way as domesticated animals.

Next, various earlier attempts at explaining the role of the hunts in Shang society are discussed. These include the traditional Chinese view that the hunts were conducted mainly as a decadent luxury sport, and more recent views that emphasize the usefulness of the hunts as military exercise, as a supplementary subsistence activity, or as a source of sacrificial victims. Each of these interpretations has some merit, but all are also unsatisfactory, for a number of reasons. Most importantly, they overlook and cannot account for the possibility that the hunting expeditions also had an important role in the establishment and maintenance of the sphere of influence of the Shang kings. The "itinerant" character of the Shang kings, indicated by the frequent hunting trips, suggests the importance of the re-affirmation of a personal presence, as well as of the building and cementing of alliances and ties by the use of invitations extended to important Shang officials or to non-Shang allies. Furthermore, given that the Shang diviner-kings presided over an agricultural society where harvest failure and enemy attack probably constituted the most dangerous uncertainties, it is pointed out that the hunt provided an arena for a less dangerous, but symbolically highly valuable form of risk-taking, whereby the kings could reaffirm their prestige before their subjects, and also reconfirm a status as arbiters of Shang society's relation with the surrounding wilderness. This may help explain both why the royal hunt in itself should have been so important, and why it was one of the few topics of divination that was not abandoned, or purged of the element of uncertainty, in the course of the marked trends towards regularization and standardization that have been noted in late Shang divination.

Finally, the study briefly discusses how investigation of the royal Shang hunt, properly situated within the larger context of Shang use of natural resources, can provide a useful perspective from which to address some of the later transformations that occurred in the transitions from the Shang theocracy and the feudalistic kingdoms of the Zhou period to the early Chinese empires (Qin and Han), i.e. the decline in divination using animal skeletal material as media, the important changes in the roles of animals in artistic representation, and the emergence of imperial hunting parks which replaced the "itinerant" hunting of the Shang kings.

Submission and Subscription Information

1. Submission information. Contributions should be sent to Helen Dunstan at Dept. of History, Indiana State University, Terre Haute IN 47809, U.S.A. (e-mail HIDunsta@Ruby.indstate.edu). "Noticeboard" items and mini-articles are equally welcomed, and may be submitted in English, Chinese, French, or Japanese. *Pinyin* romanization is preferred. Mini-articles should not normally exceed 2,000 words (or 2,700 Chinese characters); the absolute maximum length is 3,000 words (4,000 Chinese characters). Translations of scientific technical terms should be provided if possible. If possible, please send an electronic version of any English-language contribution exceeding 750 words, or containing many numbers. The preferred formats are ASCII or WordPerfect 5.0 or 5.1 on a 3.5" diskette, or an ASCII text file via e-mail. Hard copy should be provided as well.

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The historical and contemporary impact of rural land-use systems on the environment, especially in Southern China.

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Irrigation proclamations in Central and South China during the Song and Yuan.

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The political & social impact of the Anyuan (Pingxiang) coal mine (Jiangxi-Hunan border). Issues include the alteration of farming practices due to changes in food consumption; the impact of railroad transportation linking the local community with Hunan & Hubei markets; & the treatment & organization of workers subjected to diseases, hunger, & displacement from family members.

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Man-land relationships since the Holocene in the zone of mixed agriculture and pastoralism along the Great Wall in North China.

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The relationship between ethnicity, common property resource management systems, and environmental change in the Chinese Himalayan region. Analysis of how differing conceptions of equity among the Yi and Han affect the configuration of common property resource management systems, and thus the pattern of resource distribution and environmental change in the Liangshan Mountains, Sichuan.

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Plants, animals, and social power at Dunhuang: a study of reciprocal interactions.

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Natural resource policy analysis, environmental policy, natural resource economics. Research topics include the transition theory applied to environmental policy formulation, property rights (natural resources and environment), and non-market goods (natural resources and environment) evaluation.

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The environmental movement and the growth of a domestic market in nature tourism in Taiwan. The relations of these new phenomena to economic change, and to earlier Chinese views of nature. Hopes to expand this work to include the PRC in future.

Pierre-Étienne Will
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History of water control and irrigation in imperial China; the late imperial Chinese state and economic development.

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Energy use; technology; policy; water use; hydropower; dams; ecosystem-climate interactions; social aspects of environmental issues; history of science and technology.

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The impact of the world depression in the 1930s, contemporary Chinese economic reform and its social effects, the contemporary Chinese coal industry, and Chinese business history.

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Chinese environmental issues; natural environment and sustainable development; physical geography; soil erosion and deforestation; environmental change modelling and monitoring; environmental impact of larger projects (e.g. Three Gorges dam). Areas of interest: China and Nepal; East and South-east Asia generally.

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International relations; history; comparative study of American and Chinese attitudes towards the environment.

Yang Dong

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Water control in pre-modern South China, and related topics, with a focus on the interface between lowland water control activities and the exploitation of woods and other natural resources in the uplands in Zhejiang; changes in élite perceptions of the relationship between nature and humankind.

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Subscribers' names classified by broad subject areas

(N.B. No name is entered more than three times at the very most).

