

ON THE NATURAL HISTORY AND GEOGRAPHICAL
DISTRIBUTION OF LIVING AND EXTINCT
BEARS.

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THE contracting of the range and feeding grounds and diversities of food and climate, from far back geological epochs up to the present day, have unquestionably influenced not only the bulk and outward aspect, but also modified the bony skeleton of many animals.

With reference to the Bear Tribe, which is only one of many examples, we find that the largest specimens of fossilized individuals discovered in European caverns, surface soils, and in bogs are relatively much larger than any instance among living species, only very bulky examples of the grizzly bear (*U. ferox*) being comparable, and they fall short as regards dimensions. A comparison between the smaller fossil cave bear (*U. priscus*) and the brown bear (*U. arctos*), shows that if not identical they were closely allied; indeed, taking into consideration the various modes by which animals have been expelled from their ancient haunts, there seems good cause to suppose that these two bears claim a common ancestry. According, therefore, to the above view it may be fairly advanced that the grizzly bear was at one time common to Europe and North America. Again, considering the relative degrees of ferocity of living species—and in these respects they differ specifically to some extent—it is well known that the grizzly bear is the only one which will attack man unchallenged; indeed, the Arctic, brown, black, and sun bears, &c., rarely assail him, unless when pressed, as in case of wounds, or in guarding their young. We may believe, therefore, that primeval man would have waged a deadly warfare against so conspicuous and powerful an enemy, and would have exterminated the more ferocious bears, thus leaving the brown bear (*Ursus arctos*) to pursue its ways and frequent its ancient haunts, until advancing civilization in Europe finally repelled it to a few mountainous and secluded regions. The alliance between the brown and grizzly bears is

close, but not sufficiently intimate to lead naturalists to consider them one and the same species. In size of course the latter is superior, but now and then individuals of the brown species are met with in Asia, if anything, only slightly less bulky. These, however, are exceptions, whereas the remains of the great extinct cave bear (*U. spelæus*) show that the average dimensions of the animal exceeded considerably that of any recent species. Now to return to the geographical range of the brown bear (*U. arctos*). In Asia it is spread over Siberia and the Himalaya. On the latter chains, probably from a long sojourn in the snowy regions, its fur has become more fulvous; hence the appellation of Isabella* and white bears bestowed on the denizens of the Cashmere and more eastern ranges. This aberrant form of a well-known animal, the fur of which generally varies from a dark brown to even black, such as obtains in the bears of Northern Europe and Asia, is intensely instructive to naturalists, who, for lack of better information, are often compelled to bestow specific names on slender foundations. A still lighter coloured variety (*U. syriacus*) is met with on the mountains of Eastern Turkey and the Caucasus. In America, in the Aleutian Islands, there are "brown and red bears,"† which, unfortunately for our wants, are not yet described with greater accuracy; it is, however, recorded by Sir John Richardson, that "the barren lands lying to the northward and eastward of Great Slave Lake, and extending to the Arctic Sea, are frequented by a species of bear which differs from the American black bear in its greater size, profile, physiognomy, longer soles and tail, and from the grizzly bear also in colour, and the comparative smallness of its claws. Its greater affinity is with the brown bear of Norway, but its identity with that species has not been established by actual comparison. It frequents the sea coast in the autumn in considerable numbers for the purpose of feeding on fish."‡

* This shows how cautious naturalists should be in giving specific names to objects from imperfect materials. Dr. Horsfield, in the "Linnæan Transactions," vol. xv., p. 334, from a mutilated Nepal specimen sent to the Museum of the India House, enumerates, among other characters, that this so-called *U. Isabellinus* has its "claws small and straight." Now I have shot or examined, I may confidently state, upwards of one hundred specimens, and can assert that the claws on the fore feet are fully curved, and on the hind feet that they are small but curved. The question contemplated by this distinguished traveller and naturalist at the time was, whether or not the above bear was a tree-climber. Now, although it does not often ascend trees, the curved claws are of great utility in preserving its footing on glaciers and soft or yielding soil, and on rocky declivities.

