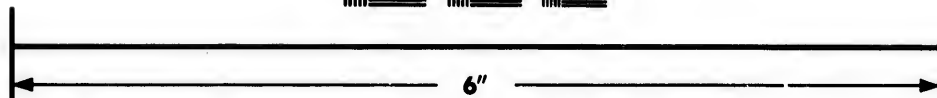
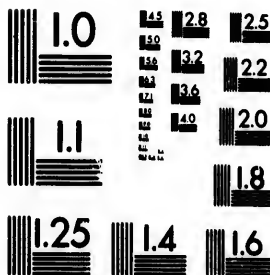


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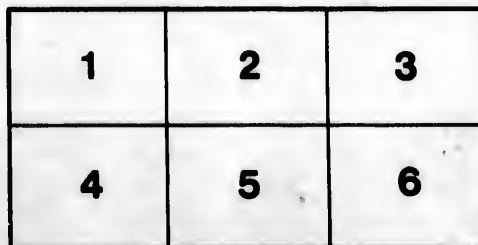
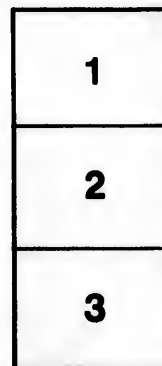
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AN ANCIENT HAUNT
OF THE
CERVUS MEGACEROS;
OR,
GREAT IRISH DEER.

BY DANIEL WILSON, LL.D., F.R.S.E.
President of University College, Toronto.

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(From the Proceedings of the Canadian Institute.)

AN ANCIENT HAUNT OF
THE CERVUS MEGACEROS:
OR, GREAT IRISH DEER.

BY DANIEL WILSON, LL.D., F.R.S.E.
President of University College, Toronto.

(READ BEFORE THE CANADIAN INSTITUTE, 11TH JANUARY, 1879.)

The following notes of a tourist's observations in a brief visit to a locality of great interest alike to the palæontologist and the archaeologist, were originally prepared with no further object in view than the contribution of a paper to be read at one of the evening meetings of the Canadian Institute, in the winter following the Irish explorations to which they refer.

The reconstruction of the geography of the Palæolithic Age, and the re-animating its haunts with the extinct mammalia known to us now only by their fossil remains, furnish materials for a romance of science more fascinating to the thoughtful student than all the fanciful creations of fiction. The geologist speaks of that time as recent when the temperature of southern France was such as to admit of the reindeer and the musk-ox, or sheep, haunting the low grounds along the skirts of the Pyrenees. But the term *recent* is used not in a historical, but a geological sense; and is employed in the full recognition of the evidence of enormous revolutions, by which changes have been wrought, the results of which are now seen in the climate, the physical geography, the fauna and flora of modern Europe. Nor have these revolutions been limited to the Eastern Hemisphere; though some of the climatic phenomena of the North American continent still perpetuate characteristics that help us in the interpretation of the strange disclosure of Europe's pleistocene era. Within the preceding geological age the whole northern hemisphere experienced an enormous climatic change, which attained its maximum in the glacial period. Far to the south of the British

Islands Europe presented a condition similar to that of Greenland at the present time ; and during the prevalence of this period of extreme cold the glacial drift, boulder clay, and stratified sands and gravels, were deposited over the whole of Northern Europe, and over North America, as far south as the 39th parallel, during prolonged submergence under an arctic sea. Then followed the changes of that subsequent period, during which the physical geography acquired its latest development, and the present continents gradually assumed the characteristics fitting them for existing conditions of life.

Of nearly a hundred species of mammals recognized in the post-glacial deposits of Europe, fifty-seven still occupy the same localities ; whilst others, such as the reindeer and the musk-sheep have withdrawn to northerly areas. A continuous chain of life, however, is indicated by the prolongation of about twelve pliocene species into the post-glacial fauna of Great Britain. But, along with those, numerous new species appear ; and changes of an altogether novel character are inaugurated by the presence among them of man.

The revolution wrought in physical geography, in climate, and in all the accompanying conditions of life, during the pleistocene age are most clearly illustrated by the character and distribution of the mammalia, of which fifty-three species are represented in the remains found in the gravels and cave deposits. The *Elephas primigenius*, or mammoth, common both to Europe and America, has become extinct in the old world, subsequent to the advent of man. It is still an open question whether in the new world man coexisted with the mastodon ; but in the eastern hemisphere at least, more than one species of proboscidean abounded, and in vast herds overspread the northern plains of Europe and Asia. Along with those there were three or four species of rhinoceros, a large hippopotamus, and other forms of animal life pointing to a condition of things widely differing from anything known within the historic period. The herbivora included both deer and oxen, some of which still survive in more limited northern areas ; and those, along with the mammoth, woolly rhinoceros, Irish elk, and reindeer, were preyed upon by numerous carnivora, including the extinct cave lion and great cave bear, the *ursus ferox*, or grizzly bear,—now the strongest and most ferocious of all the carnivora of the American continent,—and the cave hyæna, which has still its living representatives in South Africa.

