

Arnoldia (ISSN 0004-2633) is published quarterly in spring, summer, fall, and winter by the Arnold Arboretum of Harvard University.

Subscriptions are \$12.00 per year; single copies \$3.50.

Second-class postage paid at Boston, Massachusetts.

Postmaster: Send address changes to:

Arnoldia
The Arnold Arboretum
The Arborway
Jamaica Plain, MA 02130

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Front cover: The inflorescence and fruits of flowering dogwood (*Cornus florida* L.), top, and of kousa (*C. kousa* Hance), bottom. To find out why kousa has compound fruits and flowering dogwood does not, see page 2. Watercolor by Alice Tangerini, Smithsonian Institution.

Front cover foldout: Three compound fruits of *Cornus capitata* Wallich, a species of dogwood from the Himalayas. From *Curtis's Botanical Magazine* for 1852. *This page:* Painting by an anonymous Chinese artist of the tree from which Hsueh Chi-ju collected the type specimens of *Metasequoia glyptostroboides* H. H. Hu & Cheng in 1946. (See page 11.) *Inside front cover:* The Arnold Arboretum's Plant Hardiness Zone Map. (See pages 32 through 34.) *Inside back cover:* *Calypso bulbosa* Salisb., an orchid of cool, mossy woods in Canada and the United States. (See page 19.) Photograph by Francis H. Cabot. *Back cover:* Bunchberry (*Cornus canadensis* L.), a small-bracted dwarf cornel with tight clusters of fruits. From *The Monthly Flora, or Botanical Magazine*, Volume I (1846). (See page 2.)

