

Woody Grains In Chinese History: The Basis For New Agricultural Policies

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Abstract:

Historically, China was not only a large agricultural country, but also a strong agricultural power. Because there were countless types of grains produced in China, it had never been a problem to feed tens of millions of people. After consulting Chinese literature records, we are always surprised to find that, in addition to the well-known gramineous food crops, there are also many food crops produced from tall arbor or shrub. Such special food crops can be generally referred to as “tree- grains”. In this way, during the long history, the Chinese ancestors could not only have no worry about food, but also ensure an adequate supply of fuel and diversify clothing materials. Because of precisely out of a deep recognition and understanding of the superiority of Chinese traditional culture, the current Chinese government is able to put forward the decision-making on the modern agricultural transformation of establishing large-scale agriculture, large-scale food, and large-scale resources.

Keywords: *Tree-grains, Large-scale grains, New policies*

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Introduction

To lead a stable social life that aligns with their preferences, humans inevitably rely on the natural and ecological systems we inhabit. The systems provide vital substances, biological energy, and various forms of natural information. For this reason, every nation and country must possess its own unique agriculture. Additionally, due to historical sedimentation differences, even to this day, the agricultural practices that sustain different nations and ethnic groups around the world remain diverse and multifaceted. Faced with this reality, the academic community naturally seeks to categorize agriculture into basic types to facilitate targeted academic research and practical management operations.

Over the past half-century, China has endured numerous unjust and unfair treatments in the international market, resulting in the traditional woody agricultural products from China failing to receive fair and reasonable treatment (Yang & Zhang, 2024). Moreover, in the process of peaceful rise, China's main focus has been on enhancing overall economic strength, it causes woody agriculture, which has already become weak and marginalized, to remain unnoticed by the broader society. However, traditional woody agriculture in China has been actively preserved and passed down in the border regions and among minority groups, Its embedded excellent traditional cultural content is still being well-preserved and protected. Woody agriculture is a new concept that has only been put on the research agenda in recent years. European and American scholars have already conducted systematic research on it, but the introduction, digestion, and absorption in China's academic community are rather lagging behind (Wu & Luo, 2023). The reason is that although the historical tradition of woody agriculture in southern China, especially in the south-western region, is very long and has made outstanding contributions in history, it has gradually declined since the Ming and Qing dynasties.

From the historical records of Chinese civilization, it is clear that from the very beginning of its inception, Chinese civilization explicitly mentioned “the cultivation of various grains”, as well as the raising of silkworms and the consumption of nuts and berries as agricultural activities. However, the term “grain” mentioned here clearly refers to herbaceous agriculture, which involves the domestication, cultivation, and utilization of herbaceous plants. On the other hand, the cultivation of mulberry trees for silkworm breeding and the use of woody plant fruits as food are the contents of what is now referred to as woody agriculture. Since the objects of cultivation are different, the knowledge, technical skills, and even institutional guarantees for their management must also vary. However, until today, China's agricultural history research and even the “sannong” (agriculture, rural areas, and farmers) policies have long been highly focused on herbaceous agriculture. Woody agriculture, which is based on the domestication and utilization of woody plants, has

received significantly less attention and research accumulation. This is an irrational state resulting from historical reasons. It will also unexpectedly hinder the reconstruction of the harmonious relationship between humans and nature today.

From the perspective of archaeology, in the officially published archaeological reports before, it has long been noticed that among the stone relics of the Neolithic Age, it has been proven that there are starch residues of various woody plants in them. This is sufficient to show that the origin of China's woody agriculture is no later than that of herbaceous agriculture, only with regional differences. The agriculture of the ancient southern ethnic groups in China took tall perennial woody plants as the objects of cultivation and utilization, while in the north, it was mainly herbaceous agriculture with annual or biennial herbaceous plants as the cultivation objects. This means that woody agriculture and herbaceous agriculture each have their own values, as well as their own advantages and disadvantages, and both are essential for human survival. Therefore, they need to be treated equally and be interdependent, which is the right way for human sustainable development.

From the perspective of ethnology, through more than a hundred years of efforts by Chinese ethnological workers, in the living ethnic cultural data collected, no one can deny that in different regions and among different ethnic groups in China, woody agriculture has not only been actively passed down in a living state, but has also been playing irreplaceable social-economic, ecological, cultural, and social-technological values all along. In fact, we cannot do without woody agriculture for a moment.

