CHAPTER I

INTRODUCTORY

I. 1

MAN AND NATURE

> There be many strange things, but the strangest of them all is MAN... Earth, Mother Earth, is from everlasting to everlasting...but Man fretteth and wearieth her; for he putteth his horse to harness, and his ploughs go to and fro in the furrow, even as the seasons come round. He spreadeth his snares for the silly birds; he gathereth the fishes of the sea in the meshes of his nets. Man surpassing in wisdom. By craft he over-reacheth the wild beast upon the mountain, and putteth to his yoke the long-maned steed, and the strength of the great bison.
>
> THOMPSON'S *Sales Attici* (Sophocles).

SINCE Man came to his own upon the earth, he has exercised with little restraint the power of his new wisdom over all created things. So widely and deeply has his influence spread during the hundreds of thousands of years of his wanderings, that it is wellnigh impossible to gauge its effects or to distinguish them amidst the workings of Nature as a whole. Change is apparent in the interrelationships of the plants and of the animals of a country with the passing of years; but who can say that here the heavy touch of Man alone has fallen, and that there only are subtle traces of wild Nature, wrought out through cyclic changes, alternations of climate, and through the processes of natural evolution in living things? The complications due to the action of contemporaneous natural agencies, together with the difficulties of obtaining evidence regarding the earlier periods of Man's existence make the ultimate analysis of Man's influence on Nature no simple task.

SCOTLAND PARTICULARLY FITTED FOR OUR STUDY

In some respects Scotland is particularly well fitted for our study, mainly owing to its geographical situation and geological history. In the first place man arrived at a comparatively late date within its borders. There is no evidence that the country was inhabited by the human race until long after the period of rude stone implements, the Old Stone Age, when man was already established in South Britain and in the majority of the European countries in the same latitude. His influence in Scotland, therefore, is limited to the New or Polished Stone Period and succeeding ages, distant enough though the first may seem to our modern historical view.

In the second place, Scotland has undergone, and in comparatively recent geological times, an experience unlike that of neighbouring countries. During the Great Ice Age, it was completely buried beneath a continuous ice-sheet, some 3000 feet thick, which effectually blotted out its earlier plants and animals. The Scottish flora and fauna are therefore recent acquisitions due to the immigration of living things when the ice-sheets were dwindling or after they had entirely disappeared. Further, owing to the fact that Scotland has for long been bounded on three sides by a broad sea, the fauna with which Nature stocked her at the close of the Ice Age has remained isolated, suffering, it is true, fluctuations which Nature has ordained or man has induced, but unaffected by that constant immigration and emigration—except in a few cases of the more mobile creatures, such as birds—to which continental countries are constantly liable.

The original post-glacial fauna of Scotland may be likened to a limited capital upon which man has traded. So far as he has been satisfied with the natural interest of the capital, the capital has remained as it was in the beginning[1], but this has seldom been the case. Often he has trenched upon it, and at times so deep have been his overdrafts that some items of the account have been seriously diminished or exhausted. At other times he has added afresh to the old capital, but in a new currency of his own introduction. Could we but assess the original animal capital

[1] We are here ignoring natural fluctuations.

which the Neolithic invaders of Scotland had at their disposal, a great step would be made towards gaining a basis from which to compute the influence of man upon the animal life.

In the third place, from its small size Scotland gains advantages in such a study; and this partly because the fauna of a small country is more compact, and its changes, as a rule, are more readily marked; and partly because Scotland's few degrees of latitude eliminate the possibility of temperature barriers, one of the most important and far-reaching of the climatic influences which complicate the fluctuations of animal life in continental areas.

And lastly, since the study of Nature gained a firm foothold, Scotland has possessed a succession of observers and recorders such as few countries of similar size and population can claim, naturalists whose labours form a solid foundation for the accurate estimation of the later changes in animal life.

METHODS OF ENQUIRY

To enquire into the doings of man is to investigate History, and the historical method enters largely into this natural history study. The foundation of our enquiry must be such records as the past has left us. The chronicled history of Scotland begins with the advent of the Romans on their northward progress through these islands in the first century of our era, but since, at that time and for many centuries thereafter, the records of even the great political events, of the doings of man with man, are vague and unsatisfactory, it need hardly be said that the dealings of man with animals seldom encumber the written page.

