

Rediscovery of the 'first collection' of the 'Living Fossil', *Metasequoia glyptostroboides*

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Living trees of the early Cenozoic taxon *Metasequoia glyptostroboides* were first discovered in 1943. The first specimen that triggered its discovery, however, was lost. After three years of searching, we have located the first specimen stored in an unregistered, abandoned "herbarium" at the Jiangsu Forestry Academy (JFA), Nanjing, Jiangsu, China. This first specimen was collected by C. Wang (numbered 118) on July 21, 1943 from a large tree at Modaoxi, Wan Xian, Sichuan, also known as the type tree since the type was collected from the same tree by C. J. Hsueh in 1946.

KEYWORDS: Botanical history, first collection, herbaria, *Metasequoia glyptostroboides*, rediscovery.

INTRODUCTION

Discovery extant material of the "Living Fossil", *Metasequoia glyptostroboides* (dawn redwood, Chinese redwood, water fir), in China in the 1940s was one of the greatest botanical discoveries of the twentieth century (Hu 1948; Merrill 1948a, b; Chaney 1948, 1950; Longman 1970; Fulling 1976; Wang, C. K. 1981; Hsueh 1985; Wang, G. Q. 1999; Ma & al. 2000; Shao & al. 2000). The species has been saved from extinction through its timely discovery and protection (Bartholomew et al. 1983), and rapid propagation and cultivation in China and worldwide (Hendricks & Sondergaard 1998; Kuser; 1998/1999; Satoh 1998/1999). However, the first specimen that triggered the discovery of 'Living Fossil', *Metasequoia glyptostroboides*, was lost in the past six decades. Having traced and studied the limited available information about the first specimen for over three years, we finally located it in the Jiangsu Forestry Academy (Fig. 1). The significance of finding the first specimen is that it provides additional historical data regarding its natural history.

THE COLLECTION

In the summer of 1943, on an expedition to Shen Nong Jia in northwest Hubei, C. Wang (Zhan Wang in Hanyu Pinyin, Shao & al 2000) from the National Bureau of Forest Research (NBFR) at Chongqing, the wartime capital of the Republic of

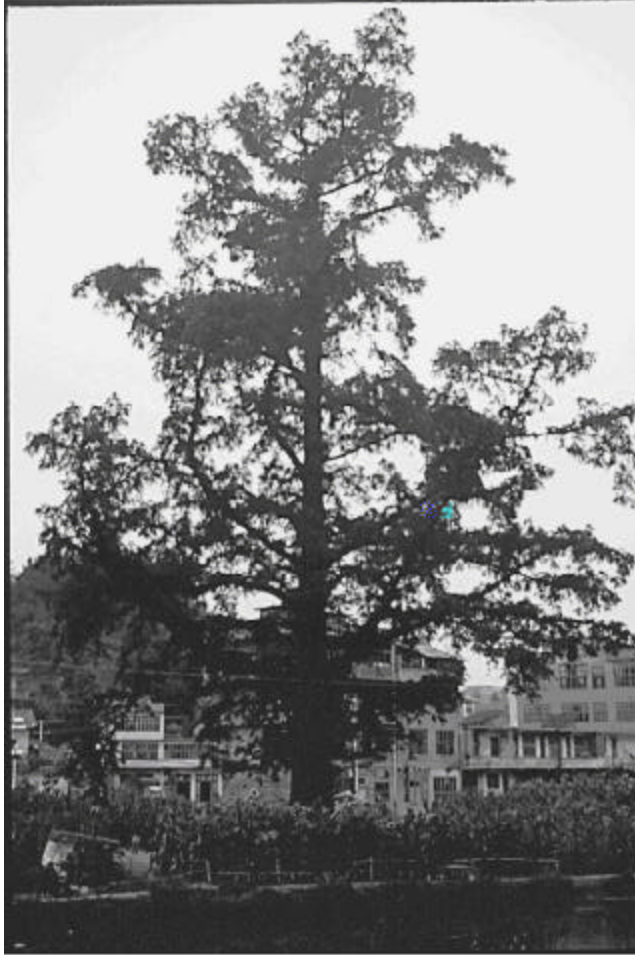
China, stopped at Wan Xian Agricultural School due to sickness (Wang 1948; Shao & al 2000). He was told by Long-Hsing Yang, the school principal, that a huge unknown tree existed in Modaoxi (about 100 km away). Their curiosity piqued, Wang and his team abandoned their intended route and followed Yang's directions to Modaoxi tree via high mountains and deep valleys in three days. They arrived at Modaoxi (i.e. Moudao), Wan Xian, Sichuan (currently administered by Lichuan Xian, Hubei Province) on July 20, 1943, and next day C. Wang collected branch specimens and gathered some fallen cones from the roof of the temple beneath the tree (because cones on the tree were beyond reach; Wang 1948). The tree from which specimens were collected is also the type tree since the type was collected from it by C. J. Hsueh in 1946. The tree is still alive today (Fig. 2). Later C. Wang identified the specimen as *Glyptostrobus pensilis* (Wang 1948; Shao & al 2000) and deposited it with the rest of their collections in the herbarium at NBFR.

