

# I AM A PROUD ZOOLOGIST

Published by



Bishop Heber College(Autonomous)  
Ranked 4<sup>th</sup> at National Level by MHRD through NIRF 2017  
(Nationally Reaccredited with “A” Grade by NAAC with a  
CGPA of 3.58/4)  
(Recognized by UGC as “College of Excellence”)  
Tiruchirappalli - 620 017  
Tamil Nadu,India.

March 2019

March 2019

Copyright © Institution

All rights reserved

No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, without written permission of the publisher.

**ISBN: 978-93-80767-47-5**

Published by  
Bishop Heber College (Autonomous)  
Tiruchirappalli – 620 017.

Editor

Mr.P.Charles

Kaarlo Training & HR solutions Pvt .Ltd

Trichy-620021.

Printed by  
The Printing House  
Trichy – 620 023.

## **ACKNOWLEDGMENTS**

I would like to thank our Lord God Jesus Christ from the bottom of my heart for giving me the inspiration to write my first book and for giving me the strength and knowledge in completing this book.

I would like to thank Bishop Heber College for publishing my work.

I would like to thank my beloved husband Mr.Charles P, my mother Mrs.Jean J and our little daughter baby Oprah Charles for their support and their prayers.

I wish to dedicate this book to all my students and all the future Zoologists.

**Dr.J.Joonu**

**Author**





## PREFACE

Not many books are written with the intention of creating interest in this subject of life.

This book is intended to all those science lovers who have already chosen Zoology as their under-graduation or post-graduation and wonder what sort of job opportunities it provides or to those who are about to choose their degree after school and are sceptical about choosing Zoology. Teachers of Zoology can also use this book as a reference to the aspects and scope of Zoology.

Zoology is a branch of science which explores the origin of life and its life forms. From bacteria to dinosaurs, from birth to death, from creation to extinction, Zoology covers all aspects of all forms of life in the universe.

It provides a wide range of job opportunities to everyone who chooses it. If you always thought there was some connection between a hen and a dinosaur, then you may choose to become an **Ornithologist** to see how true that is. If you are interested in knowing if humans really evolved from apes, then you may learn **Biological Anthropology** to learn about our extinct hominin ancestors and how we evolved from them. If you are fascinated looking at insects and their behaviours, you may try **Entomology**. The branches of Zoology go on and on. Apart from this Zoology offers other government and non-government job

opportunities such as IFS officers, Research Scientists, Teachers, Professors, etc.

This book also showcases various successful Zoologists from around the world to inspire you and motivate you. Come and get entangled in the fascinating world of Zoology!

## INDEX

<b>S.No</b>	<b>CHAPTERS</b>	<b>PAGE NO</b>
1.	The scope of Zoology	
1.1	Why to become a Zoologist	
1.2	Zoology in various fields	
1.3	Zoology courses	
2.	Job opportunities for Zoologists	
3.	The famous Zoologists in India	
4.	Branches of Zoology	
5.	Great scientists in Zoology	
6.	My Testimony	



## **CHAPTER 1**

### **The Scope of Zoology**

Zoology is a very fascinating subject and its vast range of study about animals makes it very interesting. Zoology is also known as animal science. It is the branch of Biology devoted to the study of animal life. It covers areas ranging from the structure of organisms to the subcellular unit of life. Some zoologists are interested in the biology of particular groups of animals. Others are concerned with the structure and function of animal bodies. Some others analyse the origin and the formation of new animals and the passing of their characteristics from one generation to another.

Many Zoologists have the love and affinity to study the interactions of animals with one another and their environments, as well as the significance of the behaviour of animals.

Zoology is both descriptive and analytical. It can be approached either as a basic science or as an applied science. A basic zoologist is interested in knowledge of animals for its own sake without consideration of the direct application of the information gained. In contrast, workers in applied zoology are interested in information that will directly benefit humans and animals (medicine, for example).

Historically, the study of zoology can be viewed as a series of efforts to analyze and classify animals. The ancient Greek philosopher Aristotle is credited with devising the system of classifying animals that recognized similarities among diverse organisms in the fourth century B.C.; he arranged groups of animals according to modes of reproduction and habitat. He is also called as the Father of Embryology. Zoology began to emerge as a science in the 12th century and long was dominated by studies of anatomy and efforts at classifying animals. The Swedish botanist Carolus Linnaeus developed a system of nomenclature that still is used today — the binomial system of genus and species — and established as a discipline taxonomy, the science of classification according to a predetermined system.

Zoology today is as diverse as the animal kingdom it studies, broadening its range to include such fields as genetics and biochemistry. It is now considered an interdisciplinary field that applies a great variety of techniques to obtain knowledge of the animal kingdom. For instance, the genetic study of DNA from various animals can provide insights into their evolutionary history. Zoologists who concentrate on the morphology (the study of structure, including muscles, bones, cells and cellular components) employ many techniques first developed in the biochemistry lab

## **1.1 WHY TO BECOME A ZOOLOGIST**

Study of Zoology is of great importance to man. It has helped man to recognize the living things and to adapt himself according to the environment.

The students of Zoology can learn about animals and Zoological principles which may help them for proper maintenance of life.

Zoologist acquires the power to evaluate the nature which is not possible by the other means.

The scope of applied Zoology is innumerable. It provides the knowledge of medicine, dentistry, Veterinary medicine, medical technology, nursing, Museum Work, Zoological teaching, Zoological research, agriculture, environmental science and conservation.

Genetics is the branch of Zoology. Its knowledge has brought revolution in plant and animal breeding. There is every possibility that our non-renewable natural resources will be exhausted in near future. The conservation of these natural resources may be possible through Zoological knowledge.

There is equilibrium between plants and animals on the earth. There is always a struggle for food and space which may lead to serious consequences. Man is also included in this struggle and is associated with other animals due to some other needs. Some of them are useful or harmless but some are definitely harmful to man. One can have a thorough knowledge of these associations through the study of Zoology.

## **1.2 ZOOLOGY IN VARIOUS FIELDS**

### **Scope of Zoology in the field of Health and Disease**

Zoological Knowledge and theories are applicable to maintain health and to control the epidemic diseases, but still there are some dangerous medical problems which needs further study.

For example, control and cure of cancer and cardio-vascular diseases.

Protozoan and helminths are responsible for causing many diseases. In addition, some animals act as vectors. The transference of disease producing parasites or their infective stages are performed

By Anopheles (Malaria), sand-fly (kala-azar), Tse-tse (sleeping sickness), house-fly (typhoid). The control and cure of these diseases are studied by economic zoologists. The progress of medical technology is intimately connected with the application of drugs on animals. The drug for curing diabetes was discovered with experiments on dogs. Similarly, the drugs for Diphtheria, typhoid and other diseases were found only after tiresome experiments on animals. Without these animals it would have been impossible to discover the medicines for several human diseases.

### **Scope of Zoology in the Field of agriculture**

Agriculture is a part of applied zoology. Various types of living organisms are closely associated in a particular

environment. Similarly, insects pollinate the flowers, bacteria decompose the dead animals and plants present in the soil which is observed by the plants. They are important facts for agricultural science.

Insects destroy agricultural crops, domesticated animals and wood. The amount of harm caused by the insects is beyond our estimate. A variety of rodents eat considerable amount of grains and cereals both in the field and storage areas. These problems have been solved to great extent from the knowledge and application of zoological principles.

### **Scope of zoology in the field of Industry**

Various products of animals such as coral, pearl, honey, wax, silk, lac, shell of turtle, bones, feather, tusk, leather and fur are of high demand. These products can be increased from our knowledge of production of these items.

One of the most important uses of animals is as food.

Almost in every phylum there are a few species which form the food of man like lobsters, crabs, fishes, turtles, frogs, birds and mammals. We use various types of birds (chicken, fowl, duck, etc.) and mammals (goat, sheep etc.) for our diet. The improvement of these animals is one of the major tasks of zoologists.

Application of zoological science in the field of fishers is well known. It is the study of economic zoology for the higher production of food crops and fisheries to meet the challenge of food shortage during recent times.