Even in the "historic period" therefore, the beaten tracks of historical knowledge have to be forsaken, and appeal has to be made to the relics man has left in his long-forsaken homes, to the casual pictures he has carved, often with hand and eye of wonderful skill, to the tales of travellers, many from foreign lands, who described the features of Scottish animal life which struck their fancy as differing from those familiar to them, and to the records of unusually outstanding natural phenomena which, on occasion, our

own political historians of former days condescended to notice.

But even the sparse and slender guide-posts of early chronicled history fail us in the ages (seven thousand years or more) which intervened between the coming of man to Scotland and the Christian era. Glimpses of this long-forgotten past can be gained only by piecing together the evidences left by animals and man himself, from bones and relics discovered by systematic excavation or by lucky chance in beds of marl, in the layers of peat-bogs, in the deposits of caves, in the kitchen-middens or refuse food-heaps of the early inhabitants, and in the structures built by man for defence, or for interment of his hallowed dead.

Pictures of Scottish animal life in successive ages having been gleaned from these varied sources, simple comparison of one with another and with the fauna as it is known to-day will reveal the vast changes which have taken place. Yet still a problem lies before us—that of sifting from the totality of change the effects due to the influence of man as distinct from the inevitable changes wrought by time in all Nature, animate and inanimate. In working out this problem reference will be made on occasion in the following pages to outstanding cases in other lands which help to illustrate man's influence and to explain the effects of his dominance in Scotland.

MAIN DIRECTIONS OF MAN'S INFLUENCE

Man has been described from one point of view as an instrument of destruction and from another as a creative agent. The truth of the matter as regards his relations with Nature is that he is neither all in all a destroyer nor a creator, but exercises his powers mainly as a transformer and a supplanter. Wherever he places his foot, wild vegetation withers and dies out, and he replaces it by new growths to his own liking, sometimes transformed by his genius for his own use. Where he pitches his tents and builds his cities, wild animals disappear, and woodlands and valleys where they sported are wrested from their prior owners and given over to the art of agriculture and to animals of man's own choosing, as well as to a host of camp-followers,

which attach themselves to his domestication whether he will or no. Intentionally and unintentionally, directly and indirectly, man transforms and supplants both animal and vegetable life. Some animals he deliberately destroys, some he deliberately introduces, and the characters of some he deliberately transforms by careful selection and judicious interbreeding. Other animals find his presence uncongenial and gradually dwindle in numbers or disappear, while others are encouraged by his activities to increase in numbers, sometimes even to his own confounding.

I. 2

SCOTLAND AS MAN FOUND IT

> Heir agane sall ye se braid planes, thair wattirrie dales: heir a dry knowe, or a thin forrest, thair a thick wodd, all meruellouse delectable to the eye throuch the varietie baith of thair situatione, and of the thing selfe that thair growis.
>
> Historie of Scotland by Jhone Leslie, 1578.
> (Dalrymple's Translation.)

As a preliminary to the detailed consideration of man's influence upon Scottish animal life, let us try to picture the condition of the country as primitive man found it, when in his northward wanderings his communities ventured beyond the natural boundary of the Cheviot Hills. Only with such a picture at the back of our minds can we hope to realize the changes which man has wrought in the passing of time. Before trying to gauge the extent of man's trading, we must endeavour to assess the capital which Nature placed in his hands to begin with.

THE ARRIVAL OF MAN IN SCOTLAND

Notwithstanding that even in the more distant stages of the Early Stone Age, man had travelled dry-shod from the land that is now France, across the grassy valley that separated the main mass of Europe from its western prolongation which is now the British Isles, there is no sure sign that his wanderings in Palaeolithic times ever brought him to the southern limit of Scotland. For tens of thousands of years he dwelt on the plains of England, leaving his handiwork—rudely dressed stone implements of various types which fall into a long range of stages from the early Chellean to the late Magdalenian or Reindeer period—scattered over those southern portions which lay clear of the heaviest and most persistent ice-fields of the Great Ice Age. But the northern portions of these islands, still shrouded

in their glaciers, offered no attractions to the hunters of the Early Stone Age, and the period of the great glaciation seems to have long passed away, with its mammoths, woolly rhinoceros, musk-oxen, cave-bears and lions, before man ventured to follow the retreating glaciers northwards beyond the Cheviots.