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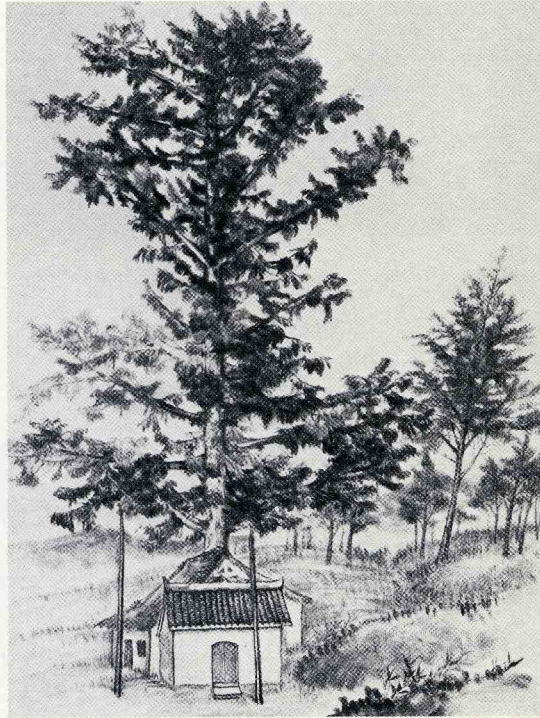
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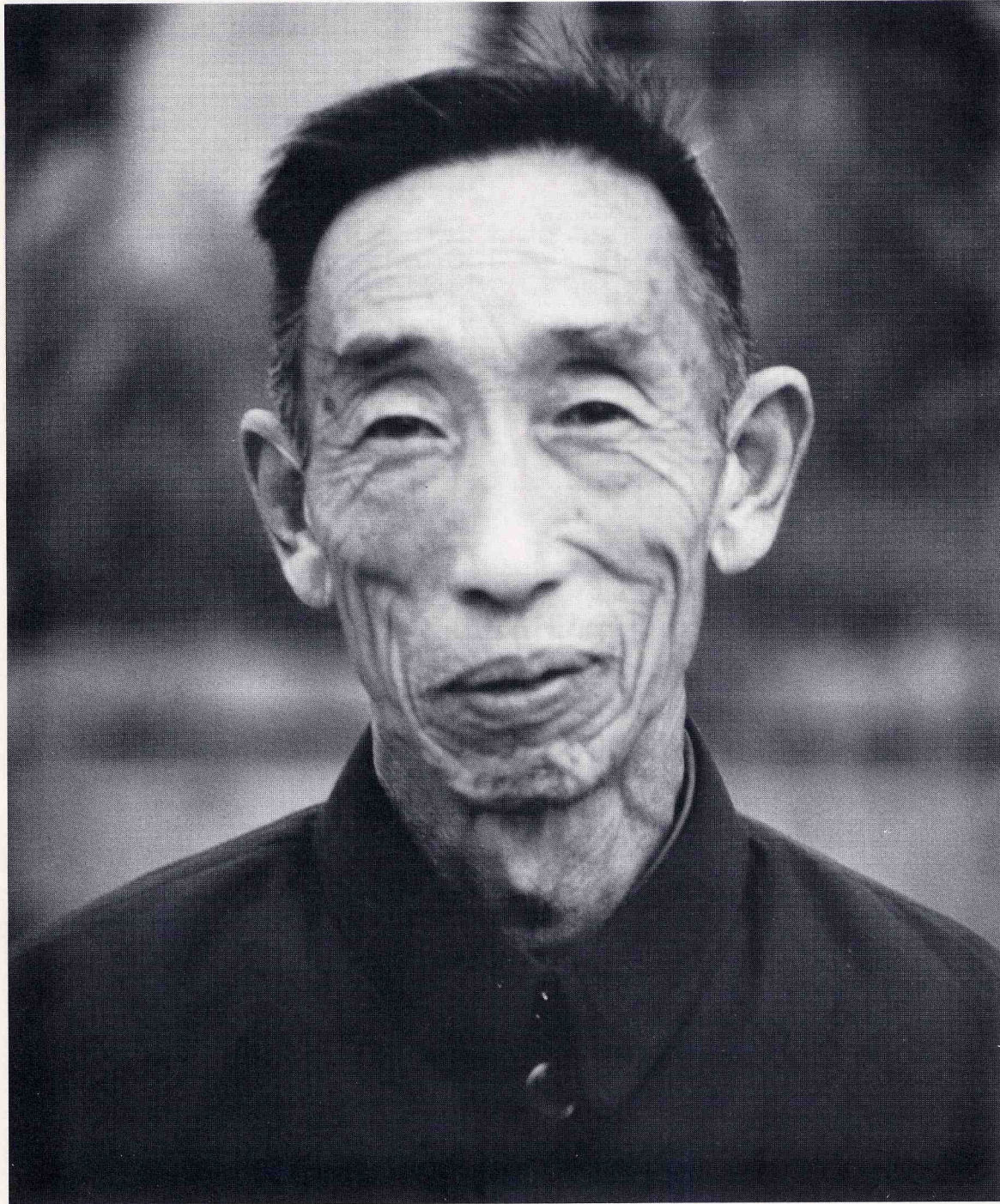
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*Professor Hsueh Chi-ju, the botanist who collected the type specimens of *Metasequoia glyptostroboides* in 1946. Photographed in October 1984 by Peter S. Ashton.*

Reminiscences of Collecting the Type Specimens of *Metasequoia glyptostroboides* H. H. Hu & Cheng

Hsueh Chi-ju

After forty years a Chinese botanist has still-vivid memories of his eager and determined quest for specimens of the dawn redwood

When the Arboretum's Director, Peter S. Ashton, visited the People's Republic of China during the fall of 1984, he met Professor Hsueh Chi-ju, of Southwestern Forestry College, Kunming City, Yunnan province. As a young man, Professor Hsueh had collected the type specimens of the recently discovered dawn redwood, Metasequoia glyptostroboides H. H. Hu & Cheng. Director Ashton invited him to write a first-hand account of his collecting trips, for publication in Arnoldia. To commemorate the approaching forty-fifth anniversary of the discovery of living Metasequoia trees, we are pleased to present herewith Professor Hsueh's fascinating account of his adventures.

Forty years ago, I happened to see the specimen of *Metasequoia glyptostroboides* that Mr. Wang Zhang had collected at Modaoqi [knife-grinding] village in Wanxian county, China. The next year, following the route Mr. Wang had taken, I made two trips there to collect perfect specimens and to conduct further investigations. Although I am old now, the two trips are still fresh in my memory.