In the variations of temperature which marked the retrocession of the expiring glacial influences in central Europe, throughout the region extending between the Alps and the mountain ranges of Scotland and Wales, the winter resembled that which even now prevails on the North American continent, in latitudes in which the moose, the wapiti, and the grizzly bear, freely range over the same areas where during a brief summer of intense heat enormous herds of buffalo annually migrate from the south. A similar alternation of seasons within the European glacial period can alone account for the presence, alongside of an arctic fauna, of animals such as the hippopotamus and the hyæna, known only throughout the historical period as natives of the tropics. The range of temperature of Canadian seasons admits of the Arctic skua-gull, the snow-goose, the Lapland bunting, and the like northern visitors, meeting the king-bird, the humming-bird, and other wanderers from the gulf of Mexico.

Such conditions of climate may account for the recovery of the remains of the reindeer and the hippopotamus in the same drift and cave-deposits of Europe's glacial period. The woolly mammoth and rhinoceros, the musk-sheep, reindeer, and other arctic fauna, may be presumed to have annually retreated from the summer heats, and given place to those animals, the living representatives of which are now found only in tropical Africa. No class of evidence is better calculated to throw light on some of the obscure questions relative to primeval man, than that which exhibits him associated with the long displaced or extinct mammals of that transitional period. Man, it is no longer doubted, was contemporaneous with the mammoth before its disappearance from southern France; and occupied the cave-dwellings in the upper valleys of the Garonne, while the reindeer still abounded there. In fact, the paleolithic hunter of central Europe, and the extinct carnivora of its caves, alike preyed upon the numerous herbivora that then roamed over fertile plains and valleys reaching uninterruptedly, northward and westward, beyond the English Channel and the Irish Sea; just as the Buffalo—now hastening to extinction,—still ranges over the vast prairies of the North American continent.

Among the fauna of this transitional period in Europe's prehistoric era, one animal, the magnificent deer, known as the *Cervus megaceros*, the *Megaceros Hibernicus*, or Great Irish Elk, occupies in some respects a unique position, and specially invites study. In

its limited endurance as a species it contrasts with the reindeer, along side of the fossil remains of which its horns and bones repeatedly occur; and its circumscribed area gives a peculiar interest to any indications of its co-existence with man. The evidence furnished by the abundance of its remains in certain localities tends to suggest the idea that, at a time when the British Islands were only the more elevated portions of the extended continent of Europe,—which then included in one continuous tract the English Channel, the German Ocean, and the Irish Sea, with a prolongation westward, embracing the Atlantic plateau now submerged to the extent of about one hundred fathoms:—the favourite haunts of the *Cervus megaceros* were in plains and fertile valleys which, throughout the historic period have been mostly buried under the sea.

In the ingenious speculations of the late Professor Edward Forbes on the migrations of plants and animals to their later insular habitats, he assumed a land passage to Ireland, consisting of the upraised marine drift which had been deposited on the bottom of the glacial sea. Over this he specially noted the presence of numerous remains of the fossil elk in the fresh water marl of his own native Isle of Man. In Scotland, on the contrary, where the reindeer existed apparently from the time when it was the contemporary of the mammoth, to a period, historically speaking, recent, authenticated examples of the *Cervus megaceros* are extremely rare; whereas its designation alike as the *megaceros Hibernicus*, and Irish elk, is based on the occurrence of its skeletons more frequently in Ireland than elsewhere. It has indeed been assumed that there now lie submerged beneath the Irish Sea, the once fertile plains which, towards the close of its existence, constituted the favourite haunt of this magnificent fossil deer.

It is not until the newer pliocene period is reached that the palæontologist encounters the amply developed horns of the gigantic bisons and uri; and that a corresponding size characterises for the first time the antlers of the *Cervus Sedgwickii*, the *Cervus dicranios*, and of the *Cervus megaceros*, pre-eminently noticeable for the enormous dimensions of its spreading antlers. Along with the remains of the latter, or in corresponding postpliocene deposits, those of the reindeer, which still survives both in Northern Europe and in America, are also found, at times in considerable abundance.