The earliest relics of man's handiwork in Scotland consist mainly of implements of bone or horn, flattened harpoon-heads, with long and well-shaped barbs on both

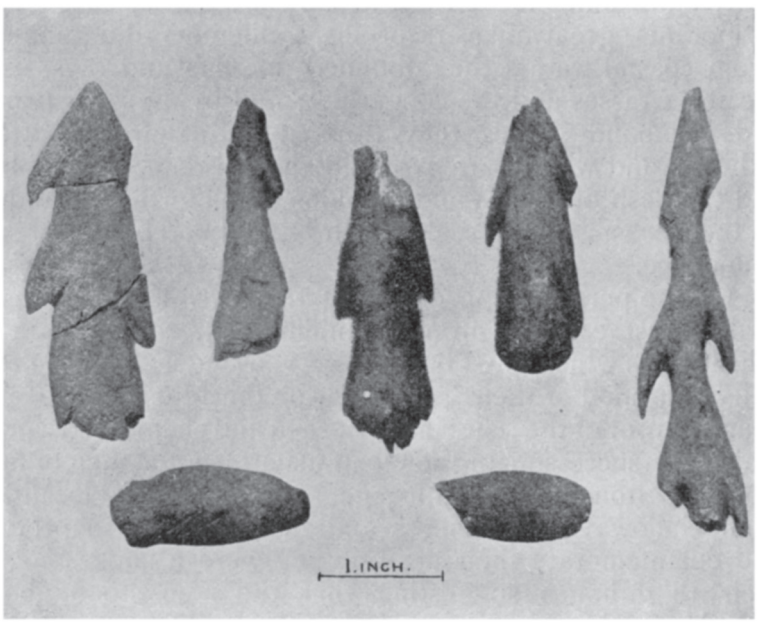

Fig. 1. Bone harpoons of Azilian type from prehistoric settlement in Oronsay. $\frac{2}{3}$ nat. size.

sides, and rough pick-axes carved from the antlers of red-deer. Implements of stone and flint-chips, rudely dressed, have also been found, but their numbers are too few and their characters too indefinite to point clearly to their place in the recognized cultural stages of European man. The characters of the bone implements (Fig. 1) indicate in a general way the *Azilian* period, a stage regarding which little is known, although it may be placed at the opening of the Polished Stone or Neolithic Age, or at any rate

between that and the definite later stages of the Palaeolithic epoch. These earliest inhabitants of Scotland were hunters, fowlers and fishers. They possessed no domestic stock and there is no evidence that they tilled the ground or cultivated corn. Yet their craft furnished a well-stocked larder, as their kitchen-middens and other relics in Scotland show[1]. They gathered from the sea-shore in great variety edible shell-fish—crabs, and mollusca such as limpets, whelks or buckies, periwinkles, mussels, oysters, cockles, scallops and razor-shells. The foreshore and sea-cliffs supplied them with many kinds of birds—wild-ducks, geese, shags and cormorants, great auks, razorbills, guillemots and gannets. From coastal waters they obtained dog-fish and rays, sea-breams, wrasses and the conger-eel; and by the river-banks and woodland glades they trapped and slew the otter, red deer and wild boar. Nor did they disdain the blubber and the flesh of whales and dolphins which fortune stranded on their coasts, or the seals which basked and bred there in abundance.

Of the personal appearance of the early settlers we can form a just estimate from examination of the skulls and other bones which have been preserved underground in the neighbourhood of their habitations at the MacArthur Cave near Oban, or of the relics in the horned and chambered cairns which the successors of the Oban fishermen, the men of late Polished Stone or Neolithic Age, built in scattered localities from Galloway to Caithness and the Orkneys, to protect and commemorate their dead. They were a short people, their thigh-bones suggesting that the men stood about 5 ft. 4½ in. high, and the women about 5 ft. 1 in.—some 2 or 3 inches below the standard of a modern Briton. Their lower limbs differed from ours and resembled those of some of the more primitive races of man at the present day, with thigh-bones flattened, shins compressed from side to side, and the bones of foot and ankle more compact and stouter—all adaptations for strong and rapid movement, indicating that the people lived an active strenuous life. In facial expression, they differed only in small degree from ourselves. Their heads and faces were long and narrow, their foreheads