### **1.3 Zoology Courses**

Zoology comprises of the study of animals and their behaviours. The subject helps people in knowing the animal behaviour, the way they live, their needs, and many more things.

Zoology deals with the environment of the animals, how they adapt to the changing environment and their needs like nutrition, genetics, characteristics, evolution, physiology, reproduction etc. People who specialize in this subject are called Zoologist.

Zoology is a recognized field today and is regarded as the top career choice in India. With the imbalance in the ecosystem today, acute need has been felt to preserve nature and even animals that are on the brink of extinction.

#### **Current Scenario of Zoology in India**

A Zoologist can work as a researcher; he can also conduct experiments and study the various changes in the animals. He can also work in the botanical gardens, nature reserves, universities, conservation organization, zoo, parks, teaching in schools and colleges or can also work independently by conducting research about relevant topics related to animals. The zoologist can get attractive salaries and work as a zookeeper, wildlife educator, wildlife rehabilitator, environmental consultant, journalist etc.

The salary is excellent and can help you earn anywhere around Rs. 8,000 to Rs. 15,000 monthly for the entry level job. But for the researchers and the teachers, the pay is much

higher and depends on the experience and qualification. The best jobs can be found in the government offices and one can apply directly to the government agencies about the job. Zoologists are in great demand today as many countries feel the need to preserve the wildlife and the nature. With the changes that affect the animals, zoologists are wanted to help stop abusing the animals directly or indirectly by man.

### **Major Zoology Exams in India**

To be a zoologist, it is a must that you pass your 12th grade with Math, Physics and Chemistry as your compulsory subjects. You can then appear for an entrance exam for various colleges or a college of your choice and pass to enroll yourself in that particular college. After that you can continue with your education in B.Sc in Zoology, which requires around 3 years of education and needs you to pass every year. Here is a list of major entrance exam for pursuing zoology.

- Delhi University Zoology entrance exam.
- Banaras Hindu university zoology entrance exam
- University of Pune zoology entrance exam
- All India common entrance test.

### **Top Zoology Colleges in India**

India has some of the best Zoology colleges that provide international standard education and have provided well qualified candidates to work well as a zoologist

- ABN Seal College, West Bengal

- ADM College, Tamil Nadu
- Acharya Nagarjun University, Andhra Pradesh
- Acharya Narendra Dev College, New Delhi
- Ahmadnagar College, Maharashtra
- Bishop Heber College, Trichy, Tamil Nadu

## **CHAPTER 2 JOB OPPORTUNITIES IN ZOOLOGY**



## **2.1 Career After B.Sc. Zoology**

### **▪ Higher Education**

After completing under graduation in Zoology, a master's degree is one of the obvious choices. You can consider following higher study options after B.Sc. in Zoology:

- Master of Science in Zoology (Honors)
- Master of Philosophy in Zoology
- Master of Philosophy in Life Science
- Master of Science in Zoology
- Master of Science in Applied Zoology
- Doctor of Philosophy in Zoology
- Post Graduate Diploma in Life Science
- Master of Business Administration

One can even go up to Ph.D. level after completing their master's in a particular field.

### **▪ Indian Forest Services (IFS) Entrance Exam**

A zoology graduate who is below 30 years of age can even appear for IFS entrance exam. IFS is a civil service exam conducted by Union Public Service Commission (UPSC). Clearing this exam makes you eligible for the following designations in Union Ministry and State Government:

#### **Union Ministry Designations**

- Director General of Forests
- Additional Director General of Forests
- Inspector General of Forests
- Additional Inspector General of Forests
- Deputy Inspector General of Forests
- Director

- Assistant Inspector General of Forests

### **State Government Designations**

- Principal Chief Conservator of Forests
- Additional Chief Conservator of Forests
- Chief Conservator of Forests
- Regional Chief Conservator of Forests
- Conservator of Forests
- Deputy Conservator of Forests
- Divisional Forest Officer
- Probationary Officer

Under this category, it includes all those career prospects that you can choose after completing B.Sc. in Zoology. They are the options that can be considered directly after your graduation in Zoology.

- **Ecologist**

An Ecologist is a research scientist who studies about the relationship between the organism and its environment. They spend time creating reports, collecting data, and drawing conclusions of their study. They spend most of their time outdoors conducting a survey on different issues.

Median Salary: Rs. 8,000- 12,000/-

<https://career.webindia123.com>

- **Environmental Consultant**

Those passionate about conserving and improving the environment can consider this option. An environmental consultant works with organizations. S/he offers expert advice and assessment services on various environmental issues.

Median Salary: 443,732 per year..

<https://www.payscale.com>

### **Field Trial Officer**

A **field trial officer** performs the task of monitoring and observing the effects of scientific experiments on plants and animals. They work in close coordination with the scientists to match their requirements with the trial site or laboratory.

**₹12,000 - ₹15,000 a month**

#### ○ **Marine Biologist**

A **marine biologist** studies and researches about organisms that habitat in saline water. S/he studies about both marine plants and animals.

Median Salary per annum: .Rs20,000 to Rs.40,000 per month .

<https://career.webindia123.com>

### **Nature Conservation Officer**

As a **nature conservation officer**, you would work to conserve, enhance, and manage the local environment. S/he motivate and educate people to protect their environment. Also, S/he frame environment protection laws and policies for their respective region.

Median Salary per annum

Deputy Conservator of Forests makes between 67,700 - 118,500 Rupees/month

Salaries of research assistants, contract and full-time teaching faculty start at 35,000/month

### **Research Scientist (Life Sciences)**

Research scientist within **Life Sciences** is responsible for collecting scientific data, recording observations, correlating data, and preparing detailed reports.

Since Life Sciences cover a number of disciplines, the research scientist can work in any of the following categories:

1. neurosciences
2. pharmacology
3. physiology
4. plant sciences
5. stem cell research
6. bioinformatics
7. biotechnology
8. cancer studies
9. genomics
10. microbiology

Median Salary: ₹20,500/month

<https://www.glassdoor.co.in/>

### **Animal Behaviorist**

An animal behaviorist is the one who studies animal behavior or Ethology. They observe, learn, and understand an animal's environment and find the cause of their particular behavior.

Median Salary: Rs. 20,000 per month to Rs. 1,00,000 per month,

<https://career.webindia123.com>

### **Wildlife Biologist**

A **wildlife biologist** or zoologist studies about animals, animal behavior, their habitat, and the impact of humans on the life of animals. While observing the animals closely, traveling, outdoor work and unusual acquaintances with the wildlife are some of the perks of this profession.

Median Salary: ₹ 29,638 per month

<https://www.indeed.co.in>

### **Zoo curator**

A zoo curator looks over the overall functioning of the zoo. S/he keeps a check on everything from maintaining the list of zoo animals to their health to the staff of the zoo.

Median Salary per annum: \$ 45,000

#### ▪ **Indirectly Associated Career Options**

This category includes the career options where your B.Sc. degree in Zoology will be useful.

##### ○ **Biomedical Scientist**

A **Biomedical scientist** performs a number of laboratory experiments that help in diagnosing and treating diseases. The experiments are crucial in finding treatments for diseases like AIDS, Cancer, and Diabetes. Along with the appropriate knowledge, s/he must possess strong analytical skills and practical laboratory experience.

Median Salary per annum: 1.2 – 2.2 Lakh p.a

<http://www.indiaeducation.net>

### **Environmental Manager**

An **Environmental Manager** is also known as sustainability manager. S/he is responsible for managing and observing the environmental performance of private, public, and voluntary organizations.

Median Salary per annum: Rs 612,416 per year.

<https://www.indeed.co.in>

- **Toxicologist**

A **toxicologist** is a person who studies about the impact of toxic chemicals and radiations on environment, humans, and animals. S/he conducts experiments, make reports, and analyze data to study the harmful effect of chemicals on the environment.

Median Salary per month: Rs. 25,000 to 40,000

<https://career.webindia123.com>

Irrespective of the career path that you choose, genuine interest, persistent hard work, and strong determination is what you need to excel in this field.

Zoology is an interesting and versatile field. You cannot be successful if you lack dedication, perseverance, and love towards this field.

So whatever track you choose, ensure that you stick to it in the long run.

## CHAPTER 3 THE FAMOUS ZOOLOGISTS

### 1. William Stephen Atkinson

**He** was a British lepidopterist who worked for much of his life in India. [Arthur Grote](#) (1879]

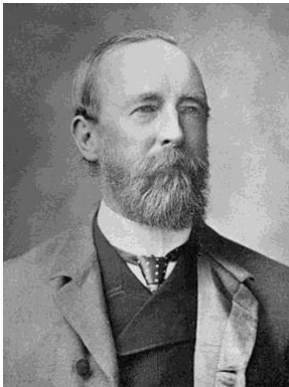
William was the eldest son of Rev. Thomas D, Atkinson, of Chesterton, in Suffolk. William was interested in nature at Cannock Chase, when his father became Vicar of Rugeley. He started collecting British Lepidoptera. He went to Trinity College, Cambridge, from 1839 and passed out as 26th Wrangler in 1843. [Atkinson, Cambridge Alumni Database] He then studied to become a Civil Engineer, but was offered the position of Principal at Martiniere College and went to Calcutta on November 1854..

In Calcutta he joined The Asiatic Society and later became its secretary. He became interested in the lepidoptera of Bengal and started breeding moths and communicated with Mr Stainton. In 1857 he became a Member of the Entomological Society. In 1860 he became Directory of Public Instruction in Bengal and made visits to Darjeeling where he made extensive collections. He made trips to Sikkim with Dr Thomas Anderson of the Calcutta Botanic Garden. In 1865 he became a Trustee of the New Indian Museum. He was in correspondence with Frederic Moore.

Atkinson lived for many years in Calcutta collecting and painting specimens. His collection was purchased on his death by William Chapman Hewitson and deposited with

the Natural History Museum in London. Frederic Moore (1830–1907) described and published many of the new species collected by him.(W S Atkinson (1879])

## 2. Allan Octavian Hume



Image

source: [www.en.wikipedia.org](http://www.en.wikipedia.org)

He was a member of the Imperial Civil Service (later the Indian Civil Service), a political reformer, ornithologist and botanist who worked in British India. He was one of the founders of the Indian National

Congress, a political party that was later to lead in the Indian independence movement. A notable ornithologist, Hume has been called "the Father of Indian Ornithology" and, by those who found him dogmatic, "the Pope of Indian ornithology".[ *Ali, S. (1979).*]

As an administrator of Etawah, he saw the Indian Rebellion of 1857 as a result of misgovernance and made great efforts to improve the lives of the common people. Hume's reforms led to the district being considered a model of development. Hume rose in the ranks of the Indian Civil Service but like his father Joseph Hume, the radical MP, he was bold and outspoken in questioning British policies in India. He



founded the journal *Stray Feathers* in which he and his subscribers recorded notes on birds from across India. He built up a vast collection of bird specimens at his home in Shimla by making collection expeditions and obtaining specimens through his network of correspondents.

As he had the loss of manuscripts that he had long been maintaining in the hope of producing a magnum opus on the birds of India, he abandoned ornithology and gave his collection to the Natural History Museum in London, where it continues to be the single largest collection of Indian bird skins. He was a follower of the theosophical movement founded by Madame Blavatsky. He left India in 1894 to live in London from where he continued to take an interest in the Indian National Congress.

The Hume collection of birds was packed into 47 cases made of deodar wood constructed on site without nails that could potentially damage specimens and each case weighing about half a ton was transported down the hill to a bullock cart to Kalka and finally the port in Bombay. The material that went to the British Museum in 1885 consisted of 82,000 specimens of which 75,577 were finally placed in the museum

### 3. Salim Ali

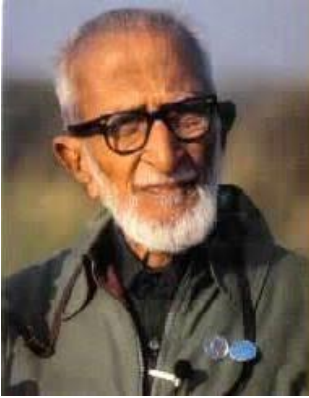


Image Source: [www.goodreads.com](http://www.goodreads.com)

Sálím Moizuddin Abdul Ali (Christopher,1988)] was an Indian ornithologist and naturalist. Sometimes referred to as the "birdman of India", Salim Ali was among the first Indians to conduct systematic bird surveys across India and wrote several bird books that popularised ornithology in India. He became a key figure behind the Bombay Natural History Society after 1947 and used his personal influence to garner government support for the organisation, create the Bharatpur bird sanctuary (Keoladeo National Park) and prevent the destruction of what is now the Silent Valley National Park. Along with Sidney Dillon Ripley he wrote the landmark ten volume Handbook of the Birds of India and Pakistan, a second edition of which was completed after his death. He was awarded the Padma Bhushan in 1958 and the Padma Vibhushan in 1976, India's third and second highest civilian honours respectively.[Padma

awards,2015] Several species of birds, a couple of bird sanctuaries and institutions have been named after him.

#### **4. C.R. Narayan Rao**

He was an Indian zoologist and herpetologist. He was among the founding editors of the journal *Current Science*. In recognition of his pioneering work on Indian amphibians, the genus *Raorchestes* was named after him.

Born in Coimbatore, he studied in Bellary and at the Madras Christian College under Professor Henderson who headed the department of zoology. After obtaining his graduate and post-graduate degrees and a gold medal for proficiency, he obtained a diploma in teaching. He taught in Coimbatore and Ernakulam, before moving to the Central College in Bangalore where he organized the department of zoology and headed it until his retirement in 1937.

His role in science and research is considered significant since he was involved in the integration of research into university education. Along with Sir Martin Onslow Forster and other Indian scientists he helped found the journal *Current Science* in July 1932 along the lines of the journal *Nature*. He was its first editor. In one of his first editorials, he pleaded for the coordination of scientific activities in India, a plea that helped create the Indian Academy of Sciences. (*Seshachar, B.R. (1960)*)

Professor Rao specialized on frogs and their taxonomy. He named and described several frog species, and his work on the Archenteric and Segmentation Cavities of frogs are

regarded as important contributions to our understanding of amphibian development. He described the new Microhylid genus *Ramanella*. The genus *Raorchestes* is named in his honour (Biju, 2010)

Professor Rao presided over the zoology section of the Indian Science Congress in 1938 at Lahore. His account of the ovarian ovum of the slender loris was presented to the Royal Society by James Peter Hill in the latter's Croonian Lecture (*Seshachar, B.R. (1960)*)

### 5. Anwaruddin Choudhury



Image source: [www.yourshot.nationalgeographic.com](http://www.yourshot.nationalgeographic.com)

Anwaruddin Choudhury, M. A., Ph.D, D.Sc, is an Indian naturalist, noted for his expertise on the fauna of North-East India.

Choudhury is an ornithologist, mammalogist, artist, civil servant, photographer and author. He is recognized by

many as an eminent naturalist and conservationist studying wildlife throughout North-East India and adjacent areas.[ Teresa Rehman (2001)] He is the Honorary Chief Executive of the Rhino Foundation for nature in North East India[4][6] and was Deputy Commissioner (District Magistrate) of Baksa and Lakhimpur districts in Assam and also served as Secretary with the government of Assam. Currently he is the Divisional Commissioner of Barak Valley. Known as the "Birdman of Assam", he was the first to produce books on the birds of different northeastern states including Assam, Arunachal Pradesh, Nagaland, Mizoram and Meghalaya.[ Choudhury, Anwaruddin (1990),2000,2003,2006,2008] His studies have contributed enormously to the conservation and awareness in North-East India. He is the author of 24 books and more than 640 articles and scientific papers. Dr Choudhury is recognised as one of India's well known wildlife experts and conservationists. In particular he has spent three decades following the fortunes of North-East India's wildlife.[ Teresa Rehman (2001)

## **6. Sister M. Cyril Mooney**



**Image source: [www.umanitoba.ca](http://www.umanitoba.ca)**

Sister M. Cyril Mooney, IBVM (born 21 July 1936) is an internationally recognized educational innovator and the 2007 winner of the Padma Shri Award, the Government of India's fourth-highest civilian honor.[Padma awards,2015] She is a native of Ireland and a Sister of the Institute of the Blessed Virgin Mary (Loreto). Since 1956 she has been living and working in India, where she has emerged as a nationwide leader in bringing quality education to urban and rural poor children.