† Langsdorff's "Voyages and Travels," vol. ii., p. 74.

‡ "Fauna Boreali Americana," p. 21.

The point, however, still unsettled is, whether or not this "barren-ground bear" is identical with the brown bear of Europe, and whether or not, in conjunction with the grizzly bear, the two represent the same species which were spread over Europe in prehistoric times. Referring to species which have ceased to exist; although much remains to be done, a great deal of valuable information has been gained in relation to the natural history of extinct bears from a study of the characters and habits of the living. Thus, among the most puzzling features in connection with the remains of extinct fossil bears, met with in caverns, are discrepancies in size between the teeth and bones of adult individuals. So marked is this that palæontologists cannot believe that they represent large and small varieties of one species; considering, however, the advantages enjoyed by the progenitors of the present tribe of the members and the contracted range and food of the latter, there seems good reason to suppose as regards dimensions that the bears, like deer and several other animals, have absolutely degenerated, and are decreasing in size. Indeed, everyone who has examined the remains of the associated quadrupeds found along with the exuvæ of fossil bears, lions, and so forth, must believe that all fed sumptuously in those days, and also attained to the maximum dimensions of their species.

I found that the Himalayan brown bear was subject to much diversity in dimensions, so much so that certain old males presented remarkable contrasts to smaller-sized adult individuals of both sexes, as much, in fact, in the bony skeleton and outline of the cranial ridges as in coloration; moreover, so marked are these discrepancies, that supposing their skeletons had been found in a fossil state, the comparative anatomist could scarcely be blamed who pronounced them to belong to different species. Again, I found that the largest or patriarch bears are more addicted to passing their latter days in caverns than are the younger and more active. This was demonstrated by the appearances of their retreats, which are met with in secluded mountain forests, where the den is situated either under a shelving precipice or in the rock, from whence the owner descends daily to the sward below, where, after browsing until mid-day, it is a habit of the individual to repair to the neighbouring spring, usually shaded by trees, and wallow in the muddy water. In consequence the sides of these pools are beaten and plastered like a beaver-dam, whilst from the margin leading towards the den are deep impressions in the turf, caused by the animal constantly treading in the same footprints.* Thus it pursues the even tenor of its ways, hybernating in the den

* Author, "Wanderings of a Naturalist in India," p. 241.

for nearly half the year, and dividing the remainder between a circumscribed feeding ground and the pool, until, dying in its lair, the body either crumbles into decay, or is partly or entirely covered over by calcareous drippings from the roof of the cavern, or by *débris* washed in from the decomposing surfaces above or around the external opening. Upon the top of this deposit other generations of bears might appear and disappear, and so on for ages, the retreat becoming either the abode of the parturient female, or the hybernating den of one or many individuals. Let us see how such data apply to bygone epochs, as displayed in the ancient bone caverns of England.

In the report on the exploration of Brixham Cave, near Torquay, Devonshire,* Mr. Busk has determined, from deviations in dental characters and size, what he believes to be no less than three species of bears, viz. the great cave bear (*U. spelæus*), the grizzly bear (*U. ferox fossilis*), and the common brown bear (*U. arctos* vel *U. priscus*). One circumstance connected with the ursine remains struck him as remarkable, and that was "the number of instances in which bones obviously belonging to the skeleton of the same animal were found collected together in one spot," thus indicating that the carcasses had been either conveyed into the cavern by other carnivores, or that the bears had died there. Again, with reference to this ancient British emporium of extinct animals, we find him adding, "There can be little doubt that amongst the bears' relics, as with those of the hyena, some at least must have belonged to animals which habitually used the cavern as a place of refuge, and especially, perhaps, at the time of parturition, and when they were nursing their young."

In further support of the latter statement it may be observed that the young are invariably born before the she-bear leaves her winter retreat, and that they often accompany the parent for two years. Of course, a den or cavern may at any time become the retreat of divers carnivorous quadrupeds; much depending on how the various sorts predominate. Thus, for instance, in a country where lions, tigers, hyenas, bears, and so forth are common, it might just happen that one or other will retain alternate possession of the retreat and drag its prey thereunto, so that the exuviæ might get intermingled. In Great Britain, in the days when such caves as Kirkdale,† Brixham, Settle,‡ the Gower Caves § of South Wales, and Kent's Hole,||

* "Philosophical Transactions," vol. clxiii., p. 471.