At the meeting of the British Association, at Dublin, in 1878, an intelligent local naturalist, Mr. Richard J. Moss, of the Royal

Dublin Society, took advantage of one of the excursions organized for the purpose of visiting the special attractions of the neighbourhood, to invite a party to explore an ancient habitat of the Irish fossil deer, at the Ballybetagh Bog, in the parish of Kiltiernan, about fourteen miles south of Dublin. The encouragement to research was great, for on two previous occasions the bog had disclosed numerous remains of the *Cervus m. jaceros*, and during the earlier excavations a fine specimen of the horns of the reindeer, now preserved in the Museum of the Royal Dublin Society, was also found.

Excavations made preparatory to the arrival of the excursionists revealed enough to furnish ample encouragement for further exploration. Saturday (August 17th) was devoted to a tentative examination, with disclosures that abundantly engaged renewed research; and on the following Monday a small party revisited the spot, under the efficient guidance of Mr. R. J. Moss, and his brother, Dr. Edward L. Moss, R. N., who most liberally undertook the entire charge of the exploration. The results of this renewed investigation of the ancient lacustrine depository of the remains of the fossil deer, though necessarily limited to the labours of a couple of days, proved highly satisfactory; and prepared the way for a systematic exploration of the site at a later date. Meanwhile a brief notice of the subject may possess some interest for others besides those who shared in the exciting operations of a busy but most pleasant holiday.

Ballybetagh Bog lies at the bottom of a glen about 600 feet above the sea, with hills of slight elevation on either side. Here some forty years ago, in making a cutting through the bog for the purpose of turning the water of a spring, known as the White Well, into a stream that flows through Kiltiernan, the first discovery of the remains of the fossil deer was made; but as the excavations were then carried on with no scientific object in view the chief value resulting from them was the demonstration of the existence there of abundant remains of the great extinct deer.

In 1875, attention was anew directed to the locality; Professor A. Leith Adams and Mr. R. J. Moss visited Ballybetagh Bog, and the latter gentleman undertook a systematic investigation, in concert with Dr. Carte, of the Dublin Society. No record had been preserved of the precise spot where the previous remains had been found, and considerable labour and research had to be expended before the proper site for renewed exploration could be determined.

An account of this exploration was contributed by Mr. Moss to the Royal Irish Academy in which he thus describes the formation under which the fossil remains lay : "The first foot of material removed consisted of peat ; under this there was a stratum of sand of an average depth of about two feet. The sand lay upon a brown coloured clay which extended for about two feet, and lay upon a bed of granite boulders. The spaces between the lower parts of the boulders were filled with a fine bluish-grey clay." Here amongst the boulders, and surrounded with the brown clay, nineteen skulls, with many broken pieces of horn and bones were found ; and the result in all was the recovery of thirty-six skulls with antlers more or less imperfect, mostly belonging to young deer, along with detached horns and bones, representing in all about fifty individuals of the *Cervus megaceros*. Among the specimens recovered at the earlier date about thirty individuals of the same gigantic fossil deer had been represented ; although both explorations involved only a very partial examination of this remarkably rich lacustrine depository. But the result of Mr. Moss' careful investigation was to determine the precise locality where research might be renewed to like advantage at any future time ; and here it was accordingly that a party of members of the British Association were invited to join him in hunting the Irish elk in its ancient habitat among the Wicklow meres.

The scene of this interesting exploration is the site of an ancient tarn, where for ages the moss has been accumulating, till a peat formation of varying thickness overlies a sandy clay intermingled with forms of vegetable matter, and at times with fallen trunks of trees. The whole rests on a bed of clay interspersed with granite boulders, as already described. Among these, but not below them, the bones of the fossil elk occur. But before describing the incidents of the recent exploration, it may be well to make some general reference to the gigantic deer once so abundant in the range of mountains which extend there in a north-westerly direction from the south coast of Dublin Bay, and to the general bearing of the evidence as to the probability of its co-existence with man.

An examination of the detritus and included fossils, the accumulations of fossiliferous caves, and the disclosures of peatmosses, shows that when the earliest ascertained colonists entered on the occupation of the British Islands—whether then insular or continental,—the low

grounds were extensively traversed by a net-work of lakes, and the surrounding country was covered with forest, and overrun by animals known to us now chiefly by the researches of the palæontologist. But also it is among the glimpses which that prolonged transitional period furnishes, that we catch, towards its prehistoric close, evidence not only of the presence of man, but of the introduction of the domesticated animals of Europe. Among its fossil mammalia the true *Cervidæ*, to which the Irish elk belongs, appear to be, geologically speaking, of recent origin. No remains of extinct genera of the deer family thus far discovered in either hemisphere have been found to extend farther back than the upper miocene; and Mr. A. Russel Wallace recognises the whole family as an Old World group which passed first to North America, and subsequently to the Southern continent. The remains of many extinct species belonging to existing genera occur in the post-pliocene and recent deposits both of Europe and America; but no representative of the deer family has thus far been found in South Africa or Australia.

