

IELTS Academic Reading Practice Test 35

The origins of birds

The science of evolutionary relationships has undergone a major change in recent decades. It used to be the case that all the features of organisms were important in working out their family tree. But following the work of German entomologist Willi Hennig, many evolutionary scientists now believe that the only features which carry any useful information are the evolutionary 'novelties' shared between organisms. Mice, lizards and fish, for example, all have backbones – so the feature 'backbone' tells us nothing about their evolutionary relationship. But the feature 'four legs' is useful because it's an evolutionary novelty – a characteristic shared only between the lizard and the mouse. This would suggest that the lizard and mouse are more closely related to each other than either is to the fish. This revolutionary approach is called cladistics, and it has been central to the idea that birds evolved from dinosaurs.

The 'birds are dinosaurs' theory was first developed by English palaeontologist Thomas Huxley (1825–1895). According to some accounts, one evening Huxley went to dinner still thinking about a mystery dinosaur bone in his lab. He knew he was dealing with the lower leg bone (tibia) of a meat-eating, two-legged dinosaur belonging to the classification known as theropods, but attached to the tibia was an unidentified extra bone. On the menu that evening was quail, a small bird similar to a pheasant, and Huxley noticed the same strange bone, attached to the quail tibia on his plate. He later realised that it was in fact the bird's anklebone. More importantly, Huxley concluded that its forms in both dinosaur and bird skeletons were so similar that they must be closely related.

Huxley's idea fell out of favour for fifty years following the 1916 publication of *The Origin of Birds* by the Danish doctor Gerhard Heilmann. During this time, Heilmann's theory was widely accepted. Heilmann had noted that two-legged, meat-eating dinosaurs lacked collarbones. In later evolutionary stages these bones fuse together to form the distinctive 'Y'-shaped bone in a bird's neck, known as the furcula. Heilmann proposed the notion that such a feature could not be lost and then re-evolve at a later date, so dinosaurs could not be the ancestors of birds.

Then, in the late 1960s, John Ostrom from Yale University in the US, noted 22 features in the skeletons of meat-eating dinosaurs that were also found in birds and nowhere else. This reset the thinking on bird ancestry and once again Huxley's ideas caught the attention of the scientific community. Subsequent work has found up to 85 characteristics that tie dinosaurs and birds together. But what of Heilmann's missing bones? It turns out that not only did many dinosaurs have collarbones, these were also fused together into a furcula. Unfortunately for Heilmann, the fossil evidence was somewhat lacking in his day, and the few furculae that had been found were misidentified, usually as belly ribs.

US ornithologist Alan Feduccia and palaeontologist Larry Martin are two vocal opponents of the dinosaur theory. They contend that birds evolved from some unknown reptile at a time long before dinosaurs. Their reasoning is that flight is most likely to have started from a treeclimbing ancestor, yet all the proposed dinosaurian ancestors were ground-dwellers. But the dino-bird supporters contend that an unknown dinosaurian bird-ancestor could have been tree-dwelling, or that birds evolved flight from the ground

up by chasing and leaping after insects. Most of Feduccia and Martin's case against the 'birds-are-dinosaurs' hypothesis is based on differences between birds and dinosaurs. Supporters of cladistics, however, maintain that differences between organisms do not matter, as it is the similarities between them that count. Evolution dictates that organisms will change through time, so it is only the features which persist that carry useful information about their origins.

Most people on either side of the debate do accept, however, that the ancient winged creature known as Archaeopteryx is an ancestor of today's birds. This is in spite of the fact that its form is distinctly non-bird-like, with a long bony tail, and teeth instead of a beak. The 'birds-are-dinosaurs' supporters contend that, if clearly-preserved feathers had not been found alongside two of the seven Archaeopteryx specimens, it would probably have been identified as a small dinosaur. However, Archaeopteryx does have some bird-like features, such as a furcula and bird-like feet, that suggest that it is too bird-like to be considered a dinosaur.

Over the last few decades several dinosaurs with bird-like features and primitive birds with dinosaur-like features have been found in several countries, connecting Archaeopteryx back to dinosaurs, and forwards to modern birds. Sinosauropteryx, excavated from 130-million-year-old rocks in northeast China, is one example. It is a dinosaur skeleton surrounded by a halo of fuzz, thought to be primitive feathers. And a reassessment of other dinosaurs reveals such bird-like features as hollow bones and a foot with three functional toes, characteristics that appeared over 50 million years before Archaeopteryx took to the air. And Rahonavis, a primitive bird from Madagascar is more bird-like than Archaeopteryx, yet retains some distinctive dinosaur features, including a long and vicious claw at the end of its wing. Over a century since Huxley's discovery, it seems that cladistics may have finally settled the 'dinobird' debate.

Questions 1 – 5

Complete the sentences below. Choose ONE WORD ONLY from the passage for each answer. Write your answers in boxes 1-5 on your answer sheet.

1 Huxley formulated his theory while studying a dinosaur belonging to a group called

2 Heilmann rejected Huxley's theory because of the apparent absence of in dinosaurs.

3 Feduccia and Martin believe that the ancestor of today's birds was a kind of early

4 In cladistics, the between organisms' characteristics are of major importance.

5 The dangerous on a primitive bird from Madagascar adds weight to the 'dino-bird' argument.

Reading Passage

The general assumption is that older workers are paid more in spite of, rather than because of, their productivity. That might partly explain why, when employers are under pressure to cut costs, they persuade a 55-year old to take early retirement. Take away

seniority-based pay scales, and older workers may become a much more attractive employment proposition. But most employers and many workers are uncomfortable with the idea of reducing someone's pay in later life – although manual workers on piece-rates often earn less as they get older. So retaining the services of older workers may mean employing them in different ways.

One innovation was devised by IBM Belgium. Faced with the need to cut staff costs, and having decided to concentrate cuts on 55 to 60-year olds, IBM set up a separate company called Skill Team, which re-employed any of the early retired who wanted to go on working up to the age of 60. An employee who joined Skill Team at the age of 55 on a five-year contract would work for 58% of his time, over the full period, for 88% of his last IBM salary. The company offered services to IBM, thus allowing it to retain access to some of the intellectual capital it would otherwise have lost.

The best way to tempt the old to go on working may be to build on such 'bridge' jobs: parttime or temporary employment that creates a more gradual transition from full-time work to retirement. Studies have found that, in the United States, nearly half of all men and women who had been in full-time jobs in middle age moved into such 'bridge' jobs at the end of their working lives. In general, it is the best-paid and worst-paid who carry on working. There seem to be two very different types of bridge job-holder – those who continue working because they have to and those who continue working because they want to, even though they could afford to retire.

If the job market grows more flexible, the old may find more jobs that suit them. Often, they will be self-employed. Sometimes, they may start their own businesses: a study by David Storey of Warwick University found that in Britain 70% of businesses started by people over 55 survived, compared with an overall national average of only 19%. But whatever pattern of employment they choose, in the coming years the skills of these 'grey workers' will have to be increasingly acknowledged and rewarded.

Questions 1 – 4

Choose the correct letter, A, B, C or D.

Write the correct letter in boxes 1-4 on your answer sheet

1 In paragraph one, the writer suggests that companies could consider

- A abolishing pay schemes that are based on age.
- B avoiding pay that is based on piece-rates.
- C increasing pay for older workers.
- D equipping older workers with new skills.

2 Skill Team is an example of a company which

- A** offers older workers increases in salary.
- B** allows people to continue working for as long as they want.
- C** allows the expertise of older workers to be put to use.
- D** treats older and younger workers equally.

3 According to the writer, 'bridge' jobs

- A** tend to attract people in middle-salary ranges.
- B** are better paid than some full-time jobs.
- C** originated in the United States.
- D** appeal to distinct groups of older workers.

4 David Storey's study found that

- A** people demand more from their work as they get older.
- B** older people are good at running their own businesses.
- C** an increasing number of old people are self-employed.
- D** few young people have their own businesses.