



A CRITICAL ANALYSIS OF ZOOLOGY AND ITS BRANCHES

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Abstract: The scientific study of the evolution, anatomy, physiology, behavior, habitats, and health of animals and humans has a tremendous impact on our planet. It encompasses a wide range of techniques, including electron microscopy, molecular genetics, and field ecology. A zoologist can provide crucial knowledge to the world about the natural environment and habitats of diverse animals, which is necessary to maintain the eco system's balance. Zoologists can study animal behavior and survival strategies in order to create a favorable environment for their recovery and population increase. Zoologists have helped the agricultural industry in a variety of ways, with entomologists playing a particularly important role in the development of extremely effective insect pest control strategies.

Index Terms - Zoology, Impact, Role, Agriculture, Sector

1.1 Introduction:

The scientific study of the evolution, anatomy, physiology, behavior, habitats, and health of animals and humans has a tremendous impact on our planet. It encompasses a wide range of techniques, including electron microscopy, molecular genetics, and field ecology. A zoologist can provide crucial knowledge to the world about the natural environment and habitats of diverse animals, which is necessary to maintain the eco system's balance. Zoologists can study animal behavior and survival strategies in order to create a favorable environment for their recovery and population increase. Zoologists have helped the agricultural industry in a variety of ways, with entomologists playing a particularly important role in the development of extremely effective insect pest control strategies.

Although people have always been captivated by the natural history of the animals they see and have used this knowledge to domesticate certain species, Aristotle is credited with founding zoology as a systematic science. He felt that animals were living beings and studied their structure and growth, as well as their adaptations to their environments and the function of their components. Galen, a Greek physician who studied human anatomy and was one of the greatest surgeons of the ancient world, but the Greek tradition of medicine and scientific study faded in Western Europe after the fall of the Western Roman Empire and the beginning of the Early Middle Ages, though it persisted in the mediaeval Islamic world. During the Renaissance and early modern periods, Carl Linnaeus, Antonie van Leeuwenhoek, Robert Hooke, Charles Darwin, Gregor Mendel, and others contributed to modern zoology.

Animal research has mainly moved on to focus on shape and function, adaptations, group connections, behavior, and ecology. Classification, physiology, biochemistry, and evolution have all been separated within zoology in recent years. With Francis Crick and James Watson's discovery of the structure of DNA in 1953, the field of molecular biology exploded, resulting in breakthroughs in cell biology, developmental biology, and molecular genetics. Aristotle is regarded as the father of biology and zoology due to his groundbreaking findings in these fields.

1.2 Evolution of Zoology:

The evolution of zoology traces the study of animals from antiquity to the present day. To exploit and survive, prehistoric man needed to understand the animals and plants in his environment. In France, there are cave paintings, engravings, and sculptures dating back 15,000 years that depict bison, horses, and deer in meticulous detail. Similar pictures from different parts of the world depicted primarily food-gathering animals, but also ferocious animals.

Throughout Antiquity, the Neolithic Revolution, which is marked by the domestication of animals, proceeded. The lifelike images of wild and domestic animals in the Near East, Mesopotamia, and Egypt, as well as husbandry procedures and techniques, hunting, and fishing, demonstrate ancient knowledge of nature. The presence of animals in Egyptian hieroglyphics reflects the invention of writing in zoology.

Although the zoological sciences arose from natural history, stretching back to Aristotle and Galen's biological works in the ancient Greco-Roman world, the concept of zoology as a single coherent discipline emerged considerably later.

In the fourth century BC, Aristotle studied the structure, growth, and vital processes of animals as living entities. He separated them into two groups: those with blood, which are similar to vertebrates, and those without blood. He spent two years on Lesbos studying and describing the animals and vegetation, as well as the adaptations and functions of many creatures. Because dissection of human cadavers was illegal at the time, Roman physician Galen dissected animals to investigate their anatomy and function of the various parts 400 years later. Some of his conclusions were incorrect as a result of this, but it was considered heretical to question any of his beliefs for many years, thus the study of anatomy stagnated.

Previously the domain of gentlemen naturalists, zoology grew into a more professional scientific subject over the 18th, 19th, and 20th centuries. Explorer-naturalists like Alexander von Humboldt created the groundwork for biogeography, ecology, and ethology by studying the interaction between species and their environments, as well as how geography affects this relationship. Naturalists began to call essentialism into doubt, emphasizing the importance of extinction and species mutability.

1.3 Branches of Zoology:

In zoology, scientific categorization is a method that zoologists use to organize and categories organisms based on biological features such as genus or species. Taxonomy is a sort of biological classification. The work of Carl Linnaeus, who classified species based on morphological similarities, is the cornerstone of current biological taxonomy. These classifications have since been updated to reflect Darwin's theory of common descent. Molecular phylogenetics, which uses nucleic acid sequences as data, has led many recent revisions, and this tendency is likely to continue. A branch of zoological systematic is biological classification.

1. **Structural Zoology:** Cell biology is the study of the structure and function of cells, as well as their behavior, interactions, and environment. For single-celled creatures like bacteria, as well as specialized cells in multicellular organisms like humans, this is done at both the microscopic and molecular levels. All biological studies require a basic understanding of cell structure and function. In molecular biology, the similarities and variances across cell types are very important. Anatomy is

concerned with the shapes of macroscopic objects such as organs and organ systems. It emphasizes on how organs and organ systems interact together in human and animal bodies, as well as how they perform independently. Anatomy and cell biology are two closely connected subjects that fall under the category of "structural" studies.

2. **Physiology:** Physiology is the study of the mechanical, physical, and metabolic processes that occur in live creatures, with the goal of understanding how all of the structures work together. Biology's primary principle is "structure to function." Plant and animal physiology are the two branches of physiology that have traditionally been researched separately, yet some concepts of physiology are universal, regardless of the creature being investigated. What is learnt about the physiology of yeast cells, for example, can be applied to human cells. Animal physiology applies the same techniques and procedures used in human physiology to non-human animals. The neurological, immunological, endocrine, respiratory, and circulatory systems, for example, are studied in physiology.
3. **Biology of Development:** The study of how animals and plants reproduce and grow is known as developmental biology. Embryonic development, cellular differentiation, regeneration, asexual and sexual reproduction, metamorphosis, and the growth and differentiation of stem cells in the adult organism are all studied in this field. In the articles on evolution, population genetics, heredity, genetic diversity, Mendelian inheritance, and reproduction, the development of both animals and plants is further addressed.
4. **Biology of Evolution:** The study of the evolutionary processes that resulted in the diversity of life on Earth is known as evolutionary biology (natural selection, common descent, and speciation). Scientists from a wide range of taxonomically oriented domains are involved in evolutionary study. It is interested in the origin and ancestry of species, as well as their evolution across time. It typically comprises scientists that have specialized training in specific creatures, such as mammalogy, ornithology, herpetology, or entomology, but who use those organisms as systems to address broad evolutionary questions.
5. **Ethology:** In contrast to behaviorism, which focuses on behavioral response studies in a laboratory context, ethology is the scientific and objective study of animal behavior under natural conditions. Ethnologists have been particularly interested in the evolution of conduct and how to understand it in terms of natural selection theory. In some ways, Charles Darwin was the first contemporary

ethologist, and his work *The Expression of Emotions in Man and Animals* influenced many future ethologists.

6. **Biogeography:** To explore the spatial distribution of life on Earth, biogeography focuses on plate tectonics, climate change, dispersal and migration, and cladistics. It is an interdisciplinary issue that combines ideas and data from evolutionary biology, taxonomy, ecology, physical geography, geology, palaeontology, and climatology. Alfred Russel Wallace, a British biologist who cooperated with Charles Darwin on some of his work, is often regarded as the originator of this field of study.
7. **Molecular Biology:** Molecular biology is the study of common genetic and developmental systems in animals and plants, with the goal of answering questions about genetic inheritance and gene structure. The structure of DNA and its connections were discovered by James Watson and Francis Crick in 1953, and this publication sparked molecular biology research and boosted interest in the field.

1.4 Conclusion:

To determine the cause of extinction, zoologists analyze animal behaviors such as food acquisition, mating habits, and disease transmission. All of these discoveries aid governments, animal protection organizations, and the general public in taking steps to safeguard endangered animals. Investigating animal models of normal or abnormal human function, studying normal function in animals, and enhancing our understanding of how interaction with companion animals can help people stay healthy or recover from illnesses or injuries.

1.5 References:

1. Zoology - Wikipedia. (2021, June 10). Zoology - Wikipedia.
2. Darwin in the World of Emotions," J. Black (June 2002). *Journal of the Royal Society of Medicine*, vol. 95, no. 6, pp. 311–313, doi:10.1258/jrsm.95.6.311.
3. Jerry A. Coyne, Jerry A. Coyne, Jerry A. Coyne (2009). *The Benefits of Evolution*. ISBN 978-0-19-923084-6. Oxford University Press, p. 17.
4. Edward E. Ruppert, Richard S. Fox, and Robert D. Barnes (2004). 7th edition of *Invertebrate Zoology*. p. 2. Cengage Learning. The ISBN for this book is 978-81-315-0104-7.