[1] The following account contains references to such animals and plants only as have been identified in Scottish deposits of the periods mentioned.

fuller and rounder than ours, the bridge of the nose and nostrils moderately narrow, and their eyes rather narrow and elongated. Their jaws were square and their front teeth, instead of overlapping as do ours, met firmly edge to edge. So regular and healthy were their teeth, a necessity for a primitive life, that they show only a wearing down due to constant use, and seldom or never any signs of the decay or caries which has given rise in our generation to armies of dentists and the science of dentistry.

The earliest traces of these primitive peoples in Scotland are associated with the so-called "Fifty-Foot Beach." Their canoes, simple dug-outs of pine, have been found at Perth in the Carse clays of this period, and frequently in similar deposits in the Forth and Clyde valleys. Some of their implements were left beside the remains of a whale, stranded in these far-off days on a shore which is now part of the fertile Carse of Stirling, and, as Dr B. N. Peach has pointed out, their kitchen-middens lie along the ridge of the Fifty-Foot Beach in the upper reaches of the Forth, never occurring in the lower seaward ground—a clear indication that at the time the refuse heaps accumulated, this Beach was the limit of high water whither the kitchen-middeners retired to feast upon the shell-fish collected at low tide.

THE PHYSICAL CONDITION OF SCOTLAND

What, we must ask, was the Scotland in which the Azilian or Early Neolithic peoples settled after their wanderings through Britain from the continent of Europe? As compared with its condition at the present day, the land was depressed relative to sea-level, all the shore area that lies beneath a contour-line varying in different areas from 35 to 65 feet being submerged by the ocean. Where the coast is bounded by high cliffs, this depression would have had little effect on the outlines of the country, but where the land shelves gradually to the sea, as in many parts of the Moray Firth and in the great valleys of the Tay, Forth and Clyde, the sea made considerable encroachments upon the land. So it is that while the Fifty-Foot terrace is generally represented on the west coast, as in the islands of Jura and Mull, by a comparatively narrow ledge, cut in the cliffs by

wave action during what must have been an extended period of time, the old shore is represented in the midlands by the Carse lands of the Forth valley, a fertile plain more than three miles wide above Stirling, and extending as far as Gartmore, some 17 miles beyond that town, and on the Clyde by level terraces which can be traced beyond Dalmuir on the north and Paisley on the south.

To the first-comers the inland landmarks of Scotland must have appeared almost as they are to-day. The hills and valleys had already been carved into their present aspect. True, the rivers were swollen in volume and many of the lakes, ponded back by the debris of the old glaciers, were greater than now, while many low-lying areas, now fertile plains, were bogs and marshy flats; but the ice-fields of the Great Glaciation had disappeared, although a recrudescence of colder conditions had again clad the mountain-tops in snow and filled the higher valleys with moving sheets of ice.

CLIMATE AND VEGETATION

The period during which the Fifty-Foot terrace was being carved out or levelled up by the sea was a prolonged one, and in it Scotland underwent drastic changes of climate. At exactly what stage in the formation of the Fifty-Foot Beach man appeared upon our shores, it is impossible to say, but it is certain that the conditions which immediately followed the retreat of the great ice-sheet had long passed away. The Arctic climate had gradually been replaced by one at least as temperate as that of to-day; distinctive Arctic plants, such as Arctic Willows (*Salix repens* and *polaris*), Arctic Birch (*Betula nana*), Crowberry (*Empetrum nigrum*), Creeping Azalea (*Loiseleuria recumbens*), and Mountain Avens (*Dryas octopetala*), all of which occurred in late glacial times on low ground at Corstorphine in the neighbourhood of Edinburgh, had deserted the lowland valleys and followed the line of the dwindling snowfields to the hill-tops. With the rising temperature, forests of Silver Birch, Hazel and Alder clad the lowlands and spread up the mountain-sides, at least to an elevation of over 1500 feet above sea-level.