Combining the above understandings from these three disciplines, we finally have to admit that within the framework of large-scale agriculture, the multi-format agricultural production patterns of different categories, items, and styles each have their own uses and values for the process of human civilization. Each category and item determines contemporary social life and, more importantly, the future sustainable development of humanity. Neglecting any category or item is an unforgivable mistake and bias.

In the history of ethnological theories over more than a century, different theories such as classical evolutionism, diffusionism, structural-functionalism, and neo-evolutionism have successively proposed different civilizational histories and development sequences (Yang, 2007). However, in terms of reconstructing the harmonious relationship between humans and nature, the most worthy-of-reflection theoretical omission precisely lies in the fact that in the documented human history, different eras and nations have either attached great importance to herbaceous agriculture, or favored animal husbandry, or relied on woody agriculture for a living. But they have never treated all agricultural categories and items equally, allowing each to be in its proper place and fully utilized.

If such theoretical biases are not remedied and corrected in a timely manner, it will be difficult to implement all the correct decisions regarding the concepts of large-scale agriculture, large-scale food, and large-scale resources, and the reconstruction of the harmonious relationship between humans and nature will also remain an armchair strategist. To practice the concept of large-scale food, we should break away from the inherent thinking pattern of "grain, oil, meat, eggs, and milk", extend our perspective from the fields to the branches, develop and make good use of China's 5.4351 billion acre of forest resources, and deeply tap the potential of "tree-grains" mainly composed of edible fruits, tubers, flowers, and leaves. As an important fulcrum for alleviating food security pressure and supporting the national large-scale food strategy, there is a great potential for the future development of "tree-grains" (Lu & Qu, 2022).

The "Grain" Behind Silk

At present, the Silk Road is well-known to people. It was a great commercial passage across Eurasia in ancient times. Since it was opened in the 2nd century BC, the exquisite silk produced in China has been continuously exported to Central Asia, West Asia and all parts of Europe, becoming an expensive fabric sought after by people all over the world. People still remember this vividly. However, it would never occur to people that behind the exquisite silk, the fiber-producing crops in Chinese traditional culture can also produce delicious "grains" at the same time. Of course, the "grains" mentioned here are not the seeds of gramineous plants, but the fruits and seeds of tall trees. They were indeed one of the important food sources for peoples in Chinese history.

Originally, the plants that support silkworms are tall Moraceae plants. The tender leaves of woody crops such as mulberry tree, *Broussonetia papyrifera*, and oak tree are the feed for silkworms, and these plants also bloom and bear fruit. The fruits of mulberry and *Broussonetia papyrifera* are berries with tiny seeds, but they are also rich in nutrients. Therefore, while picking mulberry leaves to feed silkworms, people also consume the berries and seeds they produce as "grains". This determined that in ancient times, the collection of mulberry leaves would not only take the tender leaves, but also cut down the thick branches of mulberry trees along with the leaves and berries, tie them into bundles, and take them home. The leaves are used to feed silkworms, while the berries are consumed by humans. The bark stripped from the branches can be soaked in mud water, and after rotting, it can also be used to weave fabrics.

What's more, the astonishing is that after silkworms spin their cocoons, people will heat and steam the cocoons to kill them, then place them in water to boil and extract the silk. Noting that this manual process not only obtains fabric, but also obtains silkworm pupae. Such silkworm pupae are also a delicious animal-based food, providing a rich source of protein and fat for people, with effects similar to soybeans. After such multi-layered and multi-channel utilization, today's people call these crops fiber-producing economic crops, which is certainly biased, as they are also truly "grains" in a sense.

In addition to the tender leaves of Moraceae plants that can be used to raise silkworms, the tender leaves of Fagaceae plants (such as chestnut, *Lithocarpus glaber*, *Quercus semicarpifolia*, oak, *Cyclobalanopsis glauca*) can also be used to raise silkworms and are also another type of cereal crop. The silkworms raised in this way are called tussah. The silk produced by tussah is relatively thick and tough, and the silk fabric woven is particularly wear-resistant (Cao, 2022). Of course, when it was sold overseas through the Silk Road, the people in other Eurasian countries were unable to accurately distinguish it from mulberry silk, but this is not important. What is important is that there are dozens of species of tall arbors of Fagaceae for feeding tussah in China. The fruits they bear have hard thorns, and it is easy to prick fingers when picking them. But the Chinese ancestors were not stupid either. They could use long poles to knock on the branches, let the fruits fall naturally, and then collect them (Cao, 2022). After being exposed to the sun, the fruits will split open and the seeds will fall out. Fortunately, the seeds are nearly spherical, and collection is not difficult.

