

The Book of Naturalists

An Anthology

of the Best Natural History

BY

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PREFACE

THE DEVELOPMENT and growth of natural history are reflected in the writings of many naturalists, from Aristotle to the present day, and the inspiration for these writings comes from interest and love of living animals and plants observed under natural conditions. Other fields of science, such as classification, anatomy, and economic biology, all have their distinguished exponents, but these are beyond the scope of this book.

The work falls rather naturally into two parts. The first deals with the very beginnings of natural history, its roots, its foundations as discerned in the early gropings of those primitive men who had distanced their ape-like predecessors, stood firmly erect, looked around, and been able to say, or at least think: "I am I." From Aristotle, the greatest naturalist of all early times, we pass in review the painfully slow development of natural history through the Middle Ages and beyond the Renaissance.

Part Two begins with Darwin, the second landmark of greatness, and extends from the date of the *Origin of Species* to the present day. Here we have the flowering, the fruition surmounting the roots and the trunk of the Tree of Knowledge. Among this exciting company of naturalists, some, with the greatest reputations and achievements, have provided the least quotable words and phrases; others, whose names will be almost or quite unknown to many readers, are here because, as Kipling puts it, "The magic of Literature lies in the words, and not in any man."

The cave paintings of the Dordogne provide us with the inception of natural history, and the middle of the fourteenth century initiates the beginning of inspired ability to write about it. Steadily, up to the present moment, there has been an ever continuous progression in increase of knowledge, an evolution worthy of comparison with that other evolution of animal life on our planet — the foundation of all our labors and our love of science. All this has taken place in spite of numberless plagues, famines, revolutions, and wars throughout human history. No corresponding menace or peril, however global, now or in the future, can ever put an end to this advance of the mind and the spirit of man.

I have asked and received help and valuable suggestions from a host of friends, but Miss Jocelyn Crane of my scientific staff has been of such pre-eminent assistance that her name should rather be on the title page as co-author than merely as recipient of my sincere thanks and appreciation.

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The rereading of several hundred volumes as prelude to selection or rejection has resulted in a varied stirring up of emotions. Some old favorites proved to be impossible of acceptance. Others were subjectively absorbing, full of vital interest, but because of technical or beclouded diction quite inappropriate when judged for selective quotability. Still other authors, almost forgotten and of doubtful remembered value, proved more than adequate in scientific soundness and literary quality. Original spelling and syntax have of course been preserved.

These labors of an anthologist are and should be full of pleasure, but his reward is invariably lost in sarcastic if not acrimonious criticism both of omission and of commission. This, too, is as it should be, since the personal equation is so great. More than once I have been strongly tempted to base a decision on the toss of a coin, and I should have been wise to include several blank pages in each volume with an invitation to every reader to damn my selection and satisfy his personal convictions with his own choice.

My publishers allowed me one fifth of a million words as the maximum, so the size of the type should not afford discomfort to the reading eye. Before I knew it, my list of *musts* contained 248,000 words and I was not through. The subsequent cutting and slicing here and there was sheer mental agony. The list of authors as a whole could easily have been doubled and the book kept within limits, but this would mean unfairly short contributions instead of a more thorough presentation of subject, permitting a better appraisal of personality.

To make more real the acute difficulty, the cruel necessity, of choosing for an Anthology such as this I append a list of authors who were considered, any or all of whom might with propriety have been included. Of course this list in turn is far from complete: Albertus Magnus, Alcock, Aldrovandus, Allen, Banks, Bates, Belon, Boulenger, Buffon, Bullen, Bragg, Coues, Cuvier, Dewar, Eddington, Forel, Gibson, Gosse, Goethe, Gray, Haeckel, Hingston, Haldane, Jeans, Jefferies, Johnstone, Jordan, Kellogg, Lamarck, Lankester, Lewis and Clark, Lowe, Lubbock, Lydekker, Magellan, Marco Polo, Moseley, Moufet, Muller, Murphy, Peckham, Phillips, Platt, Poulton, Pycraft, Raleigh, Ray, Renshaw, Riley, Rondelet, Schmidt, Schomburgk, Sharp, Swammerdam, Teale, Thayer, D'Arcy Thompson, Vaughan Thompson, Wyville Thomson, Townsend, Turner, von Baer, Walton, Wells, Wilson, Wood.

The problem of sequence is easily solved. The reason for chronological and ordinal sequence depends not on the date of birth of the various naturalists, but on the date of publication of the quoted

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material. This represents, in the majority of cases, a high point in their creative output.

With so many equally excellent aspirants for inclusion, making choice perplexing, I gave weight to several considerations, such as wide distribution throughout time, nationality, geography, and subject matter. The result of this attempt may be judged from the following lists:

AUTHORS' PUBLICATION DATES BY CENTURIES

B.C. *Fourth*: Aristotle.

A.D. *First*: Pliny.

Eleventh: Theobaldus.

Thirteenth: Frederick II.

Sixteenth: Gesner.

Seventeenth: Leeuwenhoek.

Eighteenth: Réaumur, Linnæus, White, Bartram.

