

Exploration of discovery factors of Cretaceous paleontological fossils in Laiyang

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Abstract: In the construction and development of human civilization, nature contains a large number of representative paleontological fossils, and these contents are an important basis for current scholars to understand and study biological evolution and earth civilization. According to THE analysis of the Cretaceous fossils collected and found in Laiyang area in recent years, it can be seen that the local area, as an important place to explore the history of human development and biological civilization, is also the focus of attention of historians and biologists from all over the world. Therefore, On The Basis Of Unerstaning The Resent Sityation Of Paleontological Fossil Research In Laiyang Area, An Accoring To The New Discoveries Of Cretaceous Paleontological Fossils In China In Recent Yeas, This Paper Deeply Discusses The Discovery Factors Of Related Fossils, And Makes Clear The Main direction Of The Future Research Of Cretsceous Paleontological Fossils.

Keywords: Laiyang City; The cretaceous period. Paleontological fossils; Tyrannosaurs; Egg fossils

1. Introduction

Laiyang, as a place where the sun and the moon rise out of Donglai, defends the hinterland of Jiaodong and opens channels among the rolling and gentle hills, connecting the four towns and eight villages. Therefore, Laiyang has been named as the peninsula land dry dock since ancient times. Before the flame of human civilization lit up Jiaodong Peninsula, when the ancient world was uninhabited, Laidong land was already full of vitality, and it was ruled here by the earth overlord in ancient times - dinosaurs. Today, the area where Laiyang Dinosaur Canyon is located has been opened up into an exhibition area, realizing the world's largest ex-site preserved tree fossil forest. [1.2.3]The whole exhibition area uses the natural rolling hills to design a curvilinear loop, which ingeniously combines the tree fossils in different areas, as if to build a natural ecological landscape. The formation of several fossils is because the primary forest was buried underground due to sudden geological changes. In the environment of high temperature, low temperature and no oxygen, they were soaked by silica saturated solution, which led to the gradual replacement of carbon elements in the trees by silica, and eventually jade crystals were formed. Over time, the fossil tree will be further transformed into jade material, but retain some of the tree's physical characteristics, so it is also known as arboxylic jade. At the same time, because the geological layers in different regions contain different types of mineral elements, the tree jade also comes in a variety of textures and colors. The preserved tree fossils in Laiyang Dinosaur Canyon contain the distinctive features of South Africa, Egypt, Myanmar, Mongolia and other regions. Among them, the tree fossils in Xinjiang are 14 meters high, which can be regarded as the world's largest. A fossil tree from Mongolia with a diameter of 2.8 meters is the heaviest and thickest fossil tree in the world with a weight of 18 tons. A cedar tree existed in the Cretaceous PERIOD, between 170 million and 10 million years ago, during the Middle Jurassic period. Before becoming a tree fossil, the number of trees had reached more than 1,000 years. The last tree fossils ever found were formed during the Cretaceous period, 65 million years ago, and they share a frozen glow that records the evolution of life on Earth from the time of the dinosaurs.[4.5]

The Dinosaur canyon in Laiyang area is known as the most beautiful Plain Canyon Group. It is the area where researchers first found fossils of dinosaurs, dinosaur eggs and other important vertebrates, and also the area where they first excavated fossil insects. It is conceivable that in the distant Cretaceous period, there must have been a wide range of rivers and vegetation, which was an

important place for dinosaurs to live and breed. The most famous dinosaur is the hadrosaur, according to an analysis of recovered dinosaur fossils displayed at the Nanyang Cretaceous National Geological Park Museum. Compared with the Triceratops and Tyrannosaurus Rex seen in the movie, the spinous nose of Qingdao Dragon was not large in size, but the most notable feature was a powerful rod-shaped spine on the nasal bone, just like the horn of a unicorn, which protruded straight forward from the dinosaur's eyes to form a spinous protrusion, so it was also called "spinous nose". The dinosaur's appearance closely resembles that of the earliest hadrosaurs ever found in North America. The horns of the latter were used to amplify calls to intimidate opponents, while the snout of the former has been debated, and it is still unclear whether it was a natural decoration or a weapon of war.