THE DISCOVERY

In the summer of 1945, Wang passed a sheet of his interesting specimen and two cones to W. C. Cheng, Professor of Dendrology and Dean of the Department of Forestry, National Central University, for further study. Cheng then visited to Wang's institute later and doubted that this was *Glyptostrobus*



The first specimen of *Metasequoia glyptostroboides* Hu & Cheng collected by Chan Wang from the Type Tree, July 21, 1943 (Photograph by Jinshuang Ma, August 13, 2002)



Type Tree of *Metasequoia glyptostroboides* Hu & Cheng
(Photograph by Jinshuang Ma, August 9, 2002)

pensilis (Wang 1948). He believed that it was a new taxon but was uncertain. Because additional material, such as sporophylls, were needed for confirmation, Cheng sent Chi-Ju Hsueh, his graduate student, to make additional collections from the same tree in the spring of 1946. With directions provided by C. Wang, Hsueh traveled twice to Moudao, in February and May of 1946 (Hsueh 1985). Examining the new collections, Cheng thought that this species indeed belonged to a new genus, and tentatively named it *Chieniodendron sinense* (Wang 1948). Since lacked sufficient comparative materials to confirm his new finding, Cheng then sent some specimens to H. H. Hu, the Director of the Fan Memorial Institute of Biology in Peking. Hu at first agreed with Cheng about the new finding but renamed it *Pingia grandis* (Nelson 1998). Later he compared this living new material with *Metasequoia*, a fossil published by Miki (Miki 1941), and realised that they were

identical (Hu 1946). The two jointly published "*Metasequoia glyptostroboides* Hu et Cheng" in 1948 (Hu & Cheng 1948).

THE DISAPPEARANCE

Soon after the World War II, the National Central University returned to Nanjing from Chongqing in June 1946; the NBFRC and its herbarium, established in Chongqing in 1941, was moved also to Nanjing in May 1946. In the 1950s, the NBFRC merged with the National Bureau of Agriculture Research and several others institutions to form the East China Agriculture Academy, which became the Jiangsu Branch of China Agriculture Academy (JBCAA) in 1958. In the 1960s, the Forest unit was separated from JBCAA and was named the Jiangsu Forestry Institute (JFI), which was moved to Dong Shan Qiao Forest Farm in Jiangning Xian as its permanent location, 18 km from Nanjing. Around 1980 JFI became the Jiangsu Forestry Academy (JFA). At this time, the herbarium of the former NBFRC moved likewise, and finally reached its current location. However, it has not been managed since the 1980s. Today, the herbarium is totally abandoned on the first floor of a three-story building. The first specimen of the "living fossil" remained missing.

THE SEARCH AND REDISCOVERY

The authors became seriously interested in the first specimen of *Metasequoia glyptostroboides* in 2000 when they participated in writing a memorial article about Zhan Wang (Shao & al 2000). The most encouraging information we received was that the specimen had been locked in the former director's office of JFI. The former director Quxian Peng had been in the USA with his son for several years. During the summer of 2002, the senior author attended the First International *Metasequoia* Symposium in Wuhan, Hubei and thanks to the help of several colleagues in Beijing and Nanjing, he finally was able to enter the "herbarium" at JFA. One of the staff told him that the first specimen of *Metasequoia* had been taken away about 20 years ago by the former director Quxian Peng due to nationwide debates in the early 1980s. Still, no one knew exactly where the specimen was. With permission, senior author and his colleagues searched thoroughly for the specimen, cabinet by cabinet, and folder by folder, without electric lighting. Finally, at the bottom of an old cabinet, a moist, dusty pile of specimens with C. Wang's