† Buckland, "Reliquiæ Diluvianæ."

‡ Tiddeman, "Geological Magazine," vol. x.

§ Falconer, "Palæontological Memoirs," vol. ii., p. 525.

|| Vivian's "Cavern Researches."

were tenanted by wild quadrupeds, many of which are either now extinct or have been repelled to distant lands, it appears, if we are to judge not only from the variety but also the dimensions of many of the remains, that the British area then, whether insular or connected with the Continent, was overrun by the larger mammalia, to wit, the lion, hyena, bear, deer, hippopotamus, rhinoceros, elephant, ox, and bison, not to speak of hosts of smaller mammals. Now, on the Himalayas the chief predatory quadrupeds have more or less a hard struggle for existence, owing to the comparative paucity of, and difficulty in procuring subsistence as compared with herds of deer and the like in less alpine situations. The plantigrade bear is especially at a disadvantage in this respect, and we need not therefore be astonished to find that it subsists chiefly on vegetable food. Hence modifications in the characters and position of the teeth are likely to occur under the changed habits of life; indeed, considered as an exponent of discrepancies in the dental construction of extinct mammals, it is of the utmost importance to fully realise similar contingencies. Thus, in relation to the food of recent species, we find the grizzly bear still clinging to the haunts of the buffalo on the prairies and plains of the West, but destined at no distant period to be swept off the Continent, whilst the American black bear, essentially a vegetable feeder, will linger on just as may have happened in Europe with the cave bears and the *Ursus arctos*. Indeed, what is now going on in the New World in relation to the extinction of many of the wild quadrupeds, to wit, the bear, beaver, elk, &c., was accomplished in Europe before the historical period. But the statement is not quite correct that the black bear of North America is partial to vegetable food, inasmuch as both it and the barren-ground bear, when compelled by dearth of vegetable food, repair to the sea-shore and feed on marine animals; moreover I have seen the brown bear on the Himalayas, soon after coming forth from the long winter siesta, make attacks on cattle and horses, and when hard pressed for early plants which had not had time to spring up, even devour the carcase of one of its own species. In fact, bears will eat almost any description of food.

With reference to their constitutional peculiarities. The hybernating species seem to possess very sensitive nervous centres both as regards extremes of heat and cold; even the Polar bear is said to occasionally fall into a lethargic condition in mid-winter. No doubt, therefore, from the abundant remains met with in caves, that the extinct forms also hybernated; not from scarcity of food, but on account of climate and their particular organization. One of the most trying ordeals in the Canadian forest during midsummer is the annoyance occasioned by mosquitoes and the still more venomous black fly. Neither man

nor wild beast enjoys any particular exemption from these persistent tormentors. The amateur fisherman is often compelled to give up his pastime at the most tempting moment, and the woodcutter is driven into the clearings, and the bear and elk into the lakes. In Asia at the same season it is also a common occurrence to see the Himalayan brown bear basking or sound asleep on the melting surface of a glacier, as much to escape the torments of insects as for coolness; in fact, this species does not display a sufficient pliability of constitution to enable it to withstand extremes of heat and cold. Now, whatever may have been the character in these respects of such of its compeers as the cave lion and the hyena in pre-historic times, their present descendants have become restricted to warm regions, although the tiger, so closely allied to the former, is a native of northern as well as middle and southern Asia. Indeed, in attempting to speculate on the nature of the climates during the cave periods, from a knowledge of the present characters and haunts of living species, we must always bear in mind the examples of the hairy mammoth and rhinoceros, but for the discovery of which it would still be a wonder how, if like their naked representatives, they could have withstood the rigours of northern winters. Probably the hippopotamus of those days was also covered with thick fur, and the shaggy mane now restricted to the lower and fore parts of the lion may have been continued, more or less, over the entire body. Again, naturalists are apt to associate the reindeer with Arctic climates, and argue that similar conditions must have prevailed at one time in the South of France, where the fossil remains of this animal have been discovered. But although the climate was, no doubt, more rigorous then than at present, there is no need that it should have equalled that of Lapland of the present day, inasmuch as the caribou or woodland reindeer was common in the New England States of North America within the last two hundred years, and I found it plentiful in the forests of New Brunswick, latitude 45° N. Indeed, if we were to suppose western Europe covered with forest trees, whereby the mean temperature would be lowered, there is nothing to have prevented the animal from migrating in the colder portion of the year from Norway to the shores of the Mediterranean, just as Richardson* found the barren-ground reindeer traversing similar distances in northern Canada.