1. Regional classification

Northern China and neighbouring territories (see also under "Early China"): Amelung, Cheng, Dunstan, Hou, Johnson, Mayo, Perdue, Reardon-Anderson, Seo
South-east coastal provinces (Jiangsu-Fujian): Caffrey, Fan, Finnane, B. Li, Niggenaber, Yang
Southern China (including Hong Kong): Corlett, Dudgeon, Faure, Hill, Honda, MacPherson, Marks
Central China: Hornibrook
Western China: Jhaveri, Stapleton
South-west China: Damon, Daniels, Menzies, Mostern, Young
Taiwan: Caffrey, Hamburg, D. Lee, S. Liu, T. Liu, Shepherd, Sigwalt, Tung, Weller
Asia or the Asian-Pacific region: Chen, Connors, Matthews, Murphey, Takei, Wu
Japan: Schreurs, Tull
East Asian "newly industrializing countries": Tung
South Asia: Chakravarty-Kaul, Rajan

South-east Asia: Rajan, Stargardt
Australia: Connors
World and comparative environmental history: Hughes, Rajan

2. Chronological classification

Early China: Bilsky, Fiskesjo, Keightley, J. Lee
Sui-Yuan: Ellermeier, Honda, Leung, McDermott, Mayo, Mostern, Seo, N. Shi
Ming-twentieth century: Daniels, Faure, Finnane, Marks
Ming-Qing: Chao, Dunstan, Fan, Heijdra, D. Keenan, J. Lee, Leung, T. Liu, McDermott, Naquin, Perdue, Will
Nineteenth century: Amelung, Howard, Lai
Twentieth century, historical: Boxer, Hornibrook, S. Liu, Price, Rawski, Stapleton, Tull, Wright
Recent and contemporary, political and economic: Bennett, Breslin, Brown, Cheek, Cotlar, Forster, Furtado, Gunaratnam, Habel, Jahiel, Jian, Judd, Kelly, Z. Lee, Murray, Nielsen, Niggenaber, Polumbaum, Purdy, Russell, Schreurs, Strauss, Suttmeier, Thomsen, Tung, H.-J. Wang
Recent and contemporary, scientific or technological (includes geography): Cartier, Chen, Florig, Harkness, Jiang, Justi, J. Williams, Wu

3. Classification by subject area

Historical and cultural geography, geographical perspectives on history: Cartier, Edmonds, Han, Hou, X. Li, N. Shi, G. Zhang
Cartography and pre-modern geographic thought: Foret, X. Li, Mostern
Geographical Information Systems: Cicone, Crissman, Lavely
Non-anthropogenic environmental change: Fang
Climate: Fang, Sigwalt
Ecology: Corlett, Dudgeon, Hamburg, Mabry
Botany: Matthews, Takei
Forests: Hamburg, Z. Lee, Mabry, Menzies, Oakes, Yang, Young
Migratory species: Felley
Pandas: Harkness
Population (human): Campbell, Dickensheets, Han, Lavely, J. Lee, Shepherd, G. Zhang
Agricultural and land-use history: Daniels, B. Li, McDermott
Property rights (including common property systems) and rural land-use systems (changes in, environmental impact of): Chakravarty-Kaul, Cicone, Hill, Jhaveri, H.-J. Wang
Ethnohistory/ethnicity and environment, ethnobotany: Crissman, Damon, Foret, Jhaveri, Matthews, Perdue, Shepherd, Takei
Opium cultivation: Howard
Mining: Hornibrook, Wright
The built environment, urban history: Fan, X. Li, MacPherson, Seo, M. Shi, N. Shi, Stapleton
Disease, medicine, public health: Campbell, Chao, Ellermeier, Elvin, Fisher, Howard, Leung, S. Liu, MacPherson, Y. Zhang
Water and its management: Amelung, Boxer, Dunstan, Elvin,

Farmer, Honda, Will, Yang
Oceanography: Justi
Attitudes towards environment, views of nature, cosmology, history of science: Bilsky, Bloom, Boxer, Brown, Damon, Elvin, Farmer, Foret, Weller, Xu
Teaching of environmental history: Bloom, B. Keenan, D. Keenan

4. Contemporary topics

Environmental and environment-related policy (including risk management) in contemporary China and Taiwan: Breslin, Brown, Florig, Jahiel, Jian, D. Lee, Z. Lee, Niggenaber, Strauss, Suttmeier, Tull, H.-J. Wang, J. Williams
The environmental impact of economic policy changes and development projects: Bennett, Wu
Dam projects: Furtado, Harkness
Contemporary environmental degradation: Chen, Corlett, Edmonds
Land degradation, soil erosion, etc: Jiang
Pollution: Florig, Jahiel
Energy and environment: Nielsen
Conservation, nature reserves: Dudgeon, Felley
Society's responses to environmental change: Jiang
Environmental and conservation movements: Connors, Habel, Weller
Environmental journalism: Polumbaum
Environmental training within China: Furtado

5. Non-environmental topics

Economic and business history (see also under "Chronological classification": many of the scholars listed there are economic as well as environmental historians): Faure, Lai, Rawski, Wright
Economics: H. Wang
China's international relations, international business links, etc.: Cotlar, Nielsen
Electronic news and information services: Jian, N. Liu
Chinese philosophy/intellectual history: Adler, Bloom, Cheek
Ritual and religion: Johnson
Gender studies, gender history: Barlow, Finnane, Judd, Ko
Other general interest: Kay, Y.B. Miao, Michaud, Shapir
