

## FOREWORD

Swans are the beloved sons of heaven. According to Prof. Zheng Zouxin's research there are only five species of swans left in the entire world. They are:

|                   |                             |                                              |
|-------------------|-----------------------------|----------------------------------------------|
| Mute Swan         | <i>Cygnus olor</i>          | (distributed in Europe, continent of Asia)   |
| Black Swan        | <i>Cygnus atratus</i>       | (distributed in Australia)                   |
| Black-necked Swan | <i>Cygnus melancoryphus</i> | (distributed in South America)               |
| Whooper Swan      | <i>Cygnus cygnus</i>        | (distributed in Europe, Asia, North America) |
| Tundra Swan       | <i>Cygnus columbianus</i>   | (distributed in Europe, Asia, North America) |

Among these, there are two subspecies of Whooper Swan:

1. Nominate subspecies: *Cygnus cygnus cygnus*, found in northern Eurasian continent
2. American subspecies: *C. c. buccinator*, found on the west coast of Canada and Alaska

There are three subspecies of *Cygnus columbianus*:

1. Nominate subspecies: *C. c. columbianus*, found in arctic tundra in North America
2. European subspecies: *C. c. bewickii*, found mainly in northern Europe and northern part of western Asia.
3. Asian subspecies: *C. c. jankowskii*, found in the area of northern tundra of Siberia.

The above mentioned species and subspecies classification system has always been used by Chinese researchers in ornithology.

According to Johnsgard (1978) and Sears and Bacon (1991) the present inclination is to combine the above subspecies into four types: *C. cygnus*, *C. buccinator*, *C. columbianus* and *C. bewickii* (*C. b. bewickii* and *C. b. jankowskii* combined into one). The authors of this book feel that in Chinese, Tundra Swans are commonly called "small swans". Thus, they are often confused with cygnets. Therefore we do not use this term but use "short-billed swan" instead. In this way the number of species of swans in the world can be clearly classified into seven units: wild species found on the continents of Eurasia (three species), North America (two species), South America (one species) and Australia (one species). Basically, there is no overlap in their areas of habitat. Thus in this book, we have adopted these seven classifications.

China is the main wintering ground for the swans. The three species found in the continent of Eurasia come here in the Autumn and Winter for wintering. Shou Zhenghuang and Zheng Zouxin (1959), Zheng Zouxin and Zhang Yinsun (1979) were early researchers in China. In the early days, there was very little literature on this subject. Zheng Zouxin attended the Second International Swan Symposium in 1980. In the more than ten years since that time research on swans in China entered a new era. A large number of researchers, conservationists, scholars and specialists appeared. One after the other published the results of their research. They include Liang Guodong (1982), Liao Yanfa (1985), Liu Tiying and Zhang Wendong (1987), Xu Kefeng and Chao Yuhua (1987), Chen Wei *et al.* (1991), Yu Kuai (1991, 1992a,b), Ma Yong *et al.* (1992), Meng Anming *et al.* (1990, 1991, 1993), Jing Changlin *et al.* (1992, 1993), Yuan Guoying (1992), Yuan Guoying and Zhang Li (1991), Yuan Guoying and Guo Ling (1992a,b), Ma Ming and Cai Dai (1993a,b), Ma Ming *et al.* (1992, 1993a,b), Cai Dai *et al.* (1993), and Zhang Yaowen (1993). In 1980 China established the first nature reserve area especially for the protection of the swans, called the Xinjiang Bayinbuluke Swan Lake Nature Reserve. Around this time Gu Jinghe, Fu Chunli, Liang Guodong, Gu Zhenqin, and Yuan Guoying did a large amount of surveys and research in this nature reserve. All the different species of swans were listed in the second class of national protected animals, according to the "National List of Protected Wild Animals" within the "Laws Protecting Wild Animals in the People's Republic of China", published in 1989.

In 1991 the Xinjiang Institute of Biology, Pedology and Desert Research, Academia Sinica cooperated with the Xinjiang Forestry Bureau, Xinjiang Academy of Forest Sciences, Forestry Bureau of Bayinguolen Mongol Autonomous State, Xinjiang, and Bayinbuluke Swan Lake Nature Reserve and started this project, "Research on the

Reproduction and Population of Whooper Swans in Bayinbuluke Wetland, Xinjiang" (No. 39170119). This book was written based on the results of field observations and research over the past few years. In a broader sense it also introduces the major results of research in China and other countries during the past ten years. The creation of this book is the result of a collective effort.

Ma Ming, Gu Zhengqin, Cai Dai, Jing Changlin, and Barturhan, of the Swan Research Committee, disregarded all difficulties and engaged in investigations and research in the cold, high mountain regions for long periods of time, and collected a large amount of rare material and information first hand. Ma Wenliang, Zhang Binlin, Abdukadir Ablimit and Musa Anwar of the Project Committee did a lot of work on the identification of specimens, analysis of feeding habits, research into the microstructure of tissues, organized information, and translated literature from foreign countries. The following institutes and individuals gave substantial support and help to this swan project. They were: Chinese Zoological Society, Chinese Ornithological Society, Chinese Waterfowl Specialist Group, Xinjiang Zoological Society, and Tsui Dafang, Dr. Lu Jianjian, Prof. Do Chenwei, Prof. Chiu Shihung, Dr. Wang Yi, Ma Jinsheng, Zhang Zhengwan, Li Wenfa, Li Mingwei, Wan Chiwu, Leo Chuanhung, Tsai Xiaoli and Naoripu, of the Bayinbuluke Swan Lake Maintenance Station, Ma Chun and Assistant Researcher Yeer Daolaiti of Academia Sinica, Bayinbuluke Grassland Ecology Station. The following people also gave timely advice and help during application for the project and during the progress of the investigation; they are the renowned Chinese biologists Zheng Zouxin, Qian Yanwen, Zhen Guangmei, Zhang Dienming, Gu Jinghe, and Chang Jiachuan. Zheng Zouxin, approaching the age of 90, wrote a poetic dedication for us, which was full of genuine concern and encouragement. Such deep interest moved us profoundly. The following foreign institutes and individuals provided the Swan Committee with large amounts of reference material, and exchanged recent research results. They are: E.C. Rees, Honda (Bentian Qing), H. Higuchi, R. Tatsukawa, D.B. Stewart, D.T. Parkin, Y. Murase, I. Sawada, A.F. Kovshar, and the Asian Wetland Bureau, International Waterfowl and Wetlands Research Bureau, Wildfowl and Wetlands Trust, Japanese Wild Bird Association, and the Japanese White Bird Association. Research Associate Hu Ruji contributed to editing and publishing, Ji Rong-bo and Chang Ching did the drawings. For the invaluable help of the above persons and research institutes, we extend our sincere gratitude.

There are two purposes in writing this book. On the one hand it is to offer a systematic summary and scope of recent research results. On the other hand it is a duty for ornithologists to make known the results of their work on the swans: to clarify their present distribution, ecological habits, reproductive behavior, and group movements; to study their history and close relationships to human artistic and cultural life, social development, and production. Hoping to "cast a brick to get a gem", we attempted to contribute our limited effort to the progress in research and protection of the swans in our country. If there are any mistakes, we invite you, the specialists and readers, to send us your criticism and corrections.

Ma Ming  
December 1993, Urumqi, China