It has just been stated that the fossil bears met with in caverns of Germany are demonstrably much larger than either fossil or recent specimens of the grizzly bear. It is the case, also, that skulls and bones dug out of bogs in Great Britain far

* "Fauna Boreali Americana."

exceed the dimensions of any living representatives of the brown bear, but approach in this respect to the former; so that, considering the comparatively modern histories of many of the deposits of these fens and turbaries, it has been surmised by Mr. Busk, in his admirable report already referred to, that the grizzly bear lingered on in England and Ireland to comparatively speaking recent times, probably up to the pre-historic epoch, when the deer and bovine tribes were plentifully distributed over the country. Now, considering that all these fossil bears were co-existent, and taking into consideration that they were placed, more or less, on the same footing as regards food, it can scarcely be that the small were degenerate descendants of the large, the differences in size being too great for such a supposition, unless we are to believe that a far greater variability existed then than now, in which case degeneracy would have been a marked character in many species. We might believe, however, from the great tendency to variation in dimensions and colouring already pointed out in the case of the brown bear, and the cavern-haunting propensities of the larger or aged individuals, that the great fossil cave bear (*U. spelæus*) stood in much the same relation to the *U. ferox fossilis*, and was only a large variety of the latter, just as, in all probability, the so-called "gigantic urus" stood to the "great wild bull" (*Bos primigenius*). In fact, abundance of food and unrestricted freedom are as necessary conditions of the prosperity of an animal as the contrary produces a stunted and deteriorated race. What long ages have passed away since the beaver built its dam on the banks of the Thames, or the hippopotamus, elephant, and rhinoceros fed on its banks; when herds of enormous oxen, deer, and the like pastured freely over the country, before man had invented any more deadly implement than a flint arrow or a stone hatchet? Finally, we come to the mutations in the physical aspect of the continent, together with the subsequent struggles for existence and gradual disappearance of the species until only the deer-wolf and brown bear remain of all the large animals which then frequented Europe. Indeed, it is only necessary to survey the remains found in England alone, to become satisfied that the large assemblages of carnivorous and herbivorous quadrupeds were denizens of the area, at a period when our island was not only a portion of the continent of Europe, but when its climatic and topographic conditions must have been different from what obtain at the present day.

None of the following species of bears have hitherto been discovered in fossil states. This circumstance, however, may be owing more or less to the fact that the soils of the countries they frequent have not been subjected to the same searching scrutiny

as those of Europe in general and Great Britain in particular ; at the same time, it must be observed that although caverns are common in North America, no traces have yet turned up of the grizzly bear, indicating either that its progenitors were not cavern-haunting, as in Europe, or else that the animal is a far more modern occupant of the Continent. The same may be said of the American black bear, which is restricted to the temperate latitudes ; and although disappearing with the forests, was, within the historical period, very plentiful from Mexico northwards to the confines of the Arctic Circle. This species, like the brown and grizzly bears, presents the same variability with reference to colouring and texture of the fur ; the Polar bear (*U. maritimus*) being the only one of the family that preserves regularity in these respects. Its food is also more uniform, and being restricted to the Arctic regions there are not the same influences affecting it as with the preceding, spread over vast continents which differ much in climate, aspect, and natural productions. Although many bears vary very much in outward appearance and osteological characters, we find, as in equine and feline species, a general disposition to particular markings on certain parts of the body. For example, the spinal and shoulder stripes so distinctly defined in the zebra, repeated in the ass, and now and then appearing in the horse, are represented by the light-coloured shoulder and brisket markings in the bear tribe so well seen in the black and sun bears, whilst in the brown and grizzly the collar is faint and scarcely discernible, unless when the winter is being replaced by the summer fur.