Yang Zhongjian, the founder of Chinese paleontology and the father of dinosaur research, excavated a complete skeleton fossil of a large dinosaur in Laiyang, Shandong Province. According to the practical identification, the dinosaur was Acanthosaurus, which lived in the late Cretaceous period about 70 million years ago. This research caused a great sensation in the world paleontological circles at that time. After that, the Beijing museum of nature archaeological personnel within the local dinosaur valley and discovered a intact spines nasal Qingdao dragon framework, with the advancement of ancient archaeological work, a growing number of dinosaur fossils from the emerging world, such as form small red cliff a little swollen head of dragon, broken kong dragon mouth a mouthful of fangs, with scales of grignard draw dragons, etc.[6.7]

In addition, Laiyang area is also the first place to find insect fossils, among which there are more than 300 kinds of insect fossils. In the early 1920s, China's first generation of geologists collected a large number of plants, insects, fish, dinosaurs and other fossils in the Wangshi Group Qingshan Group. Later, many scholars conducted in-depth research on these fossils, which was also the earliest report of Chinese scholars on the study of plants and insects. Therefore, based on the paleontological fossils excavated in Nanyang area in recent years, this paper mainly discusses the discovery factors of Cretaceous paleontological fossils, combined with the intelligent architecture diagram shown in Figure 1 below, to provide effective basis for the research work in related fields.

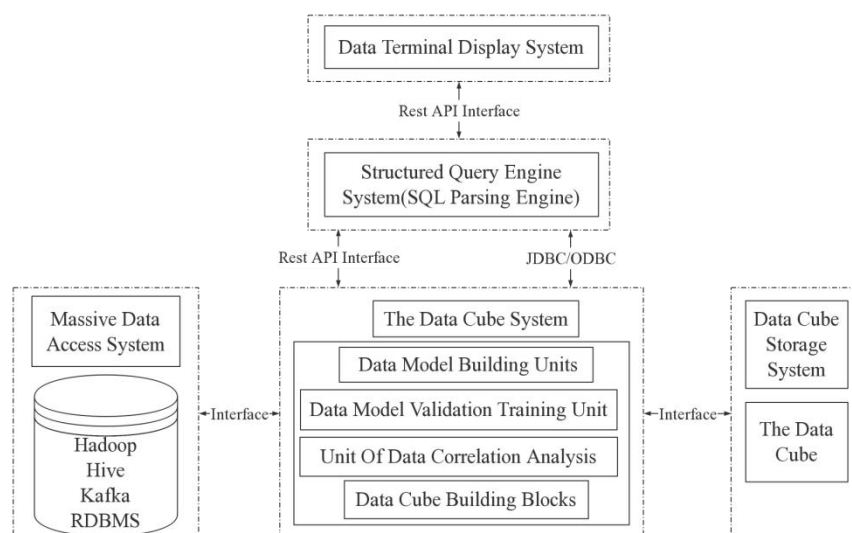


Figure 1. Architecture diagram of intelligent research platform

2. Method

2.1 Existing Achievements

Laiyang, as an important region of Mesozoic paleontological fossils, is the first area where Chinese scientific researchers discovered insects, dinosaur eggs and other fossils. From 1922 to

1923, China's first generation of geologists had excavated a variety of plants, insects, fish, dinosaurs and other fossils, among which the dinosaur skeleton was studied by Swedish paleontologist Wieman, and eventually named China's Tansilong, which is also one of the first findings of Laiyang paleontological fossils.