Of the numerous ascertained fossil deer many forms are known only by fragmentary remains; but few great collections of Natural History fail to possess a well preserved skeleton of the Irish elk. Strictly speaking the *Cervus megaceros* is not a true elk, like the living Moose (*Alces palmatus*). It takes its place intermediately between the Reindeer and the Fallow deer (*Dama vulgaris*), and has its living analogues in the European Red Deer (*Cervus elaphus*), and the Wapiti (*Cervus Canadensis*) of the American Continent. The abundance of its remains in some localities, as in the Ballybetagh Bog, their high state of preservation, and their position generally in bogs and lacustrine deposits, overlaid by bog oak and other remains of the latest forests; and at times by actual evidences of human art: all tend to suggest the idea of this gigantic deer having co-existed with man. It was contemporaneous, not only with the mammoth, the woolly rhinoceros, and other extinct European mammalia of a like unfamiliar type, but also with an important group of wild animals which not only survived into that transitional period in which the geologist and the archæologist meet on common ground; but some of which have still their living representatives. Of the former the gigantic Urus (*Bos primigenius*) is the most notable, with its recognized relationship to the larger domesticated cattle of modern Europe. Of the latter the most interesting is the Reindeer.

It bears a near affinity to the Irish elk ; they co-existed under similar circumstances, and even at times in the same localities. All three were contemporaneous with the *Ursus spelæus*, the *Felis spelæa*, and other great post-pliocene carnivora ; and their remains abound in the ancient cavern haunts of those extinct beasts of prey.

The cave-bear and the Irish elk appear to have been limited to a temperate range, and have both become extinct ; and the remains of the latter occur in such abundance in recent deposits that there is a strong temptation to assume the occurrence of some sudden change, climatal or otherwise, which abruptly exterminated this great fossil deer. The Urus and the Reindeer were both in existence in Britain within historic times ; whereas the evidence thus far adduced in proof of the co-existence there of the fossil elk with man, pertains exclusively to the palæolithic period ; and in so far as Ireland is concerned, where its remains occur in greatest abundance, the conviction is reluctantly forced on us that the great Irish deer had finally disappeared from its fauna before man made his appearance there. This, however, as will be shown, is not an opinion even now universally accepted, either by archæologists or geologists.

In the post-pliocene age the cave lions, bears, and hyænas, of Germany, France, and the British Isles, preyed on the Irish elk, along with the reindeer, mammoth, woolly rhinoceros, the fossil horse and ox ; and the bones of all of them occur among the cave deposits in which traces of primitive art reveal the early presence of man. Professor Boyd Dawkins in his record of researches in the Somerset caves, in 1862-3, mentions the remains of the Irish Elk as 35 in number, where those of the Mammoth, the Reindeer and the Bison numbered 30 each, the Rhinoceros 233, the Horse 401, and the cave Hyæna 467 ; while thirty-five implements or other evidences of human art suggested the contemporaneous presence of man. Remains of the *Megaceros* have in like manner been identified in the Devonshire Caves ; and especially in Kent's Hole Cave in the same strata with flint and bone implements. Its bones are included among the specified contents of the famous sepulchral cave of Aurignac, at the northern foot of the Pyrenees ; and its remains have been recognized in seventeen different cave deposits to the north of the Alps ; in eleven of which there are indications of the presence of palæolithic man.

So far as evidence thus far points no traces of human art suggest the presence of man either in Scotland or in Ireland, at the period of palæolithic art, so abundantly illustrated in the contents of the caves and river gravels of southern England. But the Irish elk is not only the latest among the extinct mammalia of Europe's palæolithic period; it is recognized as surviving into its neolithic period. Its remains occur in the caves of the reindeer period in southern France, as in those of Laugerie Basse and Moustier; and artificially worked and carved bones of the reindeer have been recognized in more than one of the Swiss caves. Their presence has excited special attention in that of L' Echelle, between the great and little Salève, from its close vicinity to Geneva, owing to the proof it affords of the coexistence of man and the reindeer within the area which subsequently formed the hunting ground of the lake-dwellers of Switzerland; whilst no trace of either the megaceros or the reindeer has been found among their abundant illustrations of the arts alike of the neolithic, and of the bronze period.

The weight of evidence thus tends to favour the idea that the fossil elk was coexistent with the men of Europe's Palæolithic age, by whom the reindeer was so largely turned to account, alike for food and the supply of material for their primitive arts; while it became extinct long before the more enduring reindeer withdrew entirely beyond the temperate zone. In Ireland, however, as hereafter noted, the abundant remains of its great fossil deer occur, geologically speaking, so nearly upon the horizon of its prehistoric dawn, and so little removed from some of the primitive evidences of man's presence there, that it will excite little surprise should further evidence of a wholly indisputable character demonstrate the survival of the *Cervus megaceros* within the Neolithic period, and contemporaneously with man; as in the remoter age of the Drift Folk of southern England it is now believed to have been an object of the chase, and a source of food, clothing, and tools.