The well-known long-nosed bear (*U. labiatus*) of Hindostan, so distinct in osteological characters from any other member of the genus, retains also the white mark on the front of the chest. Whatever may have been the distribution of this species in pre-historic epochs, it is now restricted to the torrid regions of the above country. Reverting to the North American black bear, we find the white spot is only occasionally present on its brisket ; and better defined on the black or spectacled bear of the Cordilleras (*U. ornatus*), a species distinct in several respects from the last, and more closely allied to the black bear of Asia, the nearest habitat of which is in the East Indian Islands, where it is known as the *bruang*. From thence it extends northwards to Eastern Siberia, over 45 degrees of latitude, and throughout countries differing very much in physical and climatal conditions ; moreover, excepting that its fur is longer and thicker in the temperate than torrid regions, there is little difference either in the coloration of the pile or in osteological characters. However, like varieties of the brown bear met with in regions wide apart, it has received various names, which are now classed under the one

common appellation of Malayan bear. The animal is also plentiful along the southern slopes of the Himalayas, from whence specimens sent to Cuvier were described by him as a new species, and named "Thibet Bear," whereas the species is not met with in that elevated region. The white mark on the brisket of the South American black bear (*U. ornatus*) and the above is very much alike. It assumes the shape of a crescent, and to the hunter is an excellent point at which to direct his rifle.

Along the base of the chains which encircle the Valley of Cashmere there is an intercommunication between the black and the afore-mentioned isabel-coloured bear; in fact, here is a border line where the two meet and dispute their footing; so that in autumn, when the jungle fruits are plentiful and the Indian corn and other grains are ripening, the latter, descending from his alpine retreats, pushes southwards into the valleys frequented by the former for the purpose of feeding on walnuts, mulberries, and wild apples. Now, considering the specific differences between the two, and that the brown is the larger, it is a fact of which I had ocular demonstration that the black bear no sooner sees his antagonist than he boldly attacks him, and compels a retreat. Indeed, it is a common occurrence in secluded valleys to observe the Malayan bear in an apple or walnut-tree greedily devouring fruit, whilst his brown compeer is feeding on whatever happens to be knocked down, but no sooner does the former descend than the latter decamps into the jungle. A similar competition between allied forms of the same genus takes place at higher elevations on these ranges. There the ibex and great horned wild goat establish themselves on certain feeding grounds and dispute each other's footing, so that the two are rarely seen on the same mountain; in fact, the rule is more or less universal, and the competition is always most severe between allied forms; but, strange to say, it is not invariably the most powerful animal that is victorious; nor does it appear why or wherefore. At all events, this enmity has among other effects that of both contracting and extending the range of species, and when applied to the study of the geographical distribution of living and extinct forms it enables us to understand how an animal may be checked in its advance, driven back, or even exterminated by one of its own genus.

In tracing the geographical distributions of living and extinct bears we naturally wonder how the grizzly found its way to America, and how the black bear of Asia gained admittance into the East Indian Islands. The only reply is that the Aleutian Islands are remnants of a sunken area which united the New and Old Worlds, and that the Malayan peninsula ex-

tended further southwards; moreover, as just observed, the same is applicable to Great Britain and Ireland. Thus through mutations in the relative conditions of sea and land we find that many species accustomed to roam over vast tracts of country became restricted to small islands; and to the bear tribe, of all others, this would be trying to their constitutional habit of wandering from place to place; add thereto new climatic conditions, consequent on the geological changes, and we may fairly believe that modifications not only in the habits, but also the outward appearance and internal anatomy would ultimately result, so that the cabinet naturalist, trusting to bodily appearances as represented by specimens from various regions, is apt to assign distinctive characters to what are merely varieties of one species.