I graduated from the Forestry Department of the former National Central University at Zhongjing (Chungking) in 1945 and then worked on the gymnosperms, studying for a master's degree under the guidance of Professor Cheng Wanjun. One day in 1945, Wang Zhang, who worked at the Central Forestry Experimental Institute, sent a cone-bearing specimen collected at Modaoqi to Professor Cheng for identification. Its vernacular name was *shui-shan* (water fir), and it was somewhat similar to *Glyptostrobus pensilis* (*G. lineatus*). After making a preliminary identification, Professor Cheng considered that it might belong to a new taxon of the Gym-

nospermae, since the opposite arrangement of the leaves and cone scales differed from that of *G. pensilis* and other members of the Taxodiaceae.

Since the specimen Mr. Wang collected had no male inflorescences and since the cones had been picked up from the ground, we didn't know how the cones grew on the branches. In addition, we had no information on whether it was deciduous or evergreen, on its flowering season, or on its ecological characteristics and distribution.

Further research being necessary, Professor Cheng naturally advised me to collect some perfect specimens and to make an investigation. Since we had no funds and everybody was quite hard up, I could only go to the place on my own, carrying a few pieces of simple baggage and specimen-clips. I left Chungking city by streamboat and, after two days, arrived at Wanxian county, on the northern bank of the Changjiang (Yangtze) River. After crossing the river, I had to walk 120 kilometers [72 miles] to my destination. In 1946 I made two trips from Chungking to



Topography of the rugged region of central China in which the author travelled, often by narrow mountain trails, in his search for *Metasequoia* trees, as photographed from a NASA satellite in 1975. He collected the type specimens from a tree just outside Modaoqi. The irregular white areas are snow-covered mountain ranges. The population of trees Professor Hsueh was looking for when his time ran out, and he had to return to Wanxian, is labelled "Metasequoia Valley." The approximate range of *Metasequoia* is the hatched area bounded by triangles.

Modaoqi, in February and May, respectively, both times single-handedly.

The First Trip to Modaoqi

I remember that on my first trip the boat was moored in Fengdu county for the first night. On a hill behind the county town was a temple regarded in the Old China as an inferno where the "Lord of Hell" reigned. Dead souls were supposed to go there to register. So I made use of this rare opportunity to take a solitary night walk in this weird and dreadful place—evidence that I was full of vigor and curiosity in my youth.

At that time there was no highway from Wanxian county to Modaoqi village. My trip was very difficult, the trails threading through the mountains being less than one foot wide. The region was inhabited by the Tu minority and had been isolated from the outside world for ages. During the war of resistance against Japan, the Hubei provincial government moved to Enshi county in its neighborhood; thenceforward its intercourse with the outside world had somewhat increased. Since this region was located on the border between Sichuan and Hubei provinces, an area characterized by difficult and hazardous roads, murder and robbery occurred frequently. It was regarded as a forbidding place and was seldom visited by travellers.

On my trip, I set out from Wanxian and stayed at Changtanjing for the night. My fellow travellers were several pedlars. While we chatted around a fire at night, the innkeeper came to give us a warning: "If you go any farther you will travel along a narrow valley cut by the Modaoqi River. Travel will become more dangerous and threatened with robbery, which often occurs at dangerous turns of the river. Travellers from both directions are robbed by being jammed together, or 'rounded up.' Therefore, if you see no travellers coming your way for a long time, it is very likely that a robbery has occurred ahead,

and you had better take care. Only a few days ago we witnessed such an incident in this vicinity." The innkeeper then gave a vivid and horrible description of a murder. The poor pedlars, my fellow travellers, were very frightened. They dared not go any farther and returned to Wanxian the next morning. As for me, I was bent on finding that colossal tree and collecting more specimens, so I resolutely continued my trip along the route marked out by Mr. Wang, without any fear or hesitation.

Finally, at dusk on the third day, I reached my destination safely. I set out immediately to search for that colossal tree despite hunger, thirst, and fatigue, and without consid-

ering where I would take my lodging. It was February 19th, and cold. The tree was located at the edge of the southern end of a small street. In the twilight nothing was discernible except the withered and yellowed appearance of the whole tree. My excitement cooled.

"Am I to bring back just some dried branches?" I asked myself.

The tree was gigantic; no one could have climbed it. As I had no specific tools, I could only throw stones at it. When the branches fell from the tree, I found, to my great surprise, that there were many yellow male cones and some female cones on the leafless branches. I jumped with joy and excitement.