When once it is admitted that the great fossil deer was contemporaneous with the men of central Europe, in its Reindeer period; and has to be included among the fauna familiar to the Drift Folk of southern England: this special question as to its survival in Ireland within any period of the presence of man has its chief value in relation to his own advent there; for this is not a mere question of geographical distribution, but deals with the relative

age of prehistoric man in Central Europe, in Southern England, and in the later post-pliocene areas of Northern Europe. Meanwhile it will suffice to note some of the discoveries which have already been advanced in favour of the idea that the great fossil deer of Ireland was not unknown to its earliest inhabitants as one of its living fauna.

Professor Jamieson and Dr. Mantell long ago noted the discovery, in the County of Cork, of a human body exhumed from a depth of eleven feet of peat bog. It lay in the spongy soil beneath. The soft parts were converted into adipocere, and the body, thus preserved, was enveloped in a deer-skin of such large dimensions as to lead them to the opinion that it belonged to the extinct Irish elk.

At the meeting of the British Association, at Newcastle, in 1863, Professor J. Beetes Jukes exhibited a right tibia, with a portion of one of the antlers of a *Cervus megaceros*, recovered from a bog near Logan, County Longford. They were found along with other remains of the skeleton, embedded in shell-marl two or three feet thick, resting on blue clay and gravel. A deep indentation on the tibia, about two inches broad and a quarter of an inch deep, was exactly fitted to receive the antler-tyne. "They looked," says Professor Jukes, "as if they had been each chipped out with some sharp instrument," and he added, "The impression left on my mind from a first inspection was that these indentations were the best evidence that had yet turned up in proof of man having been contemporaneous in Ireland with the *Cervus megaceros*, and having left his mark upon the horns of an animal soon after its death, which he had himself probably killed."* I was present in the section at the Newcastle meeting, and examined with much interest this supposed lethal weapon of the men of the era of the great Irish deer, adduced on such credible authority as seemingly determining the question of their coexistence in Ireland. But more careful observations, added to the apparent fact that the indented bones and antler had lain alongside of other portions of the skeleton embedded in the marl, has since led to the conclusion that this supposed primitive weapon was the chance product of natural processes still in force. Such seemingly artificial indentations and abrasions are now found to be by no means rare, as will be seen from specimens now produced, of similarly marked bones of the *Cervus megaceros*

from Loch Gur, County Limerick.* The opinion which is now generally accepted is that these abrasions and indentations are due to the juxtaposition of the sharp point or edge of one bone and the side of another, while subjected to a prolonged immersion in the moist clay or marl. But to this it is further assumed must be superadded the combined action of friction with pressure consequent on the motion of the bogs in which such bones are embedded. The boggy ground in which they chiefly occur is subject not only to a perpendicular oscillation, consequent on any vibration from passing weights shaking the ground, or even from the wind; but also it undergoes a periodical contraction and expansion by the alternate drying and saturating with moisture, in the summer and winter months; and thus indentations and cuttings, like those ordinarily ascribed to a flint knife or saw, are of frequent occurrence on the bones of the great fossil deer. To this subject Dr. A. Carte drew the attention of the Royal Geological Society of Dublin, in 1866, in a paper, entitled: "On some Indented Bones of the *Cervus megaceros*, found near Lough Gur, County Limerick," and I am now enabled to exhibit for your own inspection additional illustrations from the same locality illustrative of this phenomenon, furnished to me by Mr. Pride, Assistant-Curator of the University Museum.

In some of those the indentations are such as few would hesitate at first sight to ascribe to an artificial origin; and so to adduce them as evidence of the contemporaneous presence of man. But they occur, not on separate bones, but on portions of fossil skeletons recovered from the lough under circumstances which wholly preclude the idea that they had been detached and carried off for purposes of art; or that the indentations upon them can have been the work of human hands.

Professor Jukes was present when Dr. Carte's paper was read, and referred to former statements of his opposed to the idea of the contemporaneous presence in Ireland of man and the *Cervus megaceros*. "They knew," he said, "that man did exist contemporaneously with that animal in England; and then arose the geological question, was Ireland at that time already separated from England and the continent? Was the great plain which formerly connected the British

* The principal bones of a nearly complete skeleton of the *Cervus megaceros*, from Loch Gur, were exhibited to the Canadian Institute; and the various characteristic indentations, on which must have been an undisturbed skeleton in situ, were pointed out.