In the 1950s, the second discovery of Laiyang paleontological fossils collected a large number of dinosaur and dinosaur egg fossils, the most representative is the new China's first dragon is the Spinonose Qingdao dragon. Both Chinese Tan's dragon and Spinonose Qingdao dragon belong to the hadrosaur species. The former does not have a headdress, but the latter does, as shown in Figure 2 below:[9.10]



FIG. 3 Various headdress of Spiny nose Qingdao Dragon

In the 21st century, the Chinese Academy of Sciences research team again to laiyang in cretaceous strata and fossils excavated analysis, mainly studies from 8000 to 70 million years ago the wang group of upper cretaceous continental red beds, and then determine the dinosaur fossils found in two of the 20th century and mining area, analyzes the regularity of enrichment and buried dinosaur fossils. In 2010, new potential fossil enrichment sites were identified, with at least eight layers of dinosaur fossil enrichment identified over a very small thickness range, five layers now exposed, and rescue excavations conducted at three layers, eventually collecting hundreds of specimens.

In 2010, the team continued excavating the site of the discovery, eventually unearthing nearly 30 dinosaur skeletons and a complete terrapin egg fossil. In 2015, excavation of the third fossil layer continued, culminating in the collection of more than 200 large dinosaur specimens containing at least two adults and five juvenils, mainly of the knowledge platypus species. Analysis of the integrity of the fossils and their original burial revealed that the platypuses were swept up in a sudden mudslide and buried quickly, thus forming the fossils. At the same time, a newly discovered fossil proves that the tooth marks belong to carnivorous dinosaurs, and the bone at the tooth marks has obvious pathological phenomenon of enlargement. This specimen with special marks is of great research value, which can further prove the appearance and interdependence of the late Cretaceous dinosaur fauna.

2.2 Experimental Study

Because the natural weathering of paleontological fossils and related sites is very serious, the excavation work is faced with many problems. At present, the Chinese scientific research team attaches great importance to the protection of fossils and sites, and has carried out key research on the natural weathering damage factors. Taking a fossil and its section as an example, the team used

various types of adhesives to conduct comparative experiments between the exposed bones and the excavated section while it was in situ. In practice, the binder is selected according to the crack. Under natural conditions, fossil beds are often soaked by rain in summer and at risk of freezing in winter. Therefore, the team chose to expose several small fossils in the section for continuous observations of natural weathering damage factors. The final experimental results proved that, in the relatively wet environment with water, although the adhesive was effectively treated, after the cold winter and spring ablation, the bone surface appeared the phenomenon of comminution and weathering damage, the overall repair is extremely difficult. But the same piece of bone is left intact without exposed areas of the surface. This proves that water, temperature, air and other factors are the main causes of natural weathering of fossils. In particular, freezing and ice splitting under the combined action of water and temperature have a great influence on paleontological fossils. According to the comparative analysis of experiments, in the same dry environment, after scientific research on the use of adhesive to protect the fossil, after a cold winter, although the color changed, but basically kept intact. On this basis, researchers have come to the following conclusions: try not to expose fossils in wet and watery areas; Collect fossils as soon as they are found; When the fossil is exposed according to the research needs, it should not be overexposed, and the fossil should be waterproof and water-proof, and the changes of the fossil should be observed at all times, and the binder should be used for reinforcement treatment. 3D fossil images are made by combining modern technology, as shown in Figure 3 below:

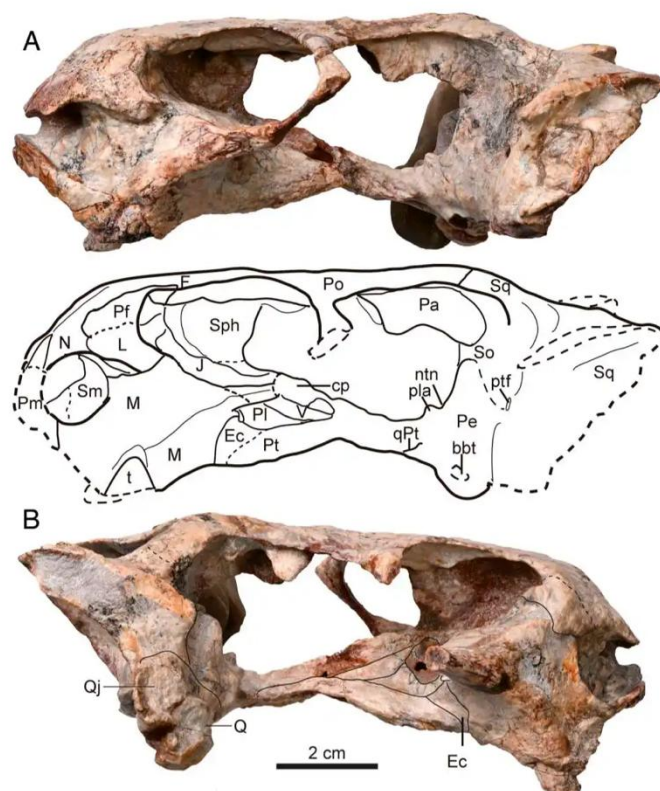


Figure 3. 3D fossil image

3. Result analysis

According to the research and analysis in this paper, it is found that the research on paleontological fossils is to explore the origin of life, the development of life and the co-evolution of the environment, and to infer the distribution rules of waterways, climate change, sedimentary minerals and other historical periods. Therefore, the practical research content is rich and the theoretical knowledge involved is complex. Taking this study to raise Cretaceous paleontological fossils as an example, in recent decades of research and exploration, scholars from all over the

world have found a lot of content. In the innovation and development of modern technology, the theory of big data technology, as shown in Figure 4 below, has played a positive role in fossil research and excavation, which can not only ensure the full excavation of paleontological fossils, but also reduce the adverse effects of air, temperature, water and other factors on fossils. At present, scholars from all over the world who participate in the research of paleontological fossils have begun to deeply discuss the application of modern technologies such as big data, cloud computing and artificial intelligence in practical work, and thus put forward a number of research topics, which are helpful to further accelerate the research pace of Cretaceous paleontological fossils in Laiyang.

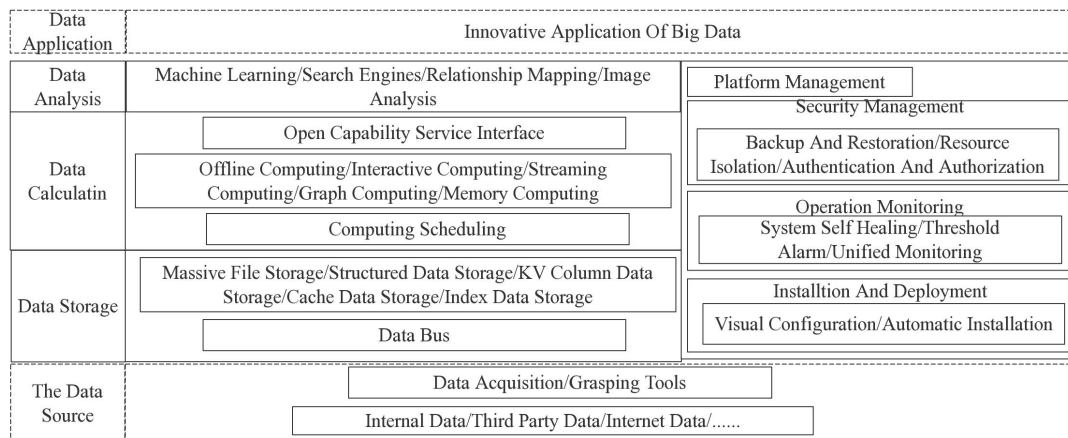


Figure 4 Architecture diagram of big data

4. Conclusion

To sum up, according to the cretaceous paleontology fossils in recent years, nanyang region, according to the status quo of research on dinosaurs, dinosaur eggs, insects, and plant fossil excavation is more and more frequent, more practical technology science and intelligence, thus research scholars in China to change the concept of traditional research at the same time, combined with modern technology to carry on the deep research, Focus on common influencing factors to put forward effective solutions, in order to master more valuable paleontological fossils, to provide an effective basis for the development of modern science and technology and cultural construction. At the same time, it is necessary to strengthen the training of professional and technical personnel, and actively introduce advanced technical theories and research results, so as to accelerate the pace of research and development of paleontological fossils.

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