

Lop Nor, China

Editor-in-Chief

Xia Xuncheng

Associate Chief Editors

Wang Fubao

Zhao Yuanjie

Translators

Zhao Yuanjie

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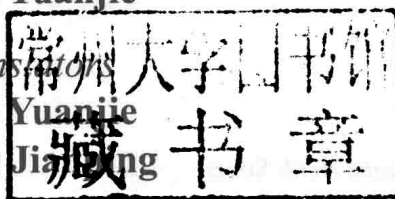
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Editor in Chief

Xia Xuncheng

Xinjiang Institute of Ecology and Geography

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Associate Chief Editors

Wang Fubao

Zhao Yuanjie

Translators

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Zhang Jianping

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Lop Nor, China

Foreword

Since his graduation from Nanjing University in 1957, Prof. Xia Xuncheng has spent half a century in Xinjiang Autonomous Region. Half a century is quite a long passage of time for an individual. What's more important, Xia has dedicated his all to the geography study of the arid region of Xinjiang and yielded discoveries and achievements with great value, among which is the study he conducted for the Lop Nor region. Based on his study, a symposium for the study of the Lop Nor region was held by Xiangshan Science Conference in May 2005, namely, the 254th symposium of Xiangshan Science Conference centering on the theme of "Environmental evolution of the Lop Nor region and the development for arid zone in the Western Regions".

Lop Nor is located in the southeast of the Xinjiang Region. The environmental change of the Lop Nor region, since the geological epoch and historical period, especially since the Quaternary, represents a miniature for the change taking place in arid region, accounting for many puzzled phenomena and mysteries. As a crucial area crossed by the famous Silk Road and a cradle for ancient western signified by Loulan, Lop Nor has been received worldwide attention. Since the middle 19th Century, scholars and explorers from many counties have arrived in the region. Their expeditions have made it an important area in the study of geography for a long period of time. However, it was pity that there were few Chinese scholars coming to the region. This led to a strange result that Lop Nor is in China, yet the study of it is conducted in foreign countries.

Prof. Xia has made his early decision that he was to change the circumstance that Lop Nor was solely studied by foreign scientists and made Chinese scientists gain their own position in the related studies. Since 1979, he has constant conducted expeditions into the harsh natural environment of Lop Nor until the age of seventy. In September 2004, the author received the gracious invitation from him to participate in a ten-day expedition into Lop Nor and experienced myself the importance and hardship in the study of it. I shall pay my heartfelt admiration to Mr. Xia, who made more than ten expeditions into the region. His perseverance and devotion has rewarded him with great fruits, including series of geographical works and atlas as well as later ushering in Xiangshan Science Conference. The book, *Lop Nor, China*, edited by Xia Xuncheng, serves as a conclusion of the above achievements. These achievements are at great expanse, that is, the sacrifice of Peng Jiamu in the Lop Nor investigation during the 1980. It is also the pioneering spirit of Peng Jiamu that drives Xia and his colleagues to advance forward. The book, *Lop Nor, China*, is in-

deed the best honor given to Mr. Peng Jiamu.

Most ancient civilizations in the world have their root in arid zones. We have reason to presume that if it is the arid zones serve as the cradles to civilization, and then must be the fact that the formation and evolvement of ancient civilizations choose the arid zones. The choice results in the evolution of environment into desertification and salinization for the development of agricultural civilization. The mutual effect of human activity and environmental change stands evident in the Western China. In his study of the Lop Nor region, Prof. Xia has focused on the environmental evolution, which is correct and must bring on further achievements without doubt.

Prof. Xia and his colleagues research is, instead of a solely qualitative one, a combination of a qualitative and a quantitative one, which stands as a prominent characteristic. For example, based on the study of Lop Nor's dispositional environment, they have divided the evolution of the region into eight phases; they explored a new approach by using Tamarix Cone age layer to examine the climate change, which is a great improvement in terms of the accuracy; they have paid a great attention on modern technologies and put forward the conclusion of the time of Lop Nor evolution by the satellite imagery interpretation. All these serve as concrete evidence to show that Chinese scientists have the improved status in the area, which deserves applause.