Nineteenth: Humboldt, Waterton, Audubon, Thoreau, Darwin, Wallace, Agassiz, Belt, T. H. Huxley, Hudson, Muir.

Twentieth: Maeterlinck, Fabre, Roosevelt, Thomson, Wheeler, Levick, Burroughs, Farrer, Stefansson, Akeley, Osborn, Digby, Seton, Roule, Eckstein, Heard, Ionides, J. Huxley, Chapman, Haskins, Peattie, Armstrong, Klingel, Carson.

NATIONALITIES OF AUTHORS

American: Bartram, Thoreau, Hudson, Muir, Roosevelt, Wheeler, Burroughs, Akeley, Osborn, Seton, Eckstein, Heard, Chapman, Haskins, Peattie, Klingel, Carson.

British: White, Waterton, Darwin, Wallace, T. H. Huxley, Belt, Thomson, Levick, Farrer, Digby, J. Huxley, Ionides, Armstrong.

French: Réaumur, Audubon, Maeterlinck, Fabre, Roule.

Swiss: Gesner, Agassiz.

Italian: Theobaldus, Frederick II.

Dutch: Leeuwenhoek.

German: Humboldt.

Greek: Aristotle.

Icelandic-Canadian: Stefansson.

Roman: Pliny.

Swedish: Linnæus.

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SUBJECT MATTER

Plants: Himalayan flowers (Farrer); first bacteria (Peattie); seed behavior (Peattie).

Protozoa: Leeuwenhoek.

Mollusks: oysters (Roule); pearls (Pliny); nautilus (Aristotle); octopuses (Klingel).

Arthropods: scorpion (Fabre); winged ants (Réaumur); ants' social ties (Haskins); army ants (Belt); bee swarms (Maeterlinck); termites (Wheeler).

Fish: eels (Aristotle); eel migration (Carson); torpedo and fishing frog (Aristotle); fierasfer (Roule).

Amphibians: tadpoles (Thomson).

Reptiles: tortoise (White); rattlesnake (Bartram).

Birds: penguins (Levick); guillemots (Armstrong); turkeys (Audubon); cuckoos (Aristotle); arctic owl (Stefansson); water ouzel (Muir); various species in England, the United States, and Patagonia (White, Burroughs, and Hudson, respectively).

Mammals: sloth (Waterton); monkeys (Wallace; Chapman); mice (Gesner); rats (Eckstein); bats (White); arctic foxes and polar bears (Stefansson); coatimundis (Chapman); sea otters (Seton); whale (Theobaldus); elephants (Pliny, Osborn, Akeley); mammoths (Digby); antelopes and zebras (Roosevelt); rhinoceros (Gesner).

Evolution of Man and His Brain: early man (Heard); comparison between animals and men (J. Huxley); growth of ideas about the universe (Ionides).

General Problems: evolution of species (Darwin); protective coloration and mimicry (Wallace); embryology and evolution (Agassiz); paleontology (T. H. Huxley); differences between the sexes (Aristotle); sleep (Aristotle); bird migration (Frederick II); aims, adventures, and tribulations of naturalists (Agassiz, Fabre, Hudson, Roosevelt, Akeley, Farrer); early classification (Linnæus).

GEOGRAPHY OF SUBJECTS (WHERE DEFINITE)

United States: Eastern (Bartram, Audubon, Thoreau, Burroughs); Western (Muir).

American Tropics: Panama (Chapman); Guiana (Waterton); Amazon (Humboldt); Brazil (Darwin); Galapagos (Darwin).

Southern South America: Hudson.

Central Africa: Akeley, Roosevelt.

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Europe: North Ireland (Armstrong) England (White; T. H. Huxley) ; France (Fabre, Réaumur) .

Asia: Himalayas (Farrer) .

Arctic Regions: general northland (Seton) ; far north (Stefansson) ; Siberia (Digby) .

Antarctic Regions: Levick.

Underwater: eel travels (Carson) ; oysters and their guests (Roule) ; diving and octopuses (Klingel) .

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THE BOOK OF
Naturalists



To Laurance and Mary Rockefeller

PART I

INTRODUCTION

IN THE very heart of Borneo I waited for my interpreter to return from a three-mile paddle down stream in search of a missing dug-out. From up the Rejang came two great war canoes filled with Dyaks, and soon several chiefs approached and began a friendly but utterly incomprehensible duet at me. Here we were, two types of human beings quite unable to communicate. I tore a page out of my journal and did my best to draw an argus pheasant. Before I had finished, heavy odorous breaths poured down my neck, and there arose a chorus of excited outcries. Vigorous noddings of feather-crowned heads indicated a unanimous burst of recognition: "*Ruoi burong! Ruoi burong!*"

I then delineated in uncertain outline three white eggs. Murmurs of negation and disagreement arose and grimy fingers sought to do something to my tremulous ovals. I crossed out one and the villagers' chorus arose affirmatively again. I erased another egg and the entire company expressed disapproval. All knew the argus pheasant and that it laid two white eggs.