Islands with the continent already worn away, or had man already crossed over from England to Ireland? They knew that man had existed in England probably before England was separated from the continent."

But, whatever be the final determination on this interesting question of the co-existence of Man and the *Cervus megaceros* in Ireland, the bones of the latter are recovered there in enormous quantities, not infrequently in a condition admitting of their being even now turned to account for economic uses; and examples have undoubtedly been found there bearing unmistakeable evidence of human workmanship. One of the most interesting of these was an imperfect Irish lyre dug up in the moat of Desmond Castle, Adare, and exhibited by the Earl of Dunraven, at a meeting of the Archaeological Institute in 1864. The relic was of value as a rare example of the most primitive form of the national musical instrument; but greater interest was conferred on it by the opinion pronounced by Professor Owen that it was fashioned from the bone of the Irish Elk.

In weighing such evidence it is manifestly important to keep prominently in view the fact already referred to, that the bones and horns of the fossil deer are recovered in a condition not less fit for working by the modern turner and carver than the mammoth ivory or the bog oak, which are now in constant use by them. In the Goat Hole Cavern at Paviland, Glamorganshire, Dr. Buckland noted the discovery of large rings or armlets and other personal ornaments made of fossil ivory, lying alongside of a human female skeleton, and in near proximity to the skull of a fossil elephant. The tusk of another fossil elephant, recovered at a depth of twenty feet in the boulder clay of the Carse of Sterling, is now preserved in the Edinburgh University Museum, in the mutilated condition in which it was rescued from the lathe of an ivory turner. This, so far as Scotland is concerned, is an exceptional example of the manufacture of fossil ivory, but we are very familiar with the fact that the tusks of the Siberian mammoth have long been an article of commerce.

In a paper "On the Crannoges of Lough Rea," by Mr. G. H. Kinohan, of the Geological Survey, read before the Royal Irish Academy in 1863, he describes a fine head of the *Cervus megaceros* found, along with abundant evidences of human art, in a large crannoge on Lough Rea. It measured thirteen feet from tip to tip of its horns; but Mr. Jukes suggested the probable solution of its discovery under

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such circumstances to be, not that the megaceros had been hunted and killed by the crannoge builders, but that they had found the gigantic deer's head, "and put it up for an ornament or trophy, as is done at the present day."*

So far, at least, it thus appears,—notwithstanding the indisputable proofs of the employment of the bones and horns of the *Cervus megaceros* by primitive manufacturers of the Neolithic age; and the survival of this gigantic deer throughout the Palæolithic age of human art:—that evidence is still wanting to satisfy the scientific enquirer as to the co-existence of man and the great fossil deer in Ireland, where, more than in any other locality, this might be expected to occur. The primitive lyre found in the moat of Desmond Castle was undoubtedly fashioned from the bones of the extinct deer; but the material may have been recovered, as in modern times, from the marle of some neighbouring bog, and turned to account like the bog oak so abundantly used in modern art; rather than have been wrought by the Neolithic craftsman from the spoils of the chase.

In 1859, Sir W. R. Wilde read a lengthened communication at two successive meetings of the Royal Irish Academy, "Upon the unmanufactured animal remains belonging to the Academy." In arranging its collection of Irish Antiquities his attention was drawn to numerous crania and bones, chiefly of carnivora and ruminants, from river beds, bogs and crannoges; including sixteen crania, and upwards of seventy detached fragments of skeletons of the *Cervus megaceros*. The circumstances under which they were recovered have not been in all cases preserved, and no distinct evidence tends to confirm the idea of their contemporaneity with man. In remarking on the then novel recognition of the remains of Irish fossil deer in the tool-bearing gravel drifts of Abbeville, Sir W. R. Wilde observes: "As yet we have not discovered any Irish name for it. If the animal was here a contemporary of man, it certainly had become extinct long before the Irish had a knowledge of letters." † It is, however, altogether consistent with the evidence of a succession of races in the British Isles, and throughout Europe, to find that this era of the long extinct fossil mammalia pertaining to the Palæolithic, or even to the Neolithic age of primitive art, has no record in the oldest of the living languages. The same is true of others of

* *Dublin Quarterly Journal of Science*, iv., 125. † *Proceedings of R. I. A.* vii., 195.

the extinct mammalia, of which evidence of their familiarity to the men of the Neolithic period is abundant. It is indeed worthy to note that, while the ingenious artists of central Europe's Reindeer period have left wondrously graphic carvings and drawings of the mammoth, the fossil horse, and of the reindeer and other cervidæ, no very clearly recognizable drawing of the great fossil deer has been found. It has indeed been assumed to be the subject of more than one representation of a large horned deer, but the identification is at best doubtful. This is all the more noteworthy, as the characteristics of the great deer are such as could not fail to attract the notice of an artist capable of so successfully representing the salient features of the reindeer, as illustrated in familiar engravings of it, such as that from the Kesslerloch, Schaffhausen, traced on a piece of one of its own antlers. If the engravings assumed to represent the *Cervus megaceros* are indeed efforts at its depiction, their less definite character may be due to the rarer opportunities for studying an unfamiliar subject.

