RADLEY

2024 Scholarship Examination Paper

BIOLOGY

20 February – 21 February 2020

Time allowed – 30 Minutes

Instructions :

You will read a passage about a Biology topic.

Please then answer the questions which follow on lined paper.

Note that some words in the text are underlined to help you find them.

There are **33 Marks** available for this paper.

Megalosaurus – the first Dinosaur

The reptilian giant found in Stonesfield Quarry, Oxfordshire, needed a name. For over a century European naturalists had been pondering strange and giant bones of long-dead creatures uncovered in quarries and sent to them to universities for research. But in the beginning of the 19th century, as science set about naming and describing **fossilized** creatures through its own language and standards, the curious bones needed proper titles. Among these early efforts, in 1824, William Buckland, Oxford University's first Professor of **Geology**, dubbed the collection of skeletal pieces from Stonesfield *Megalosaurus*, the first dinosaur to receive a **scientific name**.
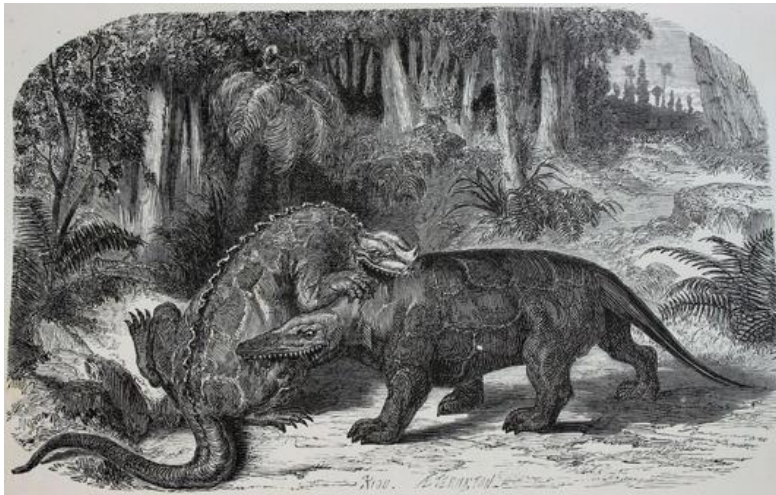
Buckland didn't know that *Megalosaurus* was a **dinosaur**. That's because the word "dinosaur" would not be coined for another 18 years. He was working during a time when the sciences of geology and **paleontology** were still very new, when the identity and broader significance of fossilized creatures were only just beginning to be understood. After all, it had only been in 1799 that naturalists finally accepted that **extinction** was a reality and Earth's rocks were full of strange, bygone species. *Megalosaurus* was one such creature.

Working through the science of comparative **anatomy**, Buckland was sure that *Megalosaurus* was a giant reptile. He recognized that the bones he described as *Megalosaurus* must have come from several different individuals of various ages and sizes, but were all from the same kind of animal. Those pieces represented a creature not quite like any known reptile. Even though the leg bones indicated an animal with upright, column-like legs, like most mammals, the details of the teeth were clearly reptilian. He envisioned the animal as crocodile-like in nature. "The Megalosaurus itself was probably an **amphibious** animal," he wrote in his paper. Fossils of crocodile teeth and turtle shells found in the same quarry seemed to bolster the idea.

Two centuries later, we have a very different image of *Megalosaurus*, whose full name is *Megalosaurus bucklandii* in the Oxford geologist's honor. Paleontologists have gone back to the original bones, as well as the dinosaur's paper trail through the history of science, to reintroduce us to *Megalosaurus* as a **bipedal** predator that wandered along the Jurassic coastline. The dinosaur roamed what's now England about 166 million years ago, a fairly large **carnivore** of its time at an adult length of more than 20 feet. Stalking about on two legs, the flesh-eater had a long and low skull of curved teeth and likely had short, stout arms tipped in large claws, like its larger relative *T. rex*.

Adapted from an article in the Smithsonian Magazine by Riley Black, February 2024.

Using the information in the passage and your own knowledge, answer these questions:

1. What is meant in the passage by the words underlined as follows:
    i.   Fossilised   vi.   Extinction
    ii.   Scientific name   vii.   Anatomy
    iii.   Geology   viii.   Amphibious
    iv.   Palaeontology   ix.   Bipedal
    v.   Dinosaur   x.   Carnivore   [10]

2. Describe some ways in which Megalosaurus was adapted to living in
    prehistoric Earth.   [2]

3. Naturalists are mentioned in the first paragraph. Use the passage and your
    own knowledge to explain what are the similarities and differences between
    a naturalist and a scientist?   [3]

4. Describe three differences between reptiles and mammals.   [3]

5. The two illustrations show an early attempt at a picture of an herbivorous
    dinosaur fighting off a megalosaur, and a picture showing what we now
    believe *Megalosaurus* actually looked like. Describe three differences between
    the "old" and "new" illustrations of it.   [3]

6. Waterweed, fish and insects are often found in swamp environments. Use
    these and other organisms mentioned in the passage to construct a
    prehistoric food chain.   [3]

7. Other than Megalosaurus, name two dinosaurs and two other reptiles
    mentioned in the passage.   [2]

8. Top predators like megalosaurs no longer live in Britain. The most recent to
    go extinct are creatures like bears, wolves and lynx. Explain:
        i.   An advantage of them still being here?
        ii.   A problem they might cause, and how we could deal with it?   [2]

9. Improving biodiversity is one of the biggest challenges facing the Earth and
    its ecosystems today. Explain in as much detail as you can what problems
    wildlife is facing because of biodiversity loss and what we can do to help
    improve the situation.   [5]

                                                        TOTAL = 33 MARKS