#### **4.Valmik Thapar**



Image source:[www.en.wikipedia.org](http://www.en.wikipedia.org)

Valmik Thapar (born 1952) is an Indian naturalist, conservationist and writer.[[www.livemint.com](http://www.livemint.com),2011] He is the author of 14 books and several articles, and has produced a range of programmes for television.[Walia, 2002] Today he is one of India's most respected wildlife experts and conservationists, having produced and narrated documentaries on India's natural habitat for such media as the BBC, Animal Planet, Discovery and National Geographic channels.

His stewardship of the Ranthambore Foundation was recognised and he was appointed a member of the Tiger Task Force of 2005 by the Government of India. He criticised the majority Task Force view in his dissent note as excessively focussed on the prospects of co-existence of tigers and humans, which was, in his view not consistent with the objective of the panel.



A tiger in India's Bandhavgarh reserve in 2006

His writings have analysed the perceived failure of Project Tiger, a conservation apparatus created in 1973 by the Government of India. He has critiqued Project Tiger, drawing attention to its mismanagement by a forest bureaucracy that is largely not scientifically trained. His most recent book *The Last Tiger* (Oxford University Press) makes this case strongly.

Among the consistent criticisms levelled by Thapar at India's Ministry of Environment and Forests relates to its unwillingness to curb poaching through armed patrols and its refusal to open forests to scholarly scientific enquiry.

5. V. S. Vijayan





Image source: [www.en.wikipedia.org](http://www.en.wikipedia.org)

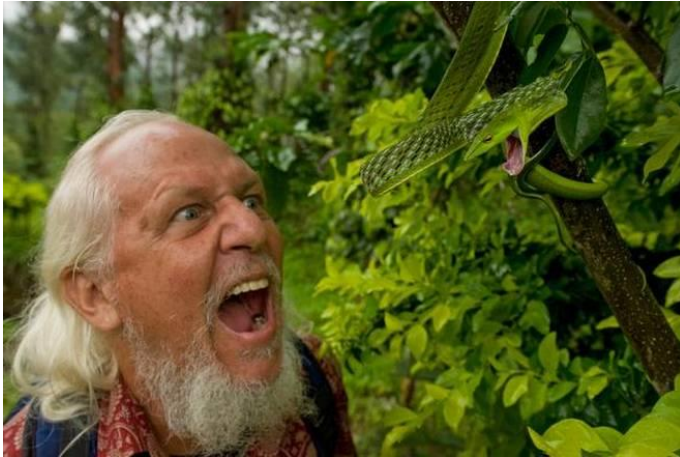
Vadayil Sankaran Vijayan is an Indian environmentalist, wildlife biologist, ornithologist, an admirer of naturopathy and the founding Director of the Salim Ali Centre for Ornithology and Natural History. He is currently the chairman of the Salim Ali Foundation [Salim Ali foundation].

Vijayan did his post graduation in Zoology at M.S. University of Baroda. He obtained Ph.D in Field Ornithology in 1976 from the University of Bombay for his work on the Ecological isolation in bulbuls (Class Aves, family Pycnonotidae) with special reference to *Pycnonotus cafer* (L) and *Pycnonotus luteolus* (Lesson) at Point Calimere, Tamil Nadu under the guidance of Salim Ali. He is married to Lalitha Vijayan, a noted ornithologist, a Ph D.

student of Salim Ali and former scientist of Salim Ali Centre for Ornithology and Natural History. The couple has a son V.V. Robin, an evolutionary biologist.

His report on the Impact of hydroelectric dam on wildlife in Silent Valley was the first scientific basis for the start of the Save Silent Valley movement. The long term studies conducted under his leadership on the ecology of Keoladeo National Park was instrumental in developing management plans for the park. This study with large-scale bird banding also contributed to the knowledge on migratory birds of Indian subcontinent. Vijayan brought attention of the public and policy makers through his reports on the environmental impacts of the proposed Pathrakadavu hydroelectric project, Pooyamkutty hydroelectric project, Athirapilly hydroelectric project, Aranmula International Airport, [The Hindu] genetically modified crops. As the founder Director of the Salim Ali Centre for Ornithology and Natural History, the premier ornithology institute in the country, he led several studies for the conservation of threatened bird of India. He contributed to the Western Ghats Ecology Expert Panel (WGEEP) known as Gadgil Committee as a member which mooted several controversies and agitations across the Western Ghats states. [Report of Western Ghats, 2011] He was instrumental in developing the Pupil's Biodiversity Register for each Grama Panchayath in the state of Kerala. He also developed an organic farming policy for Kerala state during his tenure as the Chairman of the Kerala State Biodiversity Board. [Kerala Forest Research Institute 1983]

## **Romulus Earl Whitaker**



**Image source: [www.thehindu.com](http://www.thehindu.com)**

Romulus Earl Whitaker (born 23 May 1943) is an Indian herpetologist, wildlife conservationist and founder of the Madras Snake Park, The Andaman and Nicobar

Environment Trust (ANET), and the Madras Crocodile Bank Trust. In 2008, Whitaker was selected as an Associate Laureate in the 2008 Rolex Awards for Enterprise, for his efforts to create a network of rainforest research stations throughout India. [Dickie, Phil (2008)] In 2005 he was a winner of a Whitley Award for outstanding leadership in nature conservation. He used this award and found the Agumbe Rainforest Research Station in Karnataka, for the study of King Cobras and their habitat. He was awarded India's fourth highest civilian award the Padma Shri in 2018.[ Raghavan TL (2009)]

Whitaker was the founder director of the Snake Park in Chennai. The park was conceived to rehabilitate the Irula tribe who are known for their expertise in catching snakes. The tribals were left jobless after the ban of snake trading. Whitaker helped the Irula tribe to get involved in extracting snake venom used for the production of antivenom drugs. Rom is the Founder-Director of the Madras Crocodile Bank Trust Centre for Herpetology, actively involved in crocodile breeding and conservation programs. [Raghavan TL (2009)]

Whitaker is currently coordinating an effort to save the Gharial, a Critically endangered species of Crocodilia on the brink of extinction with less than 250 individuals left in Indian waters. [BBC News]

Rom is Honorary Consultant, International Union for the Conservation of Nature and Natural Resources/Species Survival Commission (IUCN/SSC), Vice Chairman

(Western Asia), IUCN/SSC Crocodile Specialist Group, Member, IUCN/SSC Indian Subcontinent Reptile and Amphibian Group and Member, IUCN/SSC Sea Turtle Specialist Group. 200 billion dollar dry venome per month production of dry venome by reptile park chennai. Which is the largest among the world.

Lalji Singh FNA, FASc (5 July 1947 – 10 December 2017)[Dikshit et al.,2017] was an Indian scientist who worked in the field of DNA fingerprinting technology in India, where he was popularly known as the "Father of Indian DNA fingerprinting".[ The Hindu] Singh also worked in the areas of molecular basis of sex determination, wildlife conservation forensics and evolution and migration of humans. In 2004, he received the Padma Shri in recognition of his contribution to Indian science and technology.[ Padma Awards,2015)

Singh founded various institutes and laboratories in India, including the Centre for DNA Fingerprinting and Diagnostics in 1995, Laboratory for the Conservation of Endangered Species (LaCONES) in 1998, and Genome Foundation in 2004, aiming to diagnose and treat genetic disorders affecting the Indian population, in particular the under-privileged people residing in rural India.

