

Metasequoia and the Living Fossils

Henry N. Andrews

Dr. Andrews, professor of botany at the University of Washington and paleobotanist at the Missouri Botanical Garden, turned a cool eye on the furor over "the living fossil" and with a hint of mockery introduced a bit of perspective to the dialogue.

Shortly after last Christmas [1947] the Garden received a small packet of seeds from Professor Wan-Chun Cheng of the Arboretum of the National Central University in Nanking. These are the seeds of a new conifer recently discovered growing in eastern Szechuan and southwestern Hupeh provinces of central China. Its discovery was rather noisily announced a few months ago in the daily press as a "living fossil," and while it is an appropriate term it seems to be somewhat less deserving of that title than many other modern plants . . .

It is fascinating indeed to find that a group of plants supposed to be extinct still lives on, in a part of the earth remote from the searching eyes of botanical explorers. There is something of the "Lost World" motif about it that is attractive to all naturalists, and irresistible to the popular science writers who may find it profitable to mix the facts with their fancies. And one may wonder whether the *Metasequoia* stir would have had as much appeal if the sequence of discovery had been reversed. The answer is almost certainly in the negative . . .

Metasequoia glyptostroboides has been hailed as a "living fossil"—a phrase that makes good headlines but one which is notably lacking in precision as far as the time element is concerned. The fossil specimens described by Miki were found in clay beds of early Pliocene Age in Japan. The Pliocene period is generally accepted as having begun some 7 or 8 million years ago. Thus it may be appreciated that accounts of this new conifer which appeared in the daily press, hailing it as "a tree believed extinct for

100,000,000 years," may be commended for their enthusiasm but not their accuracy! One is tempted to believe that news writers keep in stock a special supply of type bearing the inscriptions "dinosaurs" and "100,000,000" with which liberally to season all of their copy dealing with life of past geologic ages. We do know a good deal about the more ancient history of the conifers; we know that as a group they were abundant and well developed in the dinosaur age, but we do not know that *Metasequoia glyptostroboides* itself dates back that far. It is possible that such may be the case, but a careful review of the many fossil *Sequoias* described in botanical literature will be necessary before significant conclusions can be drawn.

As a brief passing commentary on geologic times and the origin of various forms of living things, it may be of interest to note that large forest trees (not *Metasequoia*!) are known to have existed on the earth more than 300 million years ago; more primitive plants were established on the land some 375 million years ago; highly developed invertebrate animals existed in the seas in excess of 500 million years ago; and still simpler forms of life such as the algae go back much farther. *Metasequoia* is a real living antique but it cannot be ranked among the most ancient by a long shot.

While *Metasequoia* will undoubtedly prove to be a significant link in our knowledge of the evolution of the conifers and very possibly a valuable horticultural acquisition, it is overshadowed as a living fossil by the ancient and honorable genealogies of plants growing



Three-month-old dawn redwood seedlings at the Missouri Botanical Garden, 1948.

in our own backyards. A few of these may be of interest—to dispel the illusion of the far-away and justly to recognize the plants we live with every day.

There are very few plants that have served man to greater advantage than the pines. . . . yet the pines, not their distant relatives but pines as we know them today, may be traced well back into the Cretaceous period—at least 90 million years ago—and into still earlier periods their ancestral derivatives trail back for at least another 130 million years. There is no reason to believe that it is still an actively evolving group of plants but its retention of great virility through the ages is equalled by very few other living things and, like the modern forests, their fossil remains are widely scattered. Here is one of the greatest of all living fossils.

Numerous other existing members of the conifer order are known to have originated far back in the past, and among those of particular interest to the present discussion are the Sequoias—the California Redwood (*Sequoia sempervirens*) and the Big Tree (*Sequoiadendron giganteum*). Although these giants are at present confined to a small area in California and Oregon, their fossil remains are found widely scattered through Tertiary and late Cretaceous rocks of the northern hemisphere—from England, Greenland, Alaska, Italy, Spitzbergen, and numerous other localities come the records of their past distribution.

In the petrified forests of Yellowstone Park are great stumps indicating trees in excess of 14 feet in diameter that grew there in Miocene times. These were closely related to the modern Redwood as well as *Metasequoia*. . . .

The highly prized forest tree *Taxodium distichum* (Bald Cypress) of our southern swamps presents a fossil record that is not unlike that of the Redwood. In fact, our understanding of the past distribution of these two is not always perfectly clear since they are closely related and the foliage of the two is so similar that they are not always readily distinguished in the fossil forms. . . .

[The cycads,] palm-like in appearance, are found today from Florida and Mexico through the Indies into northern South America, in South Africa, and in the tropical Pacific isles from Japan to Australia. Our only native American species, *Zamia floridana*, is common in the sandy open pine woods of Florida. It is not a showy plant, with its underground stem and smallish palm-like leaves, but it is a lingering remnant of a once large and diversified group that apparently attained the zenith of its evolutionary powers in the Jurassic period some 140 million years ago, and there is reason to believe that its more remote ancestors originated from the Coal Age Seedferns still farther back in the past. From a clay bed exposed along a wave-swept beach in northeast England the leaves, as well as the seed-and-pollen-bearing cones, of a plant seemingly closely related to *Zamia* have been excavated. And from the Black Hills of South Dakota and the sun-scorched Ferris Mountains of Wyoming come beautifully petrified plants belonging to the great cycad complex—bearing evidence of diversity and former distribution of the cycadophytes and of changing climates and topographies. . . .

Many other instances of exceptional racial longevity might be cited. Perhaps such well-known plants as the ginkgo and the clubmosses should at least be mentioned in passing, but since these have been considered in detail by many previous writers we have chosen to consider some of those plants whose ancestry has been somewhat less publicized.



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