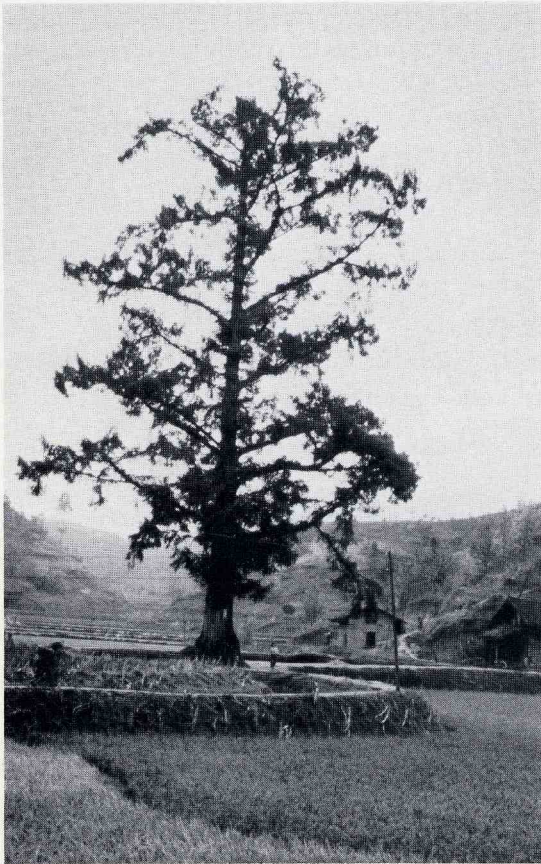


The city of Wanxian, looking downstream along the Changjiang (Yangtze) River. All of the expeditions to the Metasequoia region began in this bustling port situated over 900 miles from the river's mouth. Photograph by the American members of the 1980 Sino-American Botanical Expedition (B. Bartholomew, D. E. Boufford, J. L. Luteyn, and S. A. Spongberg).

The weather being cold, many plants were not yet in flower. Since I was short of money, I returned to Chungking city three days later.

The Second Trip to Modaoqi

The second trip was in May of the same year, its purpose being to collect the cone-bearing specimens in addition to ascertaining the natural distribution of *Metasequoia* and the flora of the region. On my way to Modaoqi, about half a day's walk from my destination, I came across a peasant carrying a bundle of



The tree in Modaoqi from which the author collected the type specimens of *Metasequoia glyptostroboides*. The shrine he mentions has been dismantled but is shown in the drawing on page 1 of this issue of *Arnoldia*. Photograph by the American members of the 1980 Sino-American Botanical Expedition.

fagot mixed with some *Podocarpus nagi*. The wood was said to have been cut from a nearby mountain. I took two twigs and pressed them as specimens. This indicated that *P. nagi*, another primeval gymnosperm, occurred in the vicinity.

This time I took measurement of the *Metasequoia* tree. It was 37 meters [about 122 feet] high and 7 meters [about 23 feet] in girth, and still grew vigorously.

To ascertain the distribution of *Metasequoia* I interviewed many local people, but none of them knew. The innkeeper did tell me that a whole stretch of *shui-shan* trees might be found at Xiahoe, in Lichuan county, Hubei province, about 50 kilometers [30 miles] away. As I had almost exhausted my travelling allowance, and as communication was extremely inconvenient, I had to give up my attempt to extend my trip to that place. Nevertheless, the innkeeper had provided an important clue for a more thoroughgoing exploration later. All I could do was—taking the original spot as a center—to make a reconnaissance within the area I could cover in one day. In a few days I had collected more than one hundred specimens.

Two things impressed me deeply. One was that I came across whole stretches of *Geastrum* sp. (an earthstar fungus) mixed with small stones of a similar shape, forming a peculiar landscape. The other thing that impressed me was an incident. Not even by the day before my departure had I given up on the possibility of making a reconnaissance. At four in the afternoon of the last day, I met a traveller coming from the southeast and asked him where the *shui-shan* tree could be found. He told me that it could be got near a small village about 5 kilometers [3 miles] from where we were. Upon hearing this I almost broke into a run, intending to return to the inn before dark so that I might leave for Wanxian the next day. After trotting for a while, I met another peasant and asked him how far it was to the village. (I can't be