Singh served as the 25th Vice Chancellor of Banaras Hindu University (BHU) and Chairman of Board of Governors of

Indian Institute of Technology (BHU) Varanasi from August 2011 to August 2014. Before his term as Vice Chancellor of Banaras Hindu University, he also served as director of the Centre for Cellular and Molecular Biology (CCMB) from May 1998 to July 2009 and Officer on Special Duty (OSD) of Centre for DNA Fingerprinting and Diagnostics (CDFD), Hyderabad, India in 1995–1999.

### **Qudsia Tahseen**



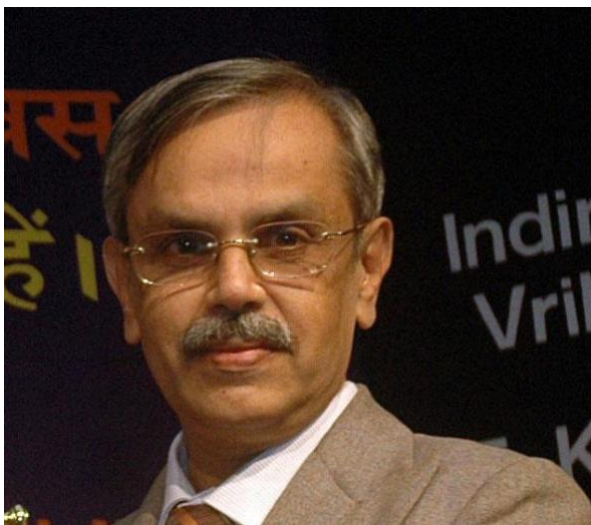
Image source:[www.amu.ac.in](http://www.amu.ac.in)

Qudsia Tahseen (born 15 December 1964) is a Professor of Zoology at Aligarh Muslim University and teaches Animal Ecology as well as Nematology to the students of the Masters programme. Her areas of research include taxonomy and developmental biology of terrestrial and aquatic nematodes. She is a fellow of two national science academies of India. [Tahseen et al., (2016)]

Qudsia Tahseen's first appointment as a faculty was in 1989 in Women's College AMU even before she had received the PhD degree. In 1997, she got transferred to the Department of Zoology, Aligarh Muslim University first serving as a Reader and then a full Professor.[ Qudsia Tehseen- CV" (PDF) 2016.]

She has been carrying out numerous studies on taxonomy, biodiversity, and biology of soil and aquatic nematodes resulting in discovery and description of several new species of Nematodes from India.[ Tahseen, Q.; Khan, R.; Ahlawat, S. (2015] Most recently her group discovered an intermediate species between two different genera of Nematodes. Qudsia Tahseen was the first Asian to receive ONTA (Organization of Nematologists of Tropical America) Special Award in 2005 for sustained excellence in Nematology

**Thekke Kuruppathe Narendran**



**Image source: [www.inmemoryglobal.com](http://www.inmemoryglobal.com)**

Thekke Kurupathe Narendran (February 24, 1944 – December 31, 2013) was an Indian entomologist specializing in the systematics of parasitic wasps in the superfamily Chalcidoidea (Hymenoptera).

Narendran is the recipient of Janakiammal National Award for Taxonomy (2004)[1] and is a Fellow of the Indian Academy of Sciences, Bangalore (IASc) and the Indian Entomology Academy, Chennai.

His major publications include monographs on the Oriental Chalcididae (1989), Torymidae & Eurytomidae of Indian Subcontinent (1994) and Indo-Australian Ormyridae (1999) - and some 300 research papers in various scientific journals have established 700 new species and over 50 new



genera. Prof. Narendran's lifelong work in Calicut University has resulted in the training of a large number of taxonomists in India.

He died of a heart attack on December 31, 2013, aged 69

### **Anwaruddin Choudhury**

Anwaruddin Choudhury, M.A., Ph.D, D.Sc, is an Indian naturalist, noted for his expertise on the fauna of North-East India.[BBCNews,2006]

Choudhury is an ornithologist, mammalogist, artist, civil servant, photographer and author. He is recognized by many as an eminent naturalist and conservationist studying wildlife throughout North-East India and adjacent areas.[BirdLife International (2006)] He is the Honorary Chief Executive of the Rhino Foundation for nature in North East India[The Sentinel Mélange (2006)] and was Deputy Commissioner (District Magistrate) of Baksa and Lakhimpur districts in Assam and also served as Secretary with the government of Assam. Currently he is the Divisional Commissioner of Barak Valley. Known as the "Birdman of Assam", he was the first to produce books on the birds of different northeastern states including Assam, Arunachal Pradesh, Nagaland, Mizoram and Meghalaya.[Choudhury, Anwaruddin (1990)] His studies have contributed enormously to the conservation and awareness in North-East India. He is the author of 24 books and more than 640 articles and scientific papers. Dr Choudhury is

recognised as one of India's well known wildlife experts and conservationists. He has spent three decades following the fortunes of North-East India's wildlife.

In 1986, he traveled to North Cachar Hills (renamed (Dima Hasao district) to start a two-decade long research on primates that covered the entire North-East India in later years.[ Choudhury, Anwaruddin (2001)] The most significant are discovery and description of three flying squirrels, new to science in 2007, 2009 and 2013. These new flying squirrels have been named by him *Petaurista mechukaensis* (=nigra),[ Choudhury,Anwaruddin (2007)] *mishmiensis*. [ Choudhury,Anwaruddin (2009)] and *siangensis*. [ Choudhury,Anwaruddin (2013)] The holotypes of these are in the collection of the Zoological Survey of India, Kolkata. He also discovered a new species of primate but identified it as a subspecies of *Macaca thibetana*. [ Choudhury, Anwaruddin (1998)] This was later on described by other scientists as *Macaca munzala*

He is the founder Chief Executive of the Rhino Foundation for nature in North East India, a leading NGO of India since 1995. His pioneering work in conservation also contributed greatly to the awareness in North East India. His stewardship of the Rhino Foundation for nature in North East India as well as his other activities was recognised and he was appointed a member of the State Board for Wildlife, the highest policy making official body on wildlife in 2003 by the Government of Assam

## **Zafar Futehally (2013)**



Image source:[www.en.wikipedia.org](http://www.en.wikipedia.org)

Zafar Rashid Futehally was an Indian naturalist and conservationist best known for his work as the secretary of the Bombay Natural History Society and for the Newsletter for Birdwatchers a periodical that helped birdwatchers around India to communicate their observations. Awarded Padma Shri by the Government of India in the year 1971, Zafar Futehally was also honoured with Dutch order of merit the Order of the Golden Ark in 1981 and Karnataka Rajyotsava award by the Government of Karnataka in 1983

Harish (Honnayya) S. Gaonkar (born 1946) is an Indian specialist on butterflies who contributed to the Zoological

Museum at the University of Copenhagen, Denmark and wrote a 1996 compilation of butterflies of Western Ghats, South India cataloguing 330 species. He is cited as the source of the list of butterflies endemic to Sri Lanka at Michael and Nancy van der Poorten's website "Butterflies & Dragonflies of Sri Lanka" in a personal communication of information from a work "The Atlas of the Butterflies of the Western Ghats and Sri Lanka", Natural History Museum, London, apparently still in preparation in August 2009(Futehally, Z (2001).

He wrote that "the origins of giving common English names to organisms, particularly butterflies for tropical species started in India around the mid 19th century. The naming of Mormons evolved slowly. I think the first to get such a name was the Common Mormon (*Papilio polytes*) (Futehally, Z (2003).