This almost forgotten incident stands for me as typical of the first manifestation of communicated natural history on the earth. In the days of our cavemen ancestors, tens of thousands of years ago, in pre-Tegumai times, there were men typified by that "enterprising wight,"

Unusually clever he,
Unusually brave,
And he drew delightful mammoths
On the borders of his cave.

The first discovery of this prehistoric natural history was in itself interesting. A Spanish nobleman, searching a cave near his home in Santander, was bringing to light bones of extinct animals — horses, mammoths, and reindeer — when his attention was distracted by his little daughter who was sitting near. She interrupted his labors by her cries of "*Toros! Toros!*" and pointed to the roof of the cavern. There, painted in bright colors, was a whole herd, life-size, of deer, horses, and the ancient extinct bison of Europe. This was the first of many similar paintings found scattered through dozens of caves in southern France and Spain. Some of the animals were anatomically correct and artistically superb, and all were wholly unexpected products of these early, primitive peoples. This art perhaps antedated

any real language; certainly no written letter or word had been formed. It shows that our forebears had already passed beyond the stage when food and fear were the only bonds between them and the wild animal life which surrounded them. These admirable paintings implied the knowledge of a hunter, together with a certain leisure of life won by the beginning of human dominance of the earth. It was the inception of an artistic record of the history of nature — of natural history.

The only relics left by the earliest races of manlike beings are stone implements, and from age to age we find these increasing in complexity, adaptive symmetry, and cunning shape. Yet long before the end of the Stone Age, artists gave us these incredibly skillful drawings; mammoths, reindeer, bison, bears, horses, deer, wild boars and rhinoceroses, some grazing singly, others in combat or running at full speed. Sheltered within dry caverns, these pictographs have persisted unharmed, unchanged, their pigments still bright, although applied in days long before the last ice age, in an antiquity which makes the work of Egyptian artists seem ultramodern.

Think of the law of compensation of being a Stone Age youth, as compared with one of today: to him everything in nature fresh, a continual surprise, nothing named, the life of no creature printed in any book. Yet this point of view becomes real and reincarnated in any modern boy who is born a predestined naturalist. When he first sees, without knowing beforehand or why, the caterpillar changing into a chrysalis and this to a butterfly, or the tadpole-fish turning before his eyes into a land animal, nothing in later life can quite equal it.

To the primitive youngster there was added the exciting uncertainty of any possible rising of next day's sun, and the terror at the vanishing of leaves, insects, and birds at the beginning of what we call autumn and the onset of winter. Perhaps the boy had even the greater fear of a still more terrible end of all things when he was taken on a long trek to the south to avoid the onrush of glaciers — the whole world turning to ice.

Think of the thousands of lonely human beings in succeeding millenniums who must have been stirred by the beauty of wild creatures, tortured by the awakening desire in their dull minds to understand it all and then to express their thoughts in the slow evolution of picture writing and finally of words. With nothing but sticks and chipped flints for weapons, implements, and tools; with a bit of skin for clothing and a cave for a home; with dogs and horses and cows still wild and untamed; with wheat, corn, and fruit only scattered

weeds or forest trees; with wolves and other carnivores ever hungry, ever present dangers: to them the only classification of animal life was edible or inedible, dangerous or harmless. What honor we must pay to the patient founders of language and art, to the first, forever unknown naturalists, who did not know it themselves, but whose accumulated efforts slowly lighted the early history of what we now call China, Egypt, and Greece!

We have no record of the tribe or race or the time of the very first talk or writing. The earliest ape men such as the Heidelberg Man were without them, but little by little, sounds were made to stick to this and that; a picture was stripped of details and became a symbol. In that unscientific and wholly delightful tale of Kipling's, "How the Alphabet was Made," there may be more of truth than we shall ever know.

A short, slender man of forty years of age, showing already a hint of baldness, with fine features and head, and eyes bright with intelligence and interest, has fastened his tunic high up about his middle. He is wading on spindly legs in the beautiful, almost landlocked lagoon of Pyrrha on the island of Lesbos. Now and then he scrambles ashore and deposits piles of shells and other water creatures near his wife and little daughter. A group of pupils crowds about the small aquatic things, sorts them, and later listens absorbed in the words of their teacher.

If from this present year of 1944 we go back and back and back to the year 1600, when Shakespeare in his turn was about forty years old, we should find him, 344 years ago, at work on *A Midsummer Night's Dream*. If Aristotle, poking about in his Pyrrhic pool, could look forward 344 years, he would envisage the birth of Jesus Christ.

But now, all unconscious of the value of what he is doing and thinking, of the influence it will exert for two full millennia, this middle-aged, vital Greek labors in the evening by the flickering light of a bronze lamp, perhaps one of the graceful little Grecian ones which have recently come into use. Patiently he scratches with his stylus upon a long roll of papyrus. How wonderful if we could have a picture of Aristotle at work, or fragments of the papyrus itself!

We wonder on what day and under what conditions he wrote:

"Out of the Lagoon of Pyrrha all the fishes swim in wintertime, except the sea-gudgeon; they swim out owing to the cold."

"Of shellfish, and fish that are finless, the scallop moves with greatest force and to the greatest distance, impelled along by some internal energy."