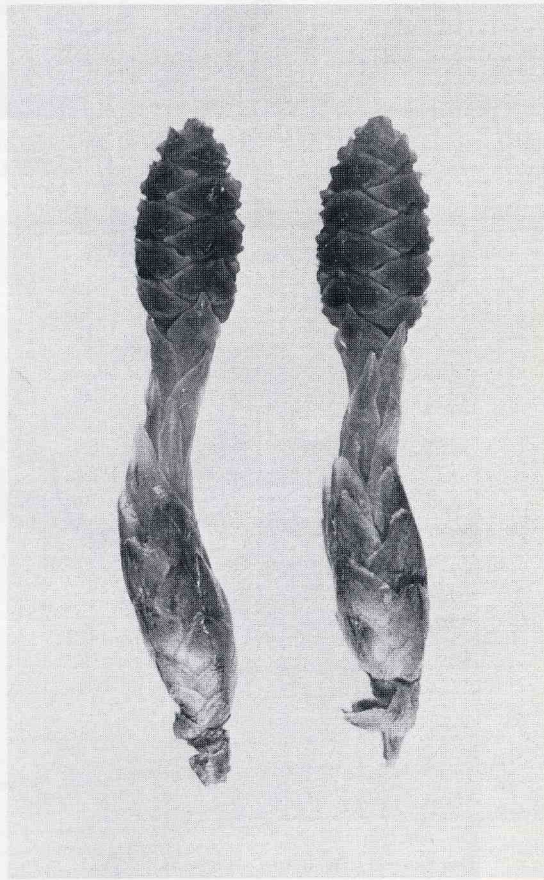
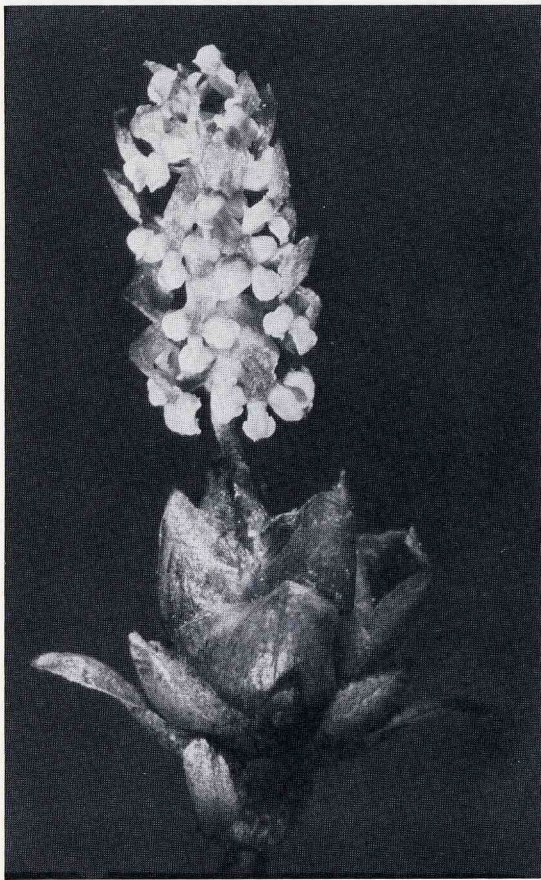
sure now, but it may have been Nanpin village in Lichuan county.) "Five kilometers," he replied. Mountain people sometimes differ considerably in their gauge of distance.

I was wavering as to whether to go or not. If I should go, it was certain that I could not have returned to the inn before dark and that the innkeeper would worry. Then, too, I had already hired a man to carry the specimens for me; we had agreed on the next morning as the time for departure. I could not break my word! But finally I made up my mind to make another reconnaissance for *shui-shan*.

It was getting dark when I arrived at the small village. The villagers in their isolation

seldom met outsiders, especially "intellectuals" such as I was. My arrival aroused their curiosity. They surrounded me, making all sorts of inquiries. But I was anxious to see the *Metasequoia* trees. When I was told that there were no such trees, I was very disappointed. However, I did not give up hope, and asked the villagers to accompany me to make one last reconnaissance. There was, indeed, no *Metasequoia*. I did collect some specimens of *Tsuga chinensis*, however.