### **Anisur Rahman Khuda-Bukhsh**

Anisur Rahman Khuda-Bukhsh (born 26 September 1948) is a professor of zoology at the University of Kalyani in West Bengal, India, and a homeopathy researcher.[Deshpande, Shashi 2005] In 2003, he published a study which claimed that homeopathic *Arsenicum album* reduced arsenic-caused liver toxicity in mice.[Deshpande, Shashi 2005] He has also done research on treating arsenic-induced diabetes in mice using a product consisting of insulin wrapped in a coat of nanoparticles; Khuda-Bukhsh and his collaborators describe this product as "nano-

insulin".[*Futehally, Zafar (1985)*]. Nature Asia describes an article published in peer review journal of Integrative Medicine about the action of homeopathic in gene expression.[ *Deshpande, Shashi 2005*]

### **Anisur Rahman Khuda-Bukhsh**



Image source [www.thehomeopathiccollege.org](http://www.thehomeopathiccollege.org)

Anisur Rahman Khuda-Bukhsh worked earlier at the Dept. of Zoology , University of Kalyani. He is now retired after he served two years as Emeritus of UGC at the same Dept. till April 2016. He worked in different areas of toxicology, mutagenesis, radio-protection, nanotechnology, pharmacology and pharmaceuticals apart from homeopathy, cancer biology and biological sensors. He utilized various modern technologies including various electron microscopies, nanoencapsulations and nanoprecipitations., immunology and other molecular

biology techniques. Their current project is 'Clinical research on PCOS , PCO and renal stones and the molecular mechanism of homeopathy. 'He is the recipient of LIFE TIME ACHIEVEMENT AWARD -2016 from i) EUROPEAN COMMITTEE OF HOMEOPATHY and ii) AYUSH, Govt. INDIA

### **Veena Tandon**



**Image source; [www.peerj.com](http://www.peerj.com)**

Dr. Veena Tandon currently professor of Zoology, at North Eastern Hill University, Shillong, Meghalaya, India is actively engaged in the areas of parasite biodiversity and molecular taxonomy and phylogeny of various helminth parasites, supplementing the morphology-based identification and development of species-specific molecular markers of diagnostic value and generating their bar codes.

## Ashok Captain



Ashok Captain is an Indian herpetologist who has authored books and papers on Indian snakes. He was also a competing cyclist from 1977 to 1989. Captain's wood snake (*Xylophis captaini*) and Ashok's bronzeback tree snake (*Dendrelaphis ashoki*) have been named after him. [Captain Ashok, 2004]

## **Kiran Mazumdar-Shaw**



Mazumdar-Shaw, India's richest self-made woman, founded India's largest biopharmaceutical firm in 1978.

The firm has successfully forayed into the lucrative US biosimilars market, catching the attention of investors and creating a surge in market cap.

Biocon became the first company to gain approval from the USFDA for two different biosimilars of drugs used in certain cancer treatments.

She's invested in research infrastructure and scientific talent with the aim of building a deep R&D-based biotech firm, not a copycat generics maker.

Her real time net worth as on 3<sup>rd</sup> March 2019 is \$3.4 billion.

( <https://www.forbes.com/profile>)



Her philanthropic initiative, The Mazumdar Shaw Medical Centre, aims to create a sustainable, affordable cancer care model.( <https://www.forbes.com/>)

## CHAPTER 4 BRANCHES OF ZOOLOGY

### 1. Acarology

-a division of zoology that studies mites and ticks.



### 2. Anthrozoology



Anthrozoology is a study of interaction between humans and other animals. This sub-discipline of zoology overlaps with anthropology, veterinary medicine, ethnology and zoology.

### **3.Arachnology**

Arachnology is a branch of zoology that deals with the study of spiders and related species known as arachnids (such as scorpions, harvestmen, etc).



### **4.Archaeozoology**



Archaeozoology is the study of dead animals (faunal remains) that includes their bones, shells and other body parts. It is also known as zooarchaeology.

### **5.Bionics**

Bionics is the study of mechanical systems that function like living organisms or parts of living organisms. It is the concept of applying biological methods and systems found in nature to the study/design of engineering systems and modern technology.



## **6. Carcinology**

-the branch of zoology that studies crustaceans.

## 6. Cetology

Cetology is a branch of zoology that deals with the study of marine mammals that include whales, dolphins, porpoise, etc.



## 7. Coccidology

-the branch of zoology that studies scales, mealy bugs, and other members of the family Coccidea.

## 8. Cynology

-the branch of zoology that studies the dog, especially its natural history.



## **9.Embryology**

The branch of zoology that studies the prenatal development of gametes (also known as sex cells), fertilization, and development of embryos and fetuses.



## **10. Echinology**

the branch of zoology that studies echinoderms.

## **11.Entomology**



Entomology is the study of insects. The following is the list of sub-branches of Entomology that specializes in different types of insects.

○



## **12.Coleopterology (Beetles)**

Coleopterology is the Entomology sub-branch that concerns with the study of beetles.



### **13.Dipterology (Flies)**

Dipterology is the sub-discipline of Entomology that studies all types of flies.

### **14.Hemipterology (True Bugs)**

Hemipterology is the sub-division of Entomology that studies true bugs or hemiptera.





### **15.Isopterology (Termites)**



Isopterology is the study of termites.

### **16.Lepidopterology (Butterflies)**

Lepidopterology is a branch of Entomology that covers the study of butterflies and moths.



### **17.Melittology (Bees)**

Melittology is the study of bees. It is also known as *Apiology*.



### **18.Myrmecology (Ants)**

Myrmecology is a sub-discipline of Entomology which focuses on the study of ants.

### **19.Orthopterology (Grasshoppers)**

Orthopterology is a sub-discipline of Entomology which handles the study of grasshoppers, crickets, etc.



## **20. Trichopteroology (Caddis Flies)**

Trichopteroology is a sub-branch of Entomology focusing on the study of caddis flies.



## **21. Vespology (Wasps)**

Vespology is a sub-discipline of Entomology which specializes in the study of wasps.

## **22.Ethology**

Ethology is a branch of zoology that deals with animal behavior under their natural habitats and studying their behavior as an adaptive trait in evolution.



## **23.Helminthology**

Helminthology is the study of parasitic worms (helminths) and deals with taxonomy of helminth and the effect on their hosts.

## **24.Herpetology**

Herpetology is the study of reptiles and amphibians.



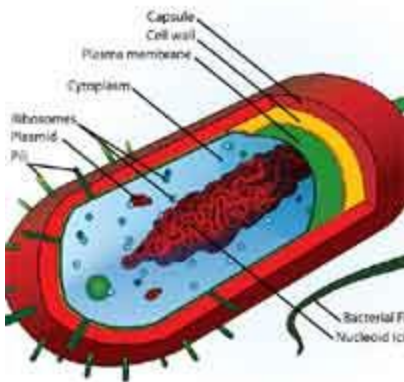
## **25.Batrachology**

**(Amphibians)**

Batrachology is a branch of Herpetology concerns with the study of amphibians alone.

## 26.Ophiology (Snakes)

Ophiology or Ophidiology is a sub-division of Herpetology which deals with the study of ophidians or snakes.



## 27.Histology

Histology is the study of microscopic anatomy of cells and tissues of animals and plants.



## **28. Ichthyology**

Ichthyology is a branch of zoology that covers the study of fish (also known as fish science).



## **29. Malacology**

Malacology is the study of Mollusca such as snails, slugs, octopus, clams, and all animals that live in water with shells.

### **30. Conchology (Mollusk**

### **Shells)**

Conchology is a sub discipline of malacology that deals with the study of mollusk shells only.



### **31. Mammalogy**

Mammalogy is the study of mammals and their characteristics. Mammalogy is also referred



as *Mastology*, *Theriology* or *Therology*.





### **32. Morphology**

Morphology is a branch of zoology dealing with the study of the form and structure of organisms and their specific structural features.



### **33. Nematology**

Nematology is a sub-discipline of zoology that studies roundworms (nematodes).

### **34. Ornithology**

Ornithology is a branch of zoology that deals with the study of birds. Check out the most colorful birds in the world.

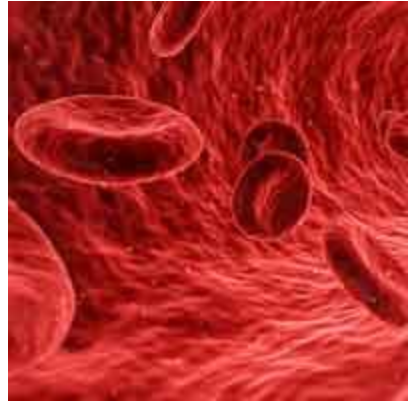


### **35. Palaeozoology**

Palaeozoology is a branch of zoology that deals with the study of fossil animals to identify multi-cellular animals from geological perspective to establish prehistoric environments and their ecosystems.