But if, as Sir W. R. Wilde, says, no native Irish name has been discovered for the great fossil deer, an ingenious identification of it has been assumed with one of the objects of the chase referred to in the *Nibelungen Lied*. There, after the hunter has slain a bison, an elk, and four strong uruses, he crowns his feats with the slaying of a fierce *schelch*. It is no sufficient argument against such identification that the poem abounds with allusions to fire-dragons, giants, pigmies, and other fanciful creations. The "lusty beaver," the elk, "the ravin bear," and other contemporary, though now extinct, animals of Scotland, are introduced in the fanciful vision of "The King's Quair:"

"With many other beasts diverse and strange."

But any reasons adduced for identifying "the fierce schelch" of the *Nibelungen Lied* as the *Cervus megaceros* are sufficiently vague and slight; and so far the warring opinions of archæologists appear to coincide with those of the geologists, that this extinct deer did not co-exist with man in Ireland.

But, whatever be the ultimate conclusion as to the period of its final disappearance there, no doubt is entertained as to this extinct deer having been contemporaneous with palæolithic man in western Europe, and even in England. Only two or three traces of its remains have been found in Scotland; and if in Ireland—seemingly its latest special habitat,—it had finally disappeared before the advent of man there; the results are significant in reference to the period of

its extinction ; as well as to the order of a succession of events in the prehistoric dawn. Indications of the presence of man must be looked for as following in natural sequence to the geological reconstruction of specific areas, and their evidences of climatic changes in the post-glacial period. Sir John Lubbock remarks in his "Prehistoric Times," when referring to the *Cervus megaceros* : "Though there is no longer any doubt that this species coexisted with man, the evidence of this has been obtained from the bone-caves, and from strata belonging to the age of the river-drift gravels. No remains of the Irish elk have yet been found in association with bronze ; nor indeed are we aware of any which can be referred to the later, or Neolithic Age." When the subject was under discussion at the meeting of the British Association at Dublin, Professor W. G. Adams affirmed most definitely the co-existence of palæolithic man and the fossil elk ; while admitting the absence of any such evidence where the remains of the latter are now found in greatest abundance. "There is," he said, "no evidence that in Ireland man existed contemporary with the *Megaceros*, or had any thing to do with its extinction ; whereas we have authentic evidences of the coexistence of man with this animal in England."

This conclusion, however consistent with the proofs thus far obtained, cannot as yet be recognized as one so absolutely settled as to render further research superfluous. Whistles formed of phalanges of the reindeer are among the most characteristic implements of the more ancient French caves ; and one found by M. E. Piette, in 1871, along with various flint implements, in the Cavern of Gourdan (Haute-Garonne), pierced not only with a mouth-piece, but with finger-holes along the sides, is aptly described by him as a neolithic flute. There is nothing therefore in the mere design or workmanship of the primitive Irish lyre incompatible with its execution at the period when the Irish elk survived ; if it can be shown that it was coeval with man in Ireland. Professor Boyd Dawkins when drawing attention to the fact that out of 48 well ascertained species living in the palæolithic period, only 31 are found surviving into the neolithic period, adds : "The cave bear, cave lion, and cave hyæna had vanished away, along with a whole group of pachyderms ; and of all the extinct animals, but one, the Irish elk, still survived." There is indeed something peculiar and exceptional in this magnificent deer which so specially claims a place among the extinct mam-

malia of prehistoric Ireland. Its range, alike in place and in time, appears to have been more circumscribed than that of most, if not all of the animals with which it is found associated in post-pliocene deposits. Traces of it, indeed, have not only been noted to the south of the Alps, but Professor Brandt has identified its remains among the cave disclosures of the Altai Mountains. But on both continents it had a similar temperate range; and no remains of it have been discovered in the extreme north of Europe. To this the nature of its food may have contributed; while the mammoth and the reindeer were able to subsist within the Arctic circle, as well as in temperate ranges common to them and to the gigantic elk. But circumscribed though the range of the latter appears to have been, its enormous dimensions, conjoined with seemingly gregarious habits, were incompatible with limits so greatly restricted as the Isle of Man, if not indeed with those of Ireland; and hence the probability of the assumption that its extinction preceded, or speedily followed the period when the British Islands became detached from the Continent of Europe.