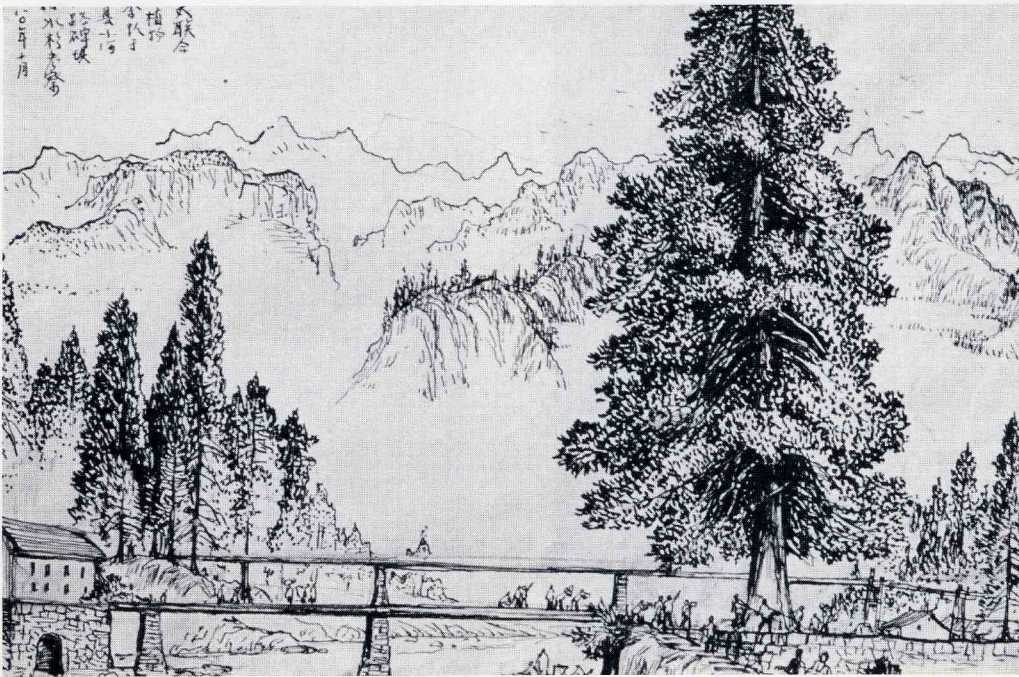
I intended to return to the inn in spite of the dark night. However, the friendly villagers had already made arrangements for my food and lodging, and had warned me repeat-



Male cone (left) and female cones of *Metasequoia glyptostroboides*. The author made his trips to secure male as well as female cones so that the new species could be given a botanical description. Photographs by LeRoy C. Johnson.



"Metasequoia Valley," near Xiaohoe, in 1980. Note the absence of natural vegetation around the conspicuous Metasequoia trees. Photograph by the American members of the 1980 Sino-American Botanical Expedition.



Drawing, by an unknown artist, of a 420-year-old Metasequoia tree in "Metasequoia Valley," Xiaohoe commune. This is the oldest Metasequoia tree known.

edly of the frequent robberies on the way, insisting on my leaving the next day, escorted by some local people. Yet I could hardly fall asleep, thinking that I could not cause them so much trouble or break my word to the hired carrier. And then I thought that in the depth of the night there would be no "bandits," since there would be no travellers to rob. So, at two in the morning I awoke my roommates, explaining to them the reason for my prompt departure, and left the villagers a letter of acknowledgment. Since the door was locked, I could only jump over the wall so as not to disturb others. In the moonlight I passed through stretches of dark pines, returning to the inn before dawn. That very day I left for Wanxian.