The evolution of arid zones is a long and complicated problem, which constitutes an important position in the worldwide evolution. But though we have had many breakthroughs in the evolution of arid zones, we still have a long way to go to fully understand the recent arid condition in the Western China and thus applying appropriate measures. We need to carry out further study so as to form a system. The edition of the book can be regarded as a new point for the ongoing exploitation. We will continue to pay attention to the scientific work in this field and to share this encouraging moment with Mr. Xia Xuncheng.

Liu Dongsheng



Research Fellow of the Institute of Geology and
Geophysics of the Chinese Academy of Sciences

Academician of the Chinese Academy of Sciences

Winner of China National Top Science Award

Send words to the publication of *Lop Nor , China*

Lop Nor , China represents the fruit of the investigations and study conducted by Lop Nor Comprehensive Investigation Team in the past twenty-five years. It is not only a long-expected achievement by experts and researchers from home and abroad, but also a milestone in this field for it is a great victory in the study of the natural environment and human activities in the arid and semi-arid zones.

Prof. Xia Xuncheng, the chief editor of the book, has been a friend of mine in the past twenty years. We are acquainted with each other for academic cooperation. His enthusiasm for the study of desert has left me with a deep impression and admiration.

Prof. Xia accomplished his *Mysterious Lop Nor* in 1985, which was then published by Science Press. This book could be viewed as his first report for his discoveries.

Prof. Xia have made a great effort to collect and compile materials about Lop Nor in terms of history, geology, geomorgraphy, natural environment, climate, soil, rivers, lakes, animals and plants and mineral resources. In addition, he conducted comprehensive analysis and expound on the subjects of ancient human activities, the relation between natural environment and the Silk Road, the vicissitudes of Loulan and the culturology of the people living in the region. The publication of the book is an important event for the academic circles, which I shall attend my sincere congratulation.

To have the opportunity to review a more detailed scientific paper, my excitement is beyond expression.

吉野正敏

Masatoshi Yoshino

Vice-Chairman of International Geographical Union (Former)

Chairman of Japanese Society of Desert (Former)

Honorary professor of Tsukuba University

Chief academic adviser of International Union University

Preface

Lop Nor and its surrounding area is located in the eastern Tarim Basin, within Bayinguo-leng Mongolian Autonomous Prefecture of Xinjiang, in the east of which is Beishan Mountains, in the west is Tarim River, in the north is Jueluotagh Mountain of the front range of Tianshan Mountains, in the south is the north foots of Altyn Mountains, the area is about $1.0 \times 10^5 \text{ km}^2$.

Lop Nor is a famous lake in the arid zone of China, is located in the communication center of the ancient Silk Road, is a passageway linking up the eastern cultural with the western cultural, in Chinese ancient history enjoys a high reputation. However, due to the changes of the natural condition and social economy etc, this region has become a piece of inaccessible desert, become a mysterious area full of the natural and cultural mysteries. In recent hundreds of years, there have been some scholars at home and abroad to come here for exploration and investigation. The exploration on Loulan civilization has put them on the historical success garland. But eventually because of the dangerous and desolate roads, harsh natural conditions, the research condition is very limited; on many scientific questions in the Lop Nor region there still are many branching and debates.

The natural and social characteristics of Lop Nor and its surrounding area, and can be summarized by the four centers, namely: the arid center of China and Asian continent. Lop Nor and its surrounding area is the most arid region in China and the Asian continent, the annual precipitation is less than 10 mm, in many places, all the year round, there is not precipitation, and the evaporation is just as high as more than 3000 mm; the collection center of water and salt of Tarim Basin. In the past, the rivers in different sizes in Tarim Basin, mainly including Tarim River, Kongque River and Qiemo River, generally flowed into Lop Nor, at that time the area of Lop Nor can amount to several thousands, even to $1.0 \times 10^4 \text{ km}^2$. After 1961, it was gradually drying up, having formed a thick layer of salt crust deposition in the Lop Nor region, and become the "big ears" image on the satellite images; the center of desert distribution and windy sand activities. There are three deserts distributed in the Lop Nor region and its surrounding area, the Lop Desert is in the center, in the west of which is Taklimakan Desert, in the south is Kumutagh Desert. Here is the concentrated distribution area of Yardang landform in China, the area is about 3000 km^2 . The windy sand activities are strong, becoming the sand material sources of desert expan-

sion, being one of sandstorm sources in China; the activity center of ancient human civilizations. In the process of human civilization, the Lop Nor region has had a glorious period, such as the opening of the Silk Road, the establishment of the Loulan kingdom etc. Therefore, Lop Nor and its surrounding area, as it were, is one of the ancient human civilization activity centers.

Lop Nor region and its surrounding area, in a typical research area in Xinjiang history, geography, biology, geological and environmental evolution, has received close attention of the academic circles, especially the sharply environmental change in the historical period has become a miniature of the environmental change of arid zones, and become the hot spots of scientific exploration and investigation. From 1980 to 1981, Xinjiang Branch of Chinese Academy of Sciences organized Lop Nor Comprehensive Scientific Investigation Team, who had carried out many scientific comprehensive investigations by three times in the Lop Nor basin, in addition to finding potassium resources, still further studied the scientific problems of the biology and geosciences of the region, and published the *Lop Nor Scientific Investigation and Research*, and *Mysterious Lop Nor* and so on. Since then, the experts and scholars in geological mining, archaeology, scientific research, education and other departments have come to the region for investigation and study. Wang Mili of Chinese Academy of Geological Sciences organized the Lop Nor Sylvite Investigation, published the *Potassium Resources of the Lop Nor Salt Lake*, and made important achievements in the study of Lop Nor potassium resources.

In recent years, Xinjiang Agricultural University, also has deeply researched hydrology, environment and remote sensing of the Lop Nor, has made gratifying achievements. It is worthy to point out that from September 2 to 12, 2004, the Lop Nor Comprehensive Scientific Investigation Team organized by Chinese Academy of Sciences again, of which Academician Liu Dongsheng, the winner of National Highest Scientific Award is as consultant, and the winner of the Special Award of Xinjiang Science and Technology Progress Award is as captain, Wang Fubao, Lei Jiaqiang and Zhao Yuanjie are as vice-captain, the members of which mainly include Hu Changkang, Cao QiongYing, Ji Qihui, Wang Shenglin, He Dexiu, Xu Xinwen, Zhao Jingfeng, Lv Zhaozhi, Ailixier • Kuerban, Fan Wen, Zhang Hongchi, Zhao Ge, Yang Jingfu, Liu Xiaobo, Zhang Meng, Chang Qing, Qian Yu, Meng Hangao, Guo Gaochao, Gao Jianchang, Chen Liang, Liu Xuecan, Zhou An, Li Minsheng, Zhao Wei, Guo Qingchun and so on, successfully completed a large-scale scientific investigation of the Lop Nor region once again. The investigation is paid close attention in various aspects, first of all is the more professional and the wide investigation range, it vertically and horizontally crossed the lake basin; the second is the complete field observation equipment including spectrometer, GPS, salt measuring meter, surveying instrument and so on. In the process of the investigation, the accompanying journalists of CCTV had reported about 20 articles, the journalists of the Xinhua News Agency had reported 23 news. The more concerned by people is a series of new discoveries, new knowledge, new conclusions in the investigation, al-

though many of these problems have research accumulation for many years, but the systematic opening is the first time, which further opened a mysterious veil of Lop Nor. The importance of the examination of Lop Nor, Academician Liu Dongsheng used in a word to summarize: Lop Nor is a geological laboratory, many of the Quaternary geological scientific questions, can get satisfactory answer here.

In May 17 to 19, 2005, in Xiangshan Hotel of Beijing held 254th Seminar of Xiangshan Scientific Conference taking the “Environmental change of the Lop Nor region and the future development of the western arid zones” as the theme, the conference executive chairmen of which are Academician Liu Dongsheng from the Institute of Geology and Geophysics of Chinese Academy of Sciences, Prof. Xia Xuncheng from Xinjiang Institute of Ecology and Geography of Chinese Academy of Sciences, and Prof. Wang Fubao from Nanjing University. Through this conference, on the basis of the existing work, has deeply discussed the scientific and technical problems such as the ecological environment evolution of the Lop Nor region and the western arid zones, the environment effect of the water and soil development, the oasis ecosystem stability, the restoration and reconstruction of the degraded ecosystem, the prevention and control of the desertification, as well as the major ecological engineering construction and so on, has condensed academic thought and scientific goal, provided countermeasures for the future development of the western arid zones, and provided a new thought in order to further promote the scientific research of the Lop Nor region.

This book consists of 56 sections of 14 chapters, is a summary of the results of scientific research of Lop Nor for many years, and is an achievement of the collective wisdom of many scientific researchers studying Lop Nor. Indeed, some of the work of the book is tentative, and because of the different technical means, the conclusions on some scientific issues would be different, in the future we need further systematic research.

The members participated in this book are as follows:

The Preface was written by Xia Xuncheng and Wang Fubao.

The Chapter 1 was written by Huang Wenfang.

The Section 1 and Section 4 of Chapter 2 were written by Mu Guijin and Wang Shuji; the Section 2 and Section 3 were written by Wang Shuji and Mu Guijin.

The Section 1 and Section 3 of Chapter 3 were written by Xia Xuncheng; the Section 2 was written by Xia Xuncheng and Qu Jianjun; the Section 4 was written by Xia Xuncheng, Zhao Yuanjie, Wang Fubao and Cao Qiongying; the Section 5 was written by Wang Shuji.

The Section 1, Section 2 and Section 3 of Chapter 4 were written by Li Jiangfeng and Xia Xuncheng; the Section 4 was written by Xia Xuncheng and Fan Zili.

The Section 1 of Chapter 5 was written by Fan Zili, Li Peiqing and Zhang Bingqian; the Section 4 was written by Zhang Bingqian, Li Peiqing, Fan Zili, Ma Renwen and Yan Hongjian; the

Section 4 was written by Yuan Guoying.

The Section 1 of Chapter 6 was written by Shen Guanmian; the Section 2 and Section 4 were written by Gao Jianxin; the Section 3 was written by Yang Ge and Wang Changgui; the Section 5 was written by Xi Jinbiao, Tian Changyan, Li Yinfang, Liu Zhaosong and Guo Yan.

The Chapter 7 was written by Gao Xingyi, Gu Jinghe and Yuan Guoying.

The Section 1 and Section 2 of Chapter 8 were written by Fan Zili; the Section 3 was written by Xia Xuncheng and Fan Zili; the Section 4 was written by Dong Xinguang, Deng Mingjiang and Zhong Ruisen; the Section 5 was written by Lin Ruifen, Wei Keqin, Wang Zhixiang, Zhou Xiuyun, Li Rongjian and Wang Wenxian.

The Section 1 of Chapter 9 was written by Mu Guijin and Yanshun; the Section 2 was written by Wang Fubao, Cao Qiongying, Xia Xuncheng and Zhao Yuanjie; the Section 3 was written by Cao Qiongying, Wang Fubao, Xia Xuncheng and Zhao Yuanjie; the Section 4 was written by Shao Yun, Gong Huaze and Dong Qing; the Section 5 was written by Qiu Honglie, Ailixier • Kuerban and Zhong Junping; the Section 6 was written by Ailixier • Kuerban and Chen Xi.

The Section 1 of Chapter 10 was written by Fan Zili, Li Peiqing and Zhang Bingqian; the Section 2 and Section 3 were written by Zhao Yuanjie, Xia Xuncheng and Wang Fubao.

The Section 1 of Chapter 11 was written by Li Peiqing, Fan Zili, Li Rongjian and Zhang Bingqian; the Section 2 and Section 3 were written by Wang Mili, Jiao Pengcheng and Liu Chenglin; the Section 4 was written by Xia Xuncheng and Zhao Yuanjie.

The Section 1 of Chapter 12 was written by Xia Xuncheng and Zhao Yuanjie; the Section 2 was written by Zhang Xinshi, Xia Xuncheng, Fu Chunli and Wang Fubao.

The Section 1, Section 2 and Section 3 of Chapter 13 were written by Idilisi, Li Wenying, He Dexiu and Hou Can; the Section 4 and Section 5 were written by Huang Wenfang; the Section 6 was written by Yang Lian.

The Section 1 of Chapter 14 was written by Xia Xuncheng, Hu Wenkang and Li Juhua; the Section 2 was written by Yang Lian; the Section 3 was written by Xia Xuncheng, Ailixier • Kuerban and Li Juhua.

Xia Xuncheng and Zhao Yuanjie were responsible for the system editing of the whole book. Fan Shucai, Idilis, Li Wenying, and Yuan Guoying provided some photos. Song Yan, Li Xiuli, Liu Liying, Wang Xiaoyi and Li Xuefeng took part in the fair drawing of some figures.

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