The *Cervus megaceros* attained a height of nearly eleven feet, and bore an enormous pair of antlers, measuring at times nearly fourteen feet from tip to tip. The head, with its ponderous pair of antlers, is estimated to have exceeded 100 lbs. in weight when living. To this the frequent miring of the deer in the lakes and bogs, where their remains abound, has been ascribed; nor is it improbable that the ultimate extinction of the species may have been due to the abnormal development of such head-gear, while its large antlered contemporary, the Reindeer, still survives.

Mr. R. J. Moss was led from his former careful observations to conclude that Ballybetagh Bog occupies the site of an ancient lake or tarn which stretched along the bottom of the glen. The west side of the glen is flanked by the southern side of a hill, and another of less elevation hems it in on the east. The embouchure of the lake appears to have been at the southern end; and whether we assume that the deer when swimming across the lake got entangled in the stiff clay at the bottom, and so were drowned; or that they resorted to the lake to die, it would seem that their bodies drifted with the current to the outlet of the lake, and hence the enormous accumulation of their remains in one place. In describing one of the trenches opened by him, Mr. Moss says; "At the north end

the stony bottom was reached at a depth of only four feet; it dipped towards the southern end, where it was about five feet from the surface. The northern half of this trench did not contain a single fragment of bone or horn; the southern half was literally packed with them.* The remains found in the course of this exploration represented about fifty individuals, the majority of the bones being those of young deer.

The result of the more hasty excavations recently made, was the discovery of two skulls and several portions of horns on the first day. On the second day a trench was opened, and cut through an accumulation of 27 inches of peat, resting upon about 22 inches of sandy clay, intermingled with roots and traces of various forms of vegetation. Underneath this among granite boulders, three fine heads were found; one of them of the largest size, and in nearly perfect preservation, with antlers measuring about eleven and a half feet from tip to tip.

There was something startling in the success of our expedition: thus setting out from the busy scenes of Dublin, with all the bustle of its crowded thoroughfares, and not less crowded scientific sections; and landing among wild uncultured bogs, to dig down, and at once light upon the remarkable evidences of an extinct fauna once so abundant. There were not even wanting sceptical doubters ready to hint at previous preparations having facilitated a too easy discovery. In this, however, we profited by the careful and intelligent labours of Mr. Moss at an earlier date; and all who put themselves under his guidance were amply rewarded by the results.

It is worthy of note that, neither on this occasion, nor in the older excavations was a true marl found underlying the peat, or clay. The rock of the district is granite; being part of a band of granite five miles broad, which extends from Dublin Bay in a south-westerly direction into the County of Waterford. A granite sand was found in some places to a depth of three feet; and Mr. Moss, after careful examination, describes the underlying clays as almost entirely free from calcium carbonate, and having every appearance of a granitic origin. But a little to the north of the section thus described, a light-coloured marl, rich in calcium carbonate, makes its appearance almost under the turf.

* Proceedings R. I. A., 2nd Ser., Vol. II.

Thus far about eighty individuals of the great fossil elk, and one reindeer, are represented in the remains recovered from the Ballybetagh Bog, without any traces of the co-existence of man having been observed. But no better locality could be chosen to test the question. Lying though this interesting locality does, in such near vicinity to the Irish metropolis, it has been left nearly untouched by the hand of man within the whole historic period, during which cathedral and castle, college, mart, and wharf, have crowded the banks of the Liffy. The traces of the primitive architecture of remoter eras have thereby escaped defacement. The general contour of the district remains little changed. The aspect is wild and savage; and it requires no very great exercise of the fancy to restore the ancient mere, reclothe its shores with forests, the buried trunks of which abound in the underlying peat, and reanimate them with the magnificent herds of the great fossil deer. Here are still the unefaced memorials of primitive art. On the rising ground on the south-east margin of the bog stands a large chambered cairn, which has been rifled; and the exposed chamber shows the megalithic structure characteristic of the most ancient works of this class. There is also a circle near it formed by an enclosure of stones and earth, which is regarded by the natives with superstitious awe. According to the belief of the peasants, if their cattle stray into this enclosure they will die.

Here, then, it is probable that the bed of the neighbouring tarn or bog must contain some evidences of the primitive arts of the Cairn-builders, with means for determining the relative date of their presence there, as compared with the true age of the *Cervus megaceros*. A report of the successful operations which rewarded the brief labours of the excursion party was made to the executive council of the British Association, and steps were taken with a view to a systematic and thorough exploration of this favourite haunt of the great fossil Irish elk, one of the most remarkable among the fauna of Europe's Palæolithic period.