collection no. 118 was seen at the top without a folder. The first specimen was found (Fig. 1)! This sheet was supposed to be among fewer than ten sheets collected by C. Wang under this number (Wang 1948). It could not be the one given to Cheng nor the one reportedly taken away by the JFI director 20 years ago. The locations of the duplicate of this number are still unknown. The condition of this invaluable specimen is sadly poor, but the notes were typed and are legible: Chinese Name: Shui Song (i.e. water pine), Scientific Name: *Glyptostrobus pensilis* Koch, Collector: C. Wang, No 118, Date: 7-21-'43 (i.e. July 21, 1943), Location: Modaoxi, Wan Xian, Sichuan (see lower label, Fig. 1). The Chinese name of this specimen and the location of collection were handwritten by C. Wang. It was a duplicate of this specimen that triggered Cheng's finding of a new conifer, leading recollection and finally to Hu and Cheng's publication of the famous "Living Fossil", *Metasequoia glyptostroboides* (Hu & Cheng 1948).

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LITERATURE CITED

- Bartholomew, B. Boufford, D. E. & Spongberg, S. A. 1983. *Metasequoia glyptostroboides* - its present status in central China. *J. Arnold Arbor.* 64:105-128.
- Chaney, R. W. 1948. Redwoods in China. *Nat. Hist. Mag.* 47: 440-444.
- Chaney, R. W. 1950. A revision of fossil *Sequoia* and *Taxodium* in Western North America based on the recent discovery of *Metasequoia*. *Trans. Amer. Phil. Soc., Philadelphia. New Ser.* 40(3): 171-263.
- Fulling, E. H. 1976. *Metasequoia*, fossil and living. *Bot. Rev.* 42(3): 215-314.
- Hendricks, D. R. & Sondergaard, P. 1998. *Metasequoia glyptostroboides* 50 years out of China. Observations from the United States and Denmark. *Dansk Dendr. Arsskrift* 6:6-24.
- Hsueh, J. R. 1985. Reminiscences of collecting the type specimens of *Metasequoia glyptostroboides*. *Arnoldia* 45(4): 10-18.
- Hu, H. H. 1946. Notes on a Palaeogene Species of *Metasequoia* in China. *Bull. Geol. Soc. China* 26: 105-107.
- Hu, H. H. 1948. How *Metasequoia*, the "Living Fossil" was discovered in China. *J. New York Bot. Gard.* 49 (#585): 201-207.
- Hu, H. H. & Cheng, W. C. 1948. On the new families Metasequoiaceae and on *Metasequoia glyptostroboides*, A living species of the genus *Metasequoia* found in Szechuang and Hupeh. *Bull. Fan Mem. Inst. Biol., New Ser.* 1(2): 153-163.
- Kuser, J. E. 1998/1999. *Metasequoia glyptostroboides*: fifty years of growth in North America. *Arnoldia* 58(4)-59(1): 76-79.
- Longman, K. A. 1970. Initiation of flowering on first year cuttings of *Metasequoia glyptostroboides* Hu and Cheng. *Nature* 227: 299-300.
- Ma, J. S. Shao, G. F. Qian, H. Chen, J. Q. 2000. www.metasequoia.org
- Merrill, E. D. 1948a. A Living *Metasequoia* in China. *Science* 107: 140.
- Merrill, E. D. 1948b. *Metasequoia*, another "living fossil". *Arnoldia* 8(1): 1-8.
- Miki, S. 1941. On the change of flora in Eastern Asia since Tertiary Period (I). The clay or lignite beds flora in Japan with special reference to the *Pinus trifolia* beds in Central Hondo. *Jap. J. Bot.* 11(3): 237-304.
- Nelson, E. C. 1998. *Metasequoia glyptostroboides*, dawn redwood: some Irish glosses on its discovery & introduction into cultivation. *Curtis's Bot. Mag.* 15:77-80.
- Satoh, K. 1998/1999. *Metasequoia* travels the globe. *Arnoldia* 58(4)/59(1): 72-75.
- Shao, G. F., Liu, Q. J. Qian, H. Chen, J. Q. Ma, J. S. & Z. X. Tan. 2000. Zhan Wang (1911-2000). *Taxon* 49(3): 593-601.
- Wang, C. K. 1981. Chinese Redwood - endemic treasure tree species of China - discovery and worldwide cultivations. *Tunghai Uni. Bull.* 22: 15-32 [in Chinese with English summary].
- Wang, G. Q. 1999. *Discovery & Research of Metasequoia*. Jiangxi High Education Press, Nanchang [in Chinese].
- Wang Z. 1948. Before and after of *Metasequoia's* discovery. *Forestry Newsl.* 4/5: 5-6 [in Chinese].