However, some of these seeds can be eaten raw, while others need to be cooked and detoxified before they can be eaten. Although the methods of eating are slightly different, the effects are the same, and in history, they were truly grains. Similarly, the pupae of tussah are also delicious protein foods. This is why the Chinese in history were not only skilled craftsmen in making silk but also well-dressed, well-fed, nutritionally comprehensive and healthy happy people. More importantly, the crops they cultivated were also truly "tree-grains". If you don't understand this point, then your knowledge of the story behind silk can only be considered as superficial.

Tea Trees Not Only Produce Beverages, But Also Food

In today's world, tea has become a well-known beverage, but few people pay attention to the fact that tea trees can also produce food. Originally, tea trees are a general term for several species of plants in the *Camellia* family. This type of plant originates from tropical and subtropical forests. Under natural conditions, they do not bloom and bear fruit in a continuous cycle. Only when they are disturbed by nature and animals will they bloom and bear fruit.

The Chinese ancestors domesticated and cultivated these crops with the intention of using their tender leaves as food seasonings. However, as the planting area continued to move northward, the species also underwent mutations. The species mainly cultivated for tea picking after domestication is called tea plant, and the one mainly for food is called *camellia oleifera*. However, regardless of how the species change, when they are planted in the mountainous areas south of the Yangtze River, they will change their original form. They will shed their leaves in early spring and bloom and bear fruit in late autumn. If the fruits are not picked, they will not fall naturally but will remain on the branches for a year until the next late autumn when they bloom, they still do not fall. This is the wonder of synchronous flowering and fruiting as described by botanists. It is important to know that this is not their nature, but a new physiological characteristic derived from artificial domestication. After recognizing this new phenomenon, the ancestors of the Chinese had a sudden inspiration and invented a new technology, that is, using squirrels as helpers to collect and store the seeds of tea plants for humans.

The specific operation method is to patrol in and around the tea tree forest, and specifically check the distribution of dry grass roots on the ground and on the trees. Once it is found that the dry grass roots are arranged in an unnatural state, when the squirrels are not in the surrounding area, push aside the grass roots that are stacked in an orderly manner, and the entrance of the hole or the tree hole will be exposed. Just reach into the hole with your hand, and you can take out the tea seeds stored by the squirrels for winter consumption. Each hole can yield 1-3 kilograms of tea seeds. Generally speaking, each squirrel usually stores tea seeds in 6-7 holes separately. They only need the tea seeds in 2-3 holes for their winter consumption. Humans take half of it. This does no harm to squirrels and is also harmless and beneficial to humans. They can coexist and get what they need through cooperation.

The tea seeds obtained in this way can be used to satisfy hunger. They can be eaten after being stir-fried and shelled. For further processing, the method of crushing and stir-frying can be used. Boil it with water and let it stand for a day and a night, and the oil contained in the tea seeds will float to the surface. Oil can also be extracted by pressing. Such oil is called *camellia oil* in China. It is a high-quality edible oil with high energy and can be compared with coconut oil and olive oil (Hou, 2021). More interestingly, the residue after oil extraction is rich in saponin. After being soaked in water, it can be used to wash clothes and hair, even take a bath, and has a miraculous effect on treating skin diseases. Even more incredible is that the ancestors of the

Chinese also used the branches obtained from pruning tea trees to cultivate various edible fungi (such as *Agrocybe cylindracea*, *Auricularia auricula*, *Tremella fuciformis*, etc.), thus also producing delicious foods. Even the tumors that grow on tea trees after being parasitized by insects are also delicious foods and can be eaten raw directly. Truly, every tea tree can be regarded as “food treasure box” (Hou, 2021).

From this perspective, the term “tree grain” in Chinese is actually just a metaphorical general term, because in the eyes of the ancestors of the Chinese, it not only produces a variety of foods at the same time, but also produces building materials, fuel, and detergent. This sufficiently demonstrates the diversity and complexity of Chinese cultural tradition, truly achieving the full utilization of resources and never wasting a branch or a leaf. The spirit of the concept of a large-scale food can be shown incisively and vividly.

Bread Made Of Wood Has Existed In Ancient China

Magellan’s global expedition has long been of concern to European and American scholars. However, after Magellan died in the Philippines, the memoirs written by the few surviving crew members after they fled back to Portugal have rarely attracted the attention of scholars. The most noteworthy detail among them is precisely that it is fortunate to mention the sago, an unique palm-family plant, is not a wild plant in the Philippines but a crop cultivated on a large scale by the local people. The purpose of cultivation is to extract its pith. Such a part of the organism is rich in starch and also contains edible protein and fat. After extraction, it can be eaten raw or directly made into bread after baking.

The unique value of these records lies in the fact that they clearly inform the world that grain crop products are not limited to plant seeds, but that the woody and pithy parts of plants can also be sources of food. This is almost a fairy tale for countries and peoples in the north temperate zone, but it is a common crop in the traditional agriculture of tropical and subtropical countries and peoples. Due to the vast territory of China, the southern mountainous areas of China have already entered the tropical and subtropical regions. Therefore, this “tree grain” should not be a novel thing in Chinese history, but an ancient custom that has existed since ancient times.

The origin and evolution history of Chinese woody agriculture is deeply accumulated in the traditional Chinese culture, with a solid social foundation for effective inheritance and protection. After consulting Chinese historical documents, it is learned that this type of “tree grain” was clearly recorded in the Historical Records as early as the 4th century. However, due to language translation, these crops were not called the sago in Chinese literature, but were translated as *arenga pinnata* according to the traditional Chinese culture. One of the historical records, “*History of the Later Han Dynasty*”, explicitly points out that in the confluence area of the North Panjiang River and the South Panjiang River today, the local people cut down tall *arenga pinnata* and dug out their pithy cores as food (Geng, 2019). The core of one *arenga pinnata* is enough to supply food for dozens of people for two months. As a result, they disdain to grow millet and wheat stipulated by the court, and look down on growing rice, but are most keen on growing *arenga pinnata* to achieve abundant clothing and food.

It is even more worth mentioning that in the same area, until the 19th century, the local people relied on *arenga pinnata* for food year after year. They could not believe that there were such good grains as wheat and rice in the world at all. They wrote their feelings into ballads and sang them repeatedly. Moreover, by the middle of the 20th century, when the Chinese government organized a large-scale ethnic identification policy, several Chinese ethnologists also faithfully recorded several ethnic groups in Yunnan, China (*Lisu people, Lu people, Wa people, De’ang people, Dai people*). Until the middle and late 20th century, they still continued to plant *arenga pinnata* for food. By the end of the 20th century, they further sold the starch produced by *arenga pinnata* as a nutritional supplement all over China, and even formed trading partnerships with villagers in Myanmar, Thailand, Laos, and Vietnam to operate the refined processing industry of *arenga pinnata*, thus winning huge market returns (Geng, 2019).

What is even more amazing is that in Chinese traditional culture, not only the heart of the tree can become a delicious food, but other parts of this crop are also precious resources. The tender leaves of the *arenga pinnata*, marketed as “zong sunzi”, are not only edible raw by humans, but also sweet and delicious. They are a delicacy for many primates, which has led to a long-drawn-out seesaw battle between the people who plant *arenga pinnata* and these annoying primates. What’s more troublesome is that Asian elephants will also use their long trunks to forage for *arenga pinnata* leaves, leaving the praise of “elephants step on *arenga pinnata* leaves in the mountain village” in ancient Chinese poetry (Geng, 2019).

The fibers growing at the base of the petioles of the *arenga pinnata* are extremely tough. Therefore, the ropes made by cutting them are the best materials for ship-mooring ropes in maritime shipping. The *arenga pinnata* also blooms, and the amount of nectar produced is very high. When it blooms, the entire flower tassel will be surrounded by bees, and no matter how humans drive them away, they cannot be driven away. As a result, the local people have to be cruel and cut off the entire flower tassel, but a miracle occurs again, because sugar-water will continuously flow out from the root incision of the flower tassel. The sugar content even exceeds 15%, and villagers only need to collect such sugar water with containers, and they can make edible

sugar powder after processing. Even if the sugar water no longer flows, it doesn't matter. Villagers only need to continuously hit the trunk of the arenga pinnata with wooden boards, and the arenga pinnata will continuously flow out sugar water again. By repeating this operation, a mature arenga pinnata can often produce hundreds of pounds of edible sugar powder. The woody part of the arenga pinnata is dense and tough, sharp as steel, whether used to make tools or as arrow shafts and arrowheads, it can replace steel. When used as tableware, it is even more famous, called "black wood pieces, black wood knives, and black wood forks" in Chinese literature. Of course, when used as furniture, it shows its luxury and preciousness.

The wide range of applicable values of the arenga pinnata is simply unbelievable. Some scholars' research and statistics show that arenga pinnata-like plants have very good nutritional content: an arenga pinnata (trunk) contains 590 grams of nitrogen (N), 170 grams of phosphorus (P), 1,700 grams of potassium (K), 850 grams of calcium (Ca), and 350 grams of magnesium (Mg); an arenga pinnata leaf contains 37 grams of nitrogen (N), 6 grams of phosphorus (P), 20 grams of potassium (K), 90 grams of calcium (Ca), and 7 grams of magnesium (Mg) (Flach, 1997). But this has nothing to do with the biological properties of the arenga pinnata, but is inseparable from Chinese traditional culture. In Chinese traditional culture, making the best use of everything has long been an ecological creed that everyone strives for. As long as means and channels for utilization can be found, the Chinese ancestors would carry it forward along this kind of cognition and would never discard any resource at will.

In this sense, the above introduction to the uses of the arenga pinnata is actually just a drop in the ocean. Because such a creed can not only be implemented on the arenga pinnata, but also on the woody plants of the Asteraceae family mentioned above. It is completely worthy of the name to call Chinese traditional culture a culture that does not leave any waste. If this concept can be realized, the southern mountainous areas in China are expected to realize the concept of "storing grain in the mountains", which can also be called "storing grain in the soil" and "storing grain in the trees". There is no need for traditional grain storage. "Picking on demand", "using as needed", "processing on demand" "selling immediately after taking" can be realized. Since the edible part of the arenga pinnata is wrapped in a hard trunk, it will not be affected by chemical or radioactive pollution and can maintain its edible value. In terms of food security, arenga pinnata-like plants are more ideal than other crops. Besides containing starch, the inflorescence liquid of arenga pinnata plants can be used to make beverages, wine and sugar, etc. Its tender buds can be eaten as vegetables to meet the daily needs of people (Wu, 2018).

"Tree-Grain" With Sterile Seeds

The term "Musa basjoo Siebold" in ancient China was a general term for a large category of plants in the Musaceae family. Such a general term was adopted because their cultivation techniques and institutional safeguards in agricultural farming were roughly the same. Their utilization and consumption values were also similar. More importantly, this type of crop has not only been cultivated and utilized for a long time in southern China, but also highly valued and cultivated on a large scale in tropical and subtropical regions around the world by different countries and ethnic groups. It can be called a typical "tree-grain" on a global scale. However, biologists still call them herbaceous plants. This is obviously because the era when plant taxonomy emerged, plant scientists in Europe and America did not have time to conduct in-depth research on them, leaving behind a misnomer. In fact, this plant has a very tall tree shape and a long life cycle. It is very similar to the real trees. Understanding them as herbaceous plants is more likely to cause misreading and confusion.

Another characteristic of this type of plant is that although it can flower and bear fruit, the seeds in the fruit cannot be used to reproduce new plants. If one wants to domesticate, cultivate and utilize them in agricultural farming, the only feasible countermeasure is to use its underground stem instead of seeds for transplanting by dividing the plant. In ancient China, they were called "jiao", and the underlying meaning was that their seeds were like being burned and could not reproduce. Therefore. Calling them "bajiao" is also a naming strategy based on in-depth cognition.

The cultivation and utilization of this crop by various ethnic groups in southern China has a very long history. In contemporary archaeological excavations in various provinces in southern China, the specific starch from the fruits and underground stems of the banana has been found multiple times in stone knives left over from the Neolithic period. This fully demonstrates that the Chinese had mastered the knowledge, technology, and skills of cultivating and efficiently utilizing this type of plant as early as 10,000 years ago. As for the exact extent and degree of utilization, due to the lack of archaeological data, it is still difficult to make an accurate explanation at present.

Fortunately, around the turn of the Common Era, China achieved unprecedented unification. This crop, which can only grow in warm and humid areas, began to gain recognition and attention from the central dynasty. As a result, it was effectively recorded in relevant documents, allowing people today to learn about how this plant was cultivated and utilized in ancient times. After integrating the relevant records, we have reasons to believe that around 2,000 years ago, the ancestors almost indiscriminately used the tender buds,

fruits, and underground tubers of this plant directly as food. The large leaves and hard trunks could be used directly as packaging materials or submerged in mud and allowed to rot. The coarse fibers that did not rot could be taken out and washed, and used to weave fabrics.

From the 3rd century until the 19th century, Chinese scholars and poets frequently mentioned the *Musa basjoo* Siebold, a southern “tree-grain” crop, in their writings, but the responses from the successive dynasties were very cold. The reason was not due to anything else, but simply because the food produced by this type of crop is not durable for storage and cannot be transported over long distances. After receiving such food, the court could not share it with its subordinates. But the daily life of the various ethnic groups in southern China could not do without bananas. This situation where the court’s and the people’s consciousness were at odds was due to the biological properties and growth environment of *Musa basjoo* Siebold, which were dilemmas that ancient society could not change with human efforts. Therefore, successive dynasties in China only treated this crop as an ornamental plant and a wild plant. In terms of court policies, it was always considered insignificant. It was not until the 18th century that the famous scholar Qu Dajun’s “*New Tales of Guangdong*” began to systematically explain the cultivation and utilization of *Musa basjoo* Siebold (Qu, 1997).

The key historical and cultural cause for the marginalization of woody agriculture is the result of the historical choice of state power in historical periods. How to eliminate the interference of historical habitual thinking patterns, convey the importance of the agricultural category of woody agriculture to all sectors of society as quickly and accurately as possible, and pave the way for the modern- transformation of China’s woody agriculture, and promotes the construction of ecological civilization is a key problem that needs to be solved urgently at present (Wang, 2004).

The process of the main-grain political treatment of *Musa basjoo* Siebold-like “tree-grains” is full of twists and is far from fair. It is not an isolated case, but a convention caused by historical reasons. Moreover, it is also an almost identical historical universal fact on a global scale. To this day, developing countries and nations are still deeply affected by it, which has instead become a major practical problem worthy of in-depth consideration.

Conclusion

In summary, although the cultivation and utilization of “tree-grains” is a cultural fact that has long existed in the history of human civilization, their social and economic status has always been far from fair and reasonable. In terms of facts, “tree-grains” and herbaceous grain crops are both in a broad sense biological resources. Humans can fully utilize them efficiently. “Tree-grains” have their own living space and can develop in parallel with herbaceous grains without conflict. They can both be considered an organic part of broad-sense agriculture. In terms of the construction of a harmonious relationship between humans and nature, they can also do their best and there is no need for differential treatment.

At present, European and American scholars have reached a climax in their research on woody agriculture. The achievements are remarkable. The omissions and deficiencies therein lie precisely in the lack of historical accumulation. But on this issue, traditional Chinese culture can be of great help. As mentioned above, in the woody-based agriculture of various ethnic groups in southern China, whether it is historical documents, archaeological materials or ethnological materials, a profound accumulation of historical materials can be obtained from them. It is sufficient to make contemporary people realize that “tree-grains” have an irreplaceable value for the future development of human society.

In recent years, in view of the multiple potential values of “tree-grains” in terms of food security, ecological security, and economic stability, and under the guidance of China’s excellent cultural traditions, the Chinese government has, by learning from history, put forward a series of forward-looking policies such as the concept of large-scale food, large-scale agriculture, and large-scale resources (Lu & Wu, 2023). The conclusions formed around the historical research of “tree-grains” have naturally become the necessary paths and means to implement the above policies. Therefore, we have reason to believe that in the not-too-distant future, China’s research on woody agriculture and the security and reliability of food supply as well as the optimization of the ecological environment will surely be at the forefront of the world.

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