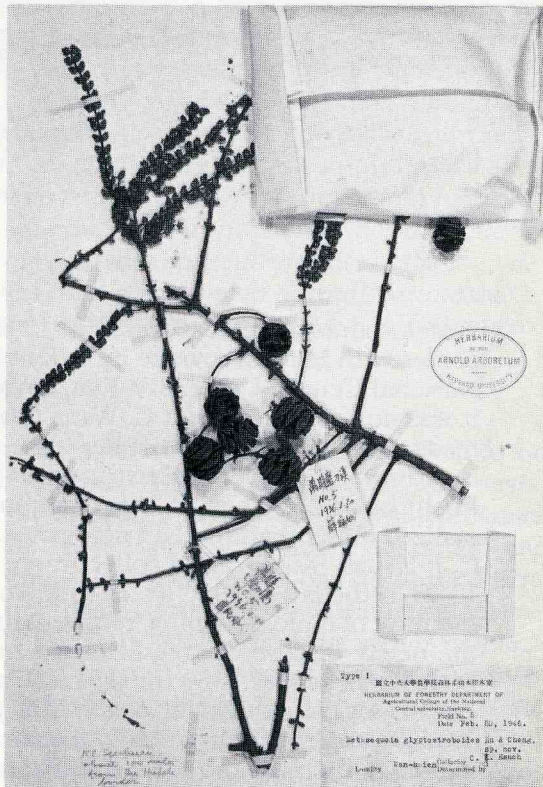
Geomancy Spared the Type Tree

Modaoqi was a very small village, to the southeast of which stood the Chiyue Mountains. Its altitude was 1,744 meters [about 5,755 feet]. At the time it was in Wanxian county, Sichuan province. It was so called because of its situation at the source of the river. As *modao* in Chinese means "knife-grinding" and suggests sinisterness, the name was changed to Moudao, which means "truth-seeking" in Chinese. At present it is under the jurisdiction of Lichuan county, Hubei province.

As the local people looked upon the *Metasequoia* as a sort of divine tree, they built a shrine beside it. Among the villagers there were quite a few traditions about the *Metasequoia*. As a result, the villagers considered its fruit-bearing condition to be an indication of the yield of crops, and the withering of its twigs or branches a forecast of someone's death. It was also rumored that, some time after the founding of the Kuomin Tang government, some foreign missionaries who were passing through the village were willing to buy the tree for a big sum of money. The villagers refused to sell, however, because of

the geomantic nature of the place. Thus, it was because of feudalistic superstition that the tree had survived. Its age is estimated at four hundred years.

With the advent of well regulated highway communication, the poor village of the former days changed its aspect long ago. The *Metasequoia* tree, which had survived the ravages of time and is reputed to be a "living fossil," has not only persisted, but is being disseminated. Now, *Metasequoia* trees are "settled" in many countries of the world. It is only natural that people, when admiring this species of primeval tree, should wonder about its original habitat and should wish to know how it was discovered.



The prize: one of the many specimens of *Metasequoia glyptostroboides* that Professor Hsueh collected during his first trip to Modaoqi. This specimen, called a syn-type, is in the Herbarium of the Arnold Arboretum. Photograph by David E. Boufford. See next page.

Type !

國立中央大學農學院森林系樹木標本室

HERBARIUM OF FORESTRY DEPARTMENT OF
Agricultural College of the National
Central university, Nanking,

Field No. 5

Date Feb. 20, 1946.

Metasequoia glyptostroboides Hu & Cheng,

sp. nov.

Locality Wan-hsien Collector C. J. Hsueh
Determined by

Metasequoia was discovered in 1941 at Modaoqi in Sichuan Province near the border with Hubei Province by T. Kan (Gan Duo), of the Department of Forestry of National Central University. Kan, however, did not collect or make specimens, and it was not until 1943 that C. Wang (Wang Zhang) of the Central Bureau of Forestry made the first collections of herbarium material. The tree was initially thought to be a form of *Glyptostrobus lineatus* (Poiret) Drude (syn.: *G. pensilis* (Staunton) Koch), but W. C. Cheng (Cheng Wanjun), of National Central University in Nanjing, realized that it represented a new genus. As a result, Cheng sent one of his assistants, C. J. Hsueh (Xue Jiru), to collect more herbarium material in February and May of 1946. In the fall of 1946, H. H. Hu (Hu Xiansu), then director of the Fan Memorial Institute of Biology, Beijing, received material from W. C. Cheng. Hu recognized that the newly discovered tree belonged to the genus *Metasequoia*, described in 1941 from Pliocene fossils by the Japanese botanist Shigeru Miki. Miki determined that certain fossils, which for nearly 100 years had been variously assigned to either *Sequoia* or *Taxodium*, actually represented a new genus, which he named *Metasequoia*. At the time, he did not realize that a living species of *Metasequoia* was still extant in south-central China.

—Reprinted from an article by Bruce Bartholomew, David E. Boufford, and Stephen A. Spongberg in the *Journal of the Arnold Arboretum*, vol. 64, no. 1 (1983). Used with permission.