Prehistoric Stone Implements From the River Bann and Lough Neagh

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VII.

PREHISTORIC STONE IMPLEMENTS FROM THE RIVER BANN AND LOUGH NEAGH.

By W. J. KNOWLES.

Plates XII-XIX.

Read June 10. Published August 7, 1912.

The stone implements of prehistoric age from the River Bann and its immediate neighbourhood, and also from Lough Neagh, are peculiar in their character, and differ as a whole from those found elsewhere in Antrim and Derry. I, therefore, consider it advisable to describe those implements from the Bann and Lough Neagh as a group by themselves, and not to mix them up with other objects of prehistoric age found in the North of Ireland.

In May, 1880, I read a short paper before the Anthropological Institute, London, on "Flint Implements from the Valley of the Bann," in which I drew attention chiefly to the large, coarsely made, pick-like implements of flint and the pointed flakes with a worked tang. In 1893, at a meeting of the Royal Society of Antiquaries of Ireland, which was held in Belfast, I read a paper on "Irish Stone Axes and Chisels," in which I treated the Bann group as a principal division. In this paper I dwelt chiefly on the axes and chisels, leaving still a large variety of the Bann implements undescribed, but in the present paper I intend to treat of the whole series.

Flint and other stone implements were found abundantly when the deepening of the bed of the Bann by the Board of Works was in progress many years ago, and Sir William Wilde, in his Catalogue of the Royal Irish Academy's Museum, mentions twenty flakes obtained from the bed of the Bann, which were presented by the Board of Works. At a meeting of the Kilkenny Archaeological Society, held in January, 1865, Mr. Robert Day, jun., presented eighteen specimens of flint implements from Toome Bar, the presentations comprising specimens of the perfect spear or knife, the partly formed celt, and the broken flint weapon. In 1867 Mr. Wm. Gray, in
illustration of a paper on flint flakes, exhibited flakes from Toome and elsewhere. In January, 1867, Mr. John Evans, F.S.A., F.R.S., read a paper before the Society of Antiquaries of London on "Discoveries of Stone Implements in Lough Neagh," numbering in all above 100 stone hatchets, and upwards of 1000 flakes, &c., and he states at the same time that Mr. Robert Day, jun., of Cork, had informed him that he had upwards of 120 stone implements and 2000 flint-flakes, &c.

In 1909 Mr. Wilfred Jackson, F.G.S., gave an account of the diatomaceous deposit of the Lower Bann valley and prehistoric implements found therein.

I have on various occasions described the Larne series of prehistoric implements, which I considered to be older than the ordinary flint implements of other parts of Ireland, and I should think that if the race which made the Larne implements survived the changes caused by the sinking of the land round the north-east coast, they may have re-appeared in the Bann valley, as some of the implements found there resemble those of the older series from Larne, Island Magee, and elsewhere on the north-east coast. The manufacturers of the Larne type of implement were not confined to Larne and Island Magee, but occupied all the coast of Belfast Lough and all the coast of Antrim northwards, as we find the remains of their industry at several places, particularly at Carnlough, Whitepark Bay, Portrush, and Portstewart. I imagine they may have entered at the mouth of the Bann, near which we find implements of the Larne type, and that they would make their way up the river to Lough Neagh.

Nearly everywhere along the Bann flint-flakes and implements are to be found, but there are several noted stations along the river which have produced flakes and implements in profusion. Considerable quantities have been found from the mouth of the Bann up to Coleraine. Mount Sandal, south of Coleraine, opposite the Salmon Leap, is a station where many of the characteristic Bann implements have been found. Further south, as at Aghadowey, some have been found. Near Kilrea, where another salmon leap was cut, great quantities were obtained; also at Gortgole, Portglenone and Glenone, Culbane, New Ferry, and various places up to Toome Bar, where the Bann emerges from Lough Neagh. When the Bann was being deepened by the Board of Works, as already referred to, great quantities of implements of stone and bronze were obtained from the bed of the river. Rev. James O'Laverty, who lived at Portglenone at that time, obtained the greater part of his fine collection during the time the excavations were going on, and we see by reference in Sir William Wilde's Catalogue of the Museum of the Royal Irish Academy that finds at Toome Bar, Portna, &c., on the Bann during the drainage and sinking of the bed of the river were presented
to the Academy. Since then the digging up of the diatomaceous clay at different places along the river has brought to light a large quantity of flint and other implements. Numbers of implements and flakes have been washed out on the shores of Lough Neagh near Toome, and the waters of the lake being shallow, antiquaries have obtained large collections by wading and picking up the objects, which were visible on the shallow bottom. Sir John Evans obtained many things in this way. I remember going with our little band of Ballymena antiquaries, including Canon Grainger, Rev. Dr. Buick, and seven or eight others, to Toome, and divesting ourselves of boots and stockings to wade along the shores of the lake, and coming home laden with miscellaneous collections of implements. The summer of 1911 was a very dry one, and the waters of the lake were low and favourable for wading. I therefore visited Toome with several members of my family, and by wading we found some characteristic implements. Rev. W. A. Adams searched the shores of Lough Neagh near Antrim in the same season, and made some very good finds, including a bronze axe.

The River Bann is noted for its abundance of salmon and other kinds of fish, and there is reason to believe that the prospect of a good supply of food was one main inducement for the prehistoric people to settle along its banks. Flakes for knives and spears must have been in continual demand, and therefore they were produced in abundance and of all sizes, from those of 6 and 7 inches in length to the most tiny flakes, many of which have been manufactured into small knives, borers, and scraping tools. Many of these flakes and other implements have been found in the bed of the Bann, but more by digging up the surface of the river's banks. How many implements got into the bed of the Bann may be a question that should be considered. In cutting of fords and deepening the bed of the Bann stone implements have been found lying in a layer above that containing bronze weapons, and therefore it is considered that the theory of there being a Stone Age succeeded by a Bronze Age is incorrect; but when everything is fairly weighed and considered it will be found that the position of objects deposited in fords of a river is not proof of succeeding ages of culture. The banks of the river are being continually denuded, and objects contained in the denuded portions would be redistributed by the running water and the newest object perhaps dropped first, and something older on top of that, and so on. During fishing and other operations many implements might be dropped into the river and lost, but the greater quantity obtained from the bed of the Bann came, I believe, from the denudation of the banks of the river.

The digging up of the diatomaceous clay at Culbene for brick-making has yielded abundant material for local collectors of antiquities. Rev. Dr. Buick

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obtained from that place a large addition to his collection, and the Rev. A. H. Beattie, who lived at Portglenone, got almost his entire collection from the brick-works. I was myself a competitor with these and other collectors, some of them from England, for the objects found there, and was successful in obtaining a fair proportion. The collections of Monsignor O'Laverty, Rev. Dr. Buick, and Rev. A. H. Beattie have lately been dispersed by auction, and I was fortunate in being able to secure some of the best articles in these collections that came from the Bann. The illustrations, which have been made by my daughter, Margaret Knowles, are taken from examples in my own collection, but from my long experience of the subject, and my frequent visits to different parts of the Bann, I believe I am giving a fair general view of the various implements that have been obtained from this interesting locality.

I shall first describe the flakes and the implements made from flakes.

Large Flakes slightly dressed at the Base.

A good many large symmetrical flakes show by slight dressings in parts that they have been used as cutting-tools. I show in No. 1 a symmetrical flake. It is slightly dressed at the base on both sides, so as to remove any sharp or jagged parts, and thus enable it the better to be inserted in a shaft as a spear, or in a shorter shaft as a knife. In No. 2 will be seen a flake less symmetrical, but of the pointed kind. One of the sides is quite regular, but the other, that to the left of the figure, judging from the thickness of the flake at the dressed part, has had a good breadth of wing removed. This flake could also have been usefully employed as the point of a spear. It is now fairly symmetrical, though very little further dressing, after all the pains that had been taken, would have made it more suitable for a spear-head; but the undressed edges are now all good and sharp, and their being symmetrical, or the reverse, would not signify for cutting purposes; and therefore I think it is more likely that this flake was employed rather as a knife than as a spear. From the slight dressing at the base, which is merely enough to remove sharp edges or points of projecting flint, it may have had a handle of hide or soft vegetable substance to protect the hand when used as a knife.

Both Nos. 1 and 2 were found between Coleraine and the mouth of the Bann, probably from material dredged from the bed of the river in order to deepen it. Both show black patination, and have the outward appearance of chert from the Carboniferous limestone; but from slight chips, accidentally removed, here and there one sees that the material is flint. No. 3 shows a flake from Culbane. It is of greyish-mottled flint; and, like the others, only shows slight dressing at the base, and could be used,
like those already described, either as a knife or spear-point. It shows slight teething along the edges, either from use in cutting or from knocking against other stones in the river.

I show in No. 4 another flake which is pointed, but not so symmetrical as Nos. 1 and 3; but in its natural state it would appear to have been more regular in form than No. 2. It would be less suitable in its present form for a spear-point than for a knife. A little trimming of the edges, where they project most on each side, could have made it regular and suitable for a spear-head; but the edges, being all good and sharp, have evidently been retained for cutting purposes, and only the portion nearest the base has received a slight dressing, as in the other three cases. This circumstance, in my opinion, favours the theory of its having been a knife rather than a spear-head; and I believe the three flakes previously described were also employed as knives. This specimen was found in the valley of the Bann, in peat some distance from the river, on the County Antrim side. It is formed of grey-mottled flint, like No. 3. In Plate XII will be seen some more flakes dressed at the base for shafting. The curved points in Nos. 4, 6, 7, 8, 13 and 14 make them unsuitable for spears. The curves in the points of Nos. 6 and 8 are natural; but those in the points of 4, 7, 13 and 14 have been made intentionally—possibly with the view of supplying a blunted surface for the forefinger to rest on in order to exert pressure when cutting, as has been suggested by some authors. The flakes with curved or oblique points are not rare. A little irregularity in the outline of a flake would not, so long as the edges are sharp, affect the cutting quality of the flake, as we see in No. 9; and therefore it is provided with a good tang for shafting. No. 10 is also irregular, by having one side projecting much further from the midrib than the other; but the projecting part has not been chipped off, for the reason, in my opinion, that the projecting part has a sharp edge suitable for cutting; therefore this also would be used rather as a knife than a spear-head. Some flakes of the pointed kind, with symmetrical sides, and having a worked tang at the base, may have been mounted as spears (see Nos. 11 and 12), but they could also have been used as knives.

Many flakes from Lough Neagh and the Bann, even though irregular in shape and without points, may have been turned to serviceable use. If the edges were sharp, they could be employed as cutting-tools, or for scraping or hacking. The flake shown in No. 13 has been employed in hacking or some other hard usage, as will be seen by the edge to the left. It appears first to have been hacked and blunted, and afterwards to have received a considerable amount of dressing to make it have somewhat of sharpness again.

Three more examples of pointed flakes are shown in Nos. 15, 16, and 18.
They were all found at Culbane, and have portions of the sides removed at the point. These may have been used as spear-points, but they would not be serviceable as cutting-tools. Probably they may have been used for boring holes in some coarse substance, such as wood. I fear we cannot rely on any report of a flake being found with a handle attached, especially one formed of moss; but I believe the flakes like those described must, in most cases, have had handles. We find pointed flakes similar to those found along the banks of the Bann in use by the natives of Australia—some of flint, some of quartzite, and some spear points of modern bottle-glass, all having handles of some kind. My son, William, who is at present living in Australia, has sent me a fine series of such implements. It is astonishing to see the fine pointed flakes of quartzite the native Australian can produce; although one would imagine quartzite to be more intractable than flint. But apparently they have flint also, as some of these flakes appear to be of that substance. The handles on my specimens from Australia are of gum or resin, found abundantly in that country. Even spear-heads and arrow-points are affixed to their shafts by this substance. I show in Pl. XIII a number of Australian flakes with their handles, for the sake of comparison with Irish flakes, and for the suggestion they offer as to the way the natives of the Bann valley may have put handles on their flakes. No. 30 is a flake apparently of flint, with edges irregular, but everywhere sharp. It would compare very well with our Irish specimen, No. 9. I believe its sole use was for cutting purposes. It has a handle of gum, slightly broken. No. 27 is a very regular flake, also apparently of flint. It has a handle of gum, fairly large and rounded, to fill the hollow of the hand, and has evidently been a knife or small dagger. No. 29 is a large pointed flake of quartzite, probably a dagger, also with a handle of gum. No. 26 is its scabbard, made of bark, and bound round with coarse cord. No. 2 has also its scabbard; but one illustration of such an object is sufficient. No. 28 is a saw formed of small flakes of quartz stuck into gum. The shaft is 20 inches long, but only part of it can be shown. Other saws have a double row of teeth. If the small flakes that form the teeth were detached, it could only be guessed that they were artificial. It is possible that some such saws may have been in use along the Bann when the flakes I have described were made and being used; but it is only by inference that we could conclude that such an instrument existed, as we could not expect that a saw, with its teeth, fixed in a handle, would remain intact until the present day, in order that we might find it and thus prove its existence. No. 25 is described to me as a circumcision knife, with its handle of wood fixed to the flake by gum. The flake is very irregular, but has sharp edges. If either it or the flake described as No. 30 was found free from its handle, it is very probable no one would
take the trouble of collecting them. And so, many flakes from the Bann district, of irregular shape, may now be denied a place in our collections, while formerly they may possibly have been valued as useful implements.

I have seen the flake with handle of moss, in the Academy's Museum, from the Bann. The handle is very loosely attached, and if found in close association with the flake, the find is a very interesting one. Sir John Evans figures a flake with a handle of skin. I have not myself found any handle connected with a flake, but I have a handle of wood from Culbance. It is somewhat globular in shape, made of a gnarled root, that would not split easily. A hole has been made in the handle, into which a flake or other small implement could be fitted, and made secure by wedging and cementing. No care was taken by the finder to observe whether a flake or other implement was found near the handle; therefore we can only speculate on the use of the so-called handle. I have tried it with a flake inserted, and show it in that condition in fig. 24. The figure compares very well with the Australian flakes, which have gum handles (see figs. 27, 29).

There are many of the Bann pointed flakes like Nos. 15, 16, and 18 that have both sides near the point dressed off by the coarse kind of chipping so commonly seen in Bann implements. The flakes have thus a more pointed appearance than they would have in their natural state, and they are generally referred to by antiquaries as borers. It is possible that those of finer make may have been used for boring holes in leather, but some of the coarser pointed implements, if intended for boring, would no doubt be used for boring holes in wood in order to bind together pieces of timber used in the construction of huts. Some of these or any other of the tanged flakes may have been used, as suggested by Sir John Evans, in spearing fish.¹

I show in figs. 17, 18, 19, 21, 22, and 23 a number of examples graduating from the slightly dressed with thickish points down to those which have long and slender points. No. 18 shows fine dressing at the point and round the side edges. The base has also all angular parts removed. There is no dressing on the under or bulb side. It was found at the bottom of a peat bank at Gortgole near the Bann. The flake shown as No 19 has its point neatly dressed all over the ridge face and along the edges on the bulb face. It was found at Culbanc. No. 17 was found near Coleraine, and has a shorter and stouter point than No. 19, with an indenture on each side. That on the right side would seem to be caused by a defect in the flint, but the indenture on the left side was evidently made intentionally. No. 21 comes from Gortgole, about three miles below Portglenone. There is a tang formed by dressing from the bulb-face.

¹ Archaeologia, xli, part ii, p. 404.
towards the ridge-face, and the point is formed by dressing in the same direction. The point in No. 22 is more slender than that of No. 21, and shows finer dressing, which is directed towards both faces. It was found at Culbane. In No. 23 the sides of the flake have been dressed off from base to point on the one side towards the ridge-face, and on the other towards the bulb-face. It was found at Culbane. The number of flint tools from the size of No. 23 to somewhat similar objects about an inch or less in length is very considerable, all made much in the same way by chipping off the sides of the flake. No. 20 shows two views of a stout flake having the dressing entirely on the bulb-face. It is a stout implement formed by very coarse dressing, and may have been used in boring, or perhaps in pointing a spear. It was found at Portglenone. Examples of this kind are not rare. I show in Plate XIII, Nos. 31 to 41, a number of small flakes dressed along one or both edges, forming implements supposed to be borers or knives. No. 34 is stout of its kind, dressed on both sides towards the ridge-face, but irregularly, so that the dressed sides appear uneven or lumpy. It has been in contact with the diatomaceous clay at Culbane, as that material is still adhering to the hollows of the dressed parts. No. 35 was found at Gortgole, and is also dressed on both sides towards the ridge face, but the dressing is of a more regular kind than that of the last specimens. No. 32 comes from the Bann near Portglenone. It is dressed on both sides towards the ridge-face, and has a fine point. No. 39 is from Glenone (on the Co. Derry side of the river, opposite Portglenone), a place which has supplied a considerable number of the small borers. It is dressed on the right side towