

Why Do We Love Flowers?

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Abstract

This is not a regular scientific paper written by experts of the corresponding field. This presents our answer to our own questions arising from our daily life. We hope that our article stimulates young people's interest in thinking about the mysteries of science. In this article we will take a trip back to about 200 million years ago to answer our question; Why do we love flowers?

1 Introduction

It is quite puzzling why we love flowers. Why do we feel flowers are beautiful? We feel very comfortable when we have fresh air and we see streams in rivers and the sea. We feel that the green fields and green trees are very beautiful. This is because all of them are very important for us to live. Air and water do not need to be explained and the green plants are very important, since we do not have enough oxygen without green plants. But, flowers are not useful and flowers are not necessary for us to live. Thus, we naively ask ourselves why we feel they are beautiful.

Perhaps, we need to examine memories present deep inside our brain and in the deep recesses of our subconscious to answer the above question. We will take here a trip back to ~ 200 million years ago when flowers appeared first on the earth in order to ferret our relations with flowers.

2 The birth of flowers on the earth

About two years ago, on December 19 in 2018, Chinese news networks reported a new discovery concerning flowers [1]. They announced that an international team of 南京地質古生物研究所 discovered flower fossils from 174 million years ago. Before this new discovery the oldest flower fossil was from 130 million years ago. Since it coincides roughly with the time, ~ 100 million years ago, when the dinosaurs were gradually declining, we had a hypothesis that flowers, together with our ancestors, lead to the decline of the dinosaurs [2]. However, now this hypothesis seems unrealistic.

The evolution of flowers is very mysterious. Scientists have discovered many plant fossils which contain leaves, but no flowers. It is known that gymnosperms existed in the Carboniferous period (more than ~ 300 million years ago), but they did not have flowers. The evolution of flowers is indeed a big issue in the earth sciences even now, because there are still not so many flower fossils. However, we consider that flowers were already in existence around 180 million years ago, based on the above discovery.

Flowers belong to angiosperms which use insects to deliver pollen to pistil as a part of mating. On the other hand, the gymnosperms use wind for their transportation. The

use of insects as carriers of pollen is much more efficient and successful than wind. This is the reason why angiosperms were able to shorten the time for a generation. This made the evolution quite rapid. Angiosperms produced many new races and expanded their territories very quickly owing to the collaboration with insects in the Cretaceous period (150~100 million years ago). They made colorful flowers with nectar inside of them in order to attract more insects to carry the pollen.

During this time our ancestors were small mammals like a mouse. Flowers selected mammals as a new partner. Flowers made fruits to attract the mammals and they ate fruits, carrying the seeds to distant places. In this way, the collaboration among flowers, insects and mammals may have begun, but dinosaurs did not participate in the collaboration.

3 The dinosaur period

Dinosaurs appeared on the earth in the Triassic period (250~200 million years ago) and had their peak of prosperity in the Jurassic period (200~150 million years ago)[3]. They disappeared 66 million years ago. However, it is still unclear why dinosaurs suddenly disappeared from the earth. The most popular hypothesis is due to the collision of a big meteorite. It is believed that a big meteorite of diameter 10km hit the earth 66 million years ago and a large amount of dust covered fully the earth. The sun was blocked by the dust and the dark ages began. It lasted for almost 10 years. During this dark age the temperature cooled down by 10C degrees, many plants died and many animals became extinct. It is quite natural to think that dinosaurs also became extinct during the dark ages.

However, some scientists claim that dinosaurs were already declining ~20 million years before this event. The reason for this is not clear. Maybe due to the volcanic activity or maybe due to the start of temperature cooling [4]. Some earth scientists proved that many big volcanos erupted continuously producing a large amount of volcanic gas and ash. The gas and ash covered the earth and the temperature decreased because the sun was blocked. This could damage the population of dinosaurs too. In any case, the presence of this period will be important for considering the relationship between our ancestors and

flowers.

4 The birth of our ancestor

Mammals appeared on the earth almost simultaneously with dinosaurs. Hence, we lived together with dinosaurs for ~ 160 million years. Our ancestors were small mammals like a mouse and were only active at nights to escape the attack of dinosaurs. They had to search for food in the dark of night and their main food was insects. To capture their food in the dark of night, they needed good sensory organs for hearing and smelling. Most importantly, their brains developed to control their sensory organs. Perhaps, visual organs of our ancestor deteriorated, since they did not use their eyes during the dark nights. Then, a natural question arises; When did our ancestors first see flowers and why did flower make colorful fruits to attract them? A flower's color seems useless during the dark nights.

There is a hypothesis proposed by scientists that our ancestors gained very good vision to distinguish colorful flowers with sweet fruits. Good vision was very important for our ancestors to win the survival competition [5]. But we doubt this hypothesis ¹. This is because there were many animals which had better sensory organs than them. Furthermore, it is very questionable that our ancestors could obtain good visual organs spending most of their active time during the dark nights. We should continue on our trip to answer the above questions.

5 A scenario

In the Triassic and Jurassic periods when dinosaurs, flowers and mammals coexisted the temperature was higher than now. There must have been many insects and our ancestors had no difficulty finding their food. They were not interested in eating flowers or even fruits. As explained in the previous section, our ancestors had to have good sensors for hearing and smelling to catch their food, which led to a development of their brains. Our ancestors were small and weak mammals and they were always in danger of being

¹This motivated us to have this time travel.

captured and eaten by bigger mammals, even in the dark nights. However, because of their developed brains, our ancestors became able to move very quickly and escape from their enemies. This was also an important ability to survive. We think that during this period there was no reason for our ancestors to pay attention to flowers.

However, in the later part of the Cretaceous period (150~66 million years ago), the dinosaur population was gradually declining and they moved to the northern part of the earth. This may be because angiosperms expanded their territories and pushed the gymnosperms to the northern parts of the earth. Since the gymnosperms were the main food of the dinosaurs, they had to also move north. Our small mammal ancestor started to go outside during the day time and gradually recovered their visual sensors. The visual sensory organs were, of course, very useful for capturing insects. Furthermore, our ancestors developed their brain more to control the visual sensory organs.

Now the important period started for our relationship with flowers. The ecosystem started changing and the temperature may have decreased due to the volcanic gas and ash which hurt the insect population. Perhaps, the number of insects decreased and our ancestors had difficulty catching enough insects for food. They needed to find other food and they found flowers and fruits. Flowers needed new carriers of their pollen and seeds, and selected small mammals as a partner. They made colorful fruits to attract our ancestors. Our ancestor started to eat the fruits and flowers and scattered their pollen and seeds everywhere. In this way, the close coexistence between our ancestors and flowers began.

The crucial time came just after the big meteorite hit the earth. A large amount of dust covered the earth and the temperature cooled down. The dinosaurs became extinct and most of plants, insects and mammals died. Flowers were strong enough to survive and our ancestors could also survive eating flowers and fruits. Flowers and fruits were almost the only food available to our ancestors and they were an important carrier of their pollen and seeds. We helped each other. Our ancestors were already consuming a large amount of sugar from flowers and fruits. Furthermore, the sugar may have activated the brains of our ancestors. By that time, their memory function was developed enough to retain this relationship inside their brains. We maintain our fondness of flowers deep inside our

collective unconscious ². This might be the reason why we love flowers.

6 The end of our time travel

A NY research team reported eight years ago that they succeeded in identifying a mammal named "Protungulatum donnae" as our ancestor [6]. This is the unique mammal which could survive the dark ages. All of the about 40 races of mammals died together with dinosaurs. They became the new leading actor in the Cenozoic period (after ~66 million years ago). They looked similar to a small mouse with many sharp teeth. This suggests they were still eating insects during the end of the Cretaceous period as we have considered in our scenario. Next, in order to confirm our scenario, we need to check that their molars were sufficiently flat to chew flowers and fruits.

Another confirmation of our scenario will be checking that their deteriorated visual organs were recovered in the later part of the Cretaceous period. It is very crucial that our ancestors could distinguish colors.

In this article, we have proposed a scenario for how the relationship between flowers and our ancestors was built around 100 million years ago. We are not experts of the earth sciences or paleontology. Hence, our knowledge of the earth sciences and paleontology is very limited. We found all this information from articles on web pages ³. We simply want to understand why we love flowers and why we feel they are beautiful. We are not claiming that our model is completely new. Perhaps, it was already proposed by some experts or it was already excluded. Some scientists may think we are just crazy. However, we hope that this article about our scenario of the ancient history will stimulate young people's interest in science and encourage them to think more about mysteries in science.

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²The collective unconscious was originally defined by a psychoanalyst Carl Jung.

³Both of us do not have sufficient time to read the necessary scientific literatures, since we both have a regular job.

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References

- [1] AXIS Web Magazin on the discovery of the oldest fossils of flowers.
- [2] NHK documentary program.
- [3] <https://benesse.jp/teikitest/kou/science/biology/k00648.himl>
- [4] <https://www.gibe-on.info/entry/dinosaur-extinction/>
- [5] BBC documentary program.
- [6] https://www.gizmodo.jp/2013/02/post_11632.html