### 36.Pathology

Pathology is the study of bodily fluids in laboratory such as blood, urine or tissues to diagnose a disease. It further narrows down to plant pathology (for plants) and veterinary pathology (for animals).

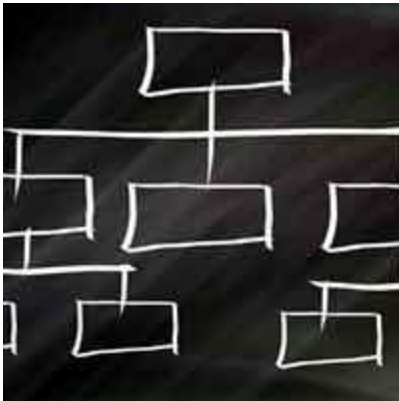


### 37. Primatology

Primatology is a study of living and extinct primates (monkeys, apes, and prosimians).

### 38. Protozoology

Protozoology is a branch of zoology that deals with the study of Protozoa (which are unicellular organisms such as amoeba, etc.).

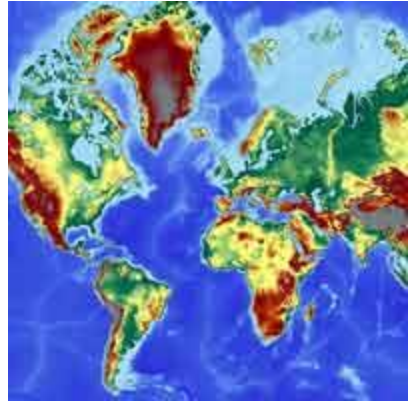


### 39. Taxonomy

Taxonomy is a study that defines groups of biological organisms on the basis of shared characteristics and giving names to those groups.

#### **40. Zoogeography**

Zoogeography is the scientific study of geographical distribution of animal species (both historic and contemporary) in the world.



#### **41. Zoography**

Zoography is study of animals and their habitats (also known as descriptive zoology).

#### **42. Zoometry**

Zoometry is a sub-division of zoology that deals with measurements (length or size) of animal parts.



#### **43. Zoopathology**

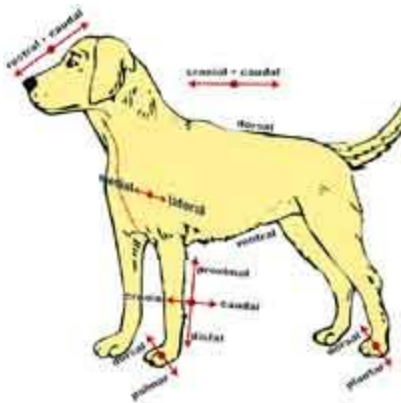
the study or science of the diseases of animals; animal pathology. Also zoopathy.



#### **44. Zoophytology**

the branch of zoology concerned with the zoophytes.





## 45.Zootomy

Human Anatomy is the study of the structure of humans and their various parts whereas Zootomy specifically refers to animal anatomy.

## **CHAPTER 5**

### **ZOOLOGY**

## **THE GREAT SCIENTISTS IN**

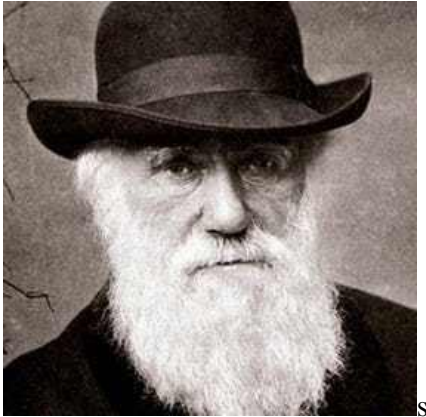
### **1. Aristotle**

Aristotle studied developing organisms, among other things, in ancient Greece, and his writings shaped Western philosophy and natural science for greater than two thousand years.. In natural philosophy, later called natural science, Aristotle established methods for investigation and reasoning and provided a theory on how embryos generate and develop. He originated the theory that an organism develops gradually from undifferentiated material, later called epigenesis.

In Book VI of History of Animals, Aristotle addressed reproduction in birds, the process of forming an egg, and the development of chick embryos. He first detailed the physical properties of bird eggs, how sperm enters the female, and the color changes associated with the developing egg. Then, he discussed wind-eggs, or eggs that developed into organisms without copulation or male sperm, a phenomenon later called parthenogenesis. He said that wind-eggs are smaller and less palatable than fertilized eggs. Aristotle then delineated the stages in the developing egg and provided a chronology of the developmental stages of the chick embryo. From his observations, he concluded that the developing chick inside the egg acquired its form over time. That conclusion contradicted the hypothesis that the sire provided a preformed embryo and the dam provided the embryo a place to grow.



## 2. Charles Robert Darwin



Charles Robert Darwin, FRS was an English naturalist and geologist, best known for his contributions to evolutionary theory. He established that all species of life have descended over time from common ancestors, and in a joint publication with Alfred Russel Wallace introduced his scientific theory that this branching pattern of evolution resulted from a process that he called natural selection, in which the struggle for existence has a similar effect to the artificial selection involved in selective breeding. Darwin published his theory of evolution with compelling evidence in his 1859 book *On the Origin of Species*, overcoming scientific rejection of earlier concepts of transmutation.

## 2. Gregor Johann Mendel

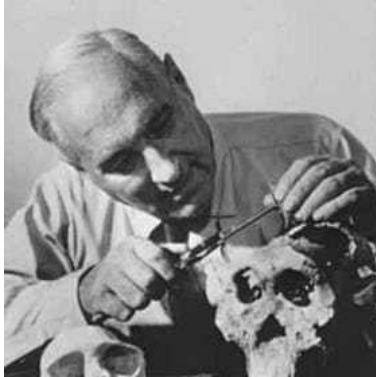


Source: Wikipedia

### **Gregor Mendel**

Gregor Johann Mendel was a German-speaking Moravian scientist and Augustinian friar who gained posthumous fame as the "Founder of the modern science of Genetics". Though farmers had known for centuries that crossbreeding of animals and plants could favor certain desirable traits, Mendel's pea plant experiments conducted between 1856 and 1863 established many of the rules of heredity, now referred to as the laws of Mendelian inheritance. Mendel worked with seven characteristics of pea plants: plant height, pod shape and color, seed shape and color, and flower position and color. (Iltis, Hugo (1958).

### **3. Louis Leakey**



## **Louis Leakey**

**Source:Wikipedia**

Louis Seymour Bazett Leakey, also known as L. S. B. Leakey, was a Kenyan paleoanthropologist and archaeologist whose work was important in establishing human evolutionary development in Africa, particularly through his discoveries in the Olduvai Gorge. He also played a major role in creating organizations for future research in Africa and for protecting wildlife there. Having been a prime mover in establishing a tradition of palaeoanthropological inquiry, he was able to motivate the next generation to continue it, notably within his own family, many of whom also became prominent. Leakey participated in national events of British East Africa and Kenya during the 1950s.( Morell et al.,1993)

## **4. Rachel Carson**



**Rachel Carson**

**Source: Wikipedia**

Rachel Louise Carson was an American marine biologist and conservationist whose book *Silent Spring* and other writings are credited with advancing the global environmental movement. Carson began her career as an aquatic biologist in the U.S. Bureau of Fisheries, and became a full-time nature writer in the 1950s. Her widely praised 1951 bestseller *The Sea Around Us* won her a U.S. National Book Award, recognition as a gifted writer, and financial security. Her next book, *The Edge of the Sea*, and the reissued version of her first book, *Under the Sea Wind*, were also bestsellers. This sea trilogy explores the whole of ocean life from the shores to the depths. (National Book Awards — 1952)

## 6. Georges Cuvier



Georges Cuvier, French zoologist and statesman, who established the sciences of comparative anatomy and paleontology (Appel, Toby (1987)..

Cuvier also argued that the anatomical characteristics distinguishing groups of animals are evidence that species have not changed since the Creation. Each species is so well coordinated, functionally and structurally, that it could not survive significant change. He further maintained that each species was created for its own special purpose and each organ for its special function. In denying evolution, Cuvier disagreed with the views of his colleague Jean-Baptiste Lamarck, who published his theory of evolution in 1809, and eventually also with Geoffroy, who in 1825 published evidence concerning the evolution of crocodiles. (Theodore W. Pietsch, 2012)

## 7. Alfred Charles Kinsey



Source: Wikipedia

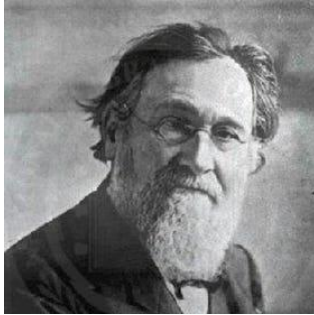
Alfred Charles Kinsey was an American biologist, professor of entomology and zoology, and sexologist who in 1947 founded the Institute for Sex Research at Indiana University,[ Gathorne-Hardy, Jonathan (2000)] previously known as the Kinsey Institute for Research in Sex, Gender, and Reproduction. He is best known for writing *Sexual Behavior in the Human Male* (1948) and *Sexual Behavior in the Human Female* (1953), also known as the Kinsey Reports, as well as the Kinsey scale. His work has influenced social and cultural values in the United States, as well as internationally.

## 8. Ernst Mayr



Ernst Walter Mayr was one of the 20th century's leading evolutionary biologists. He was also a renowned taxonomist, tropical explorer, ornithologist, and historian of science (Meyer, A. (2005)). His work contributed to the conceptual revolution that led to the modern evolutionary synthesis of Mendelian genetics, systematics, and Darwinian evolution, and to the development of the biological species concept. Although Charles Darwin and others posited that multiple species could evolve from a single common ancestor, the mechanism by which this occurred was not understood, creating the species problem. Ernst Mayr approached the problem with a new definition for species. (Rennie, J. (1994)).

## 9. Ilya Ilyich Mechnikov



Ilya Ilyich Mechnikov was a Russian zoologist best known for his pioneering research into the immune system. In particular, he is credited with the discovery of phagocytes in 1882, and his discovery turned out to be the major defence mechanism in innate immunity. He and Paul Ehrlich were awarded the 1908 Nobel Prize in Physiology or Medicine "in recognition of their work on immunity". He is also credited by some sources with coining the term gerontology in 1903, for the emerging study of aging and longevity. He established the concept of cell-mediated immunity, while Ehrlich that of humoral immunity. Their works are regarded as the foundation of the science of immunology. (Vikhanski, Luba (2016))

## **10.Rosalind Franklin**

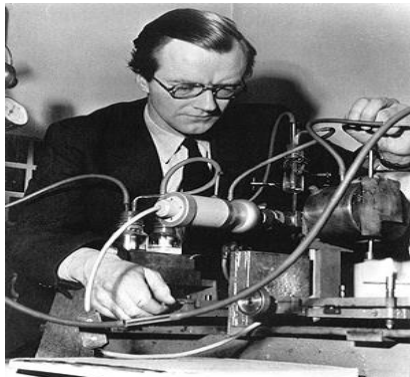


Of the four DNA researchers, only Rosalind Franklin had any degrees in chemistry. She was born into a prominent London banking family, where all the children—girls and boys—were encouraged to develop their individual aptitudes. She attended Newnham College, one of the women’s colleges at Cambridge University. She completed her degree in 1941 in the middle of World War II and undertook graduate work at Cambridge with Ronald Norrish, a future Nobel laureate. There she performed fundamental investigations on the properties of coal and graphite. She returned briefly to Cambridge, where she presented a dissertation based on this work and was granted a PhD in physical chemistry. After the war, through a French friend, she gained an appointment at the Laboratoire Centrale des Services Chimiques de l’Etat in Paris, where she was introduced to the technique of X-ray crystallography and rapidly became a respected authority in this field. In 1951 she returned to England to King’s College London, where her charge was to upgrade the X-ray crystallographic laboratory there for work with DNA. (<https://www.sciencehistory.org>)



## 11. Maurice Wilkins

[wilkins1.jpg](#)



Maurice Wilkins with X-ray crystallographic equipment about 1954.

*King's College London and Horace Freeland Judson*

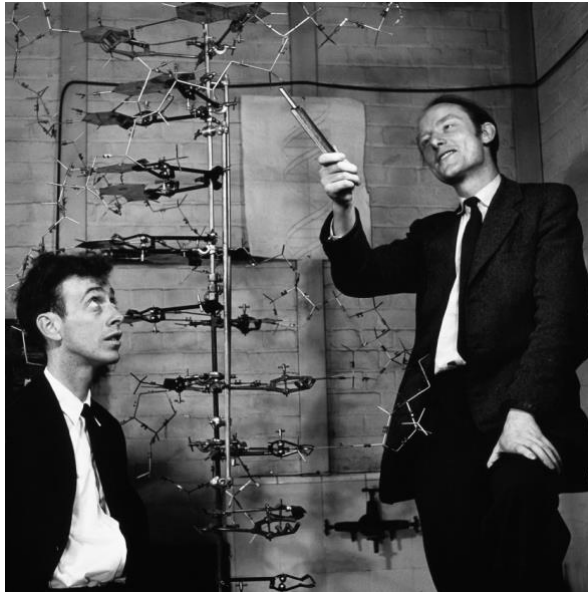
Already at work at King's College was Maurice Wilkins, a New Zealand-born but Cambridge-educated physicist. As a new PhD he worked during World War II on the improvement of cathode-ray tube screens for use in radar and then was shipped out to the United States to work on the Manhattan Project. It was Wilkins's idea to study DNA by X-ray crystallographic techniques, which he had already begun to implement when Franklin was appointed by Randall. The relationship between Wilkins and Franklin was unfortunately a poor one and probably slowed their progress. (<https://www.sciencehistory.org>)

## **12. James Watson and Francis Crick**

In 1951, 23-year-old James Watson, a Chicago-born American, arrived at the Cavendish Laboratory in Cambridge. Watson had two degrees in zoology: a bachelor's degree from the University of Chicago and a doctorate from Indiana University, where he became interested in genetics. He had worked under Salvador E. Luria at Indiana on bacteriophages, the viruses that invade bacteria in order to reproduce—a topic for which Luria received a Nobel Prize in Physiology or Medicine in 1969. Watson went to Denmark for postdoctoral work, to continue studying viruses and to remedy his relative ignorance of chemistry. At a conference in the spring of 1951 at the Zoological Station at Naples, Watson heard

Wilkins talk on the molecular structure of DNA and saw his recent X-ray crystallographic photographs of DNA. He was hooked.( <https://www.sciencehistory.org>)

**watson-crick-dna-model.jpg**



James Watson and Francis Crick with their DNA model at the Cavendish Laboratories in 1953.

[www.photoresearchers.com](http://www.photoresearchers.com).

© *A. Barrington Brown*.

Watson soon moved to the Cavendish Laboratory, where several important X-ray crystallographic projects were in progress. Under the leadership of William

Lawrence Bragg, Watson and Crick rapidly put together several models of DNA and attempted to incorporate all the evidence they could gather. Franklin's excellent X-ray photographs, to which they had gained access without her permission, were critical to the correct solution. The four scientists announced the structure of DNA in articles that appeared together in the same issue of *Nature*.

## My Testimony

My childhood dream was to do medicine; unfortunately I was not able to pursue that dream. So, I chose B.Sc Zoology which I thought was equivalent to Medicine. In the first year of my college, Zoology didn't impress me very much, however in the forthcoming years I fell in love with it and subsequently did my Masters, M.Phil and Ph.D in Zoology.

I loved Zoology and Zoology loved me back and it has given me great success in my career which wouldn't have been possible if I had done Medicine.

This book is a work of love to express my gratitude towards Zoology.

I'm sure you will have a wonderful and successful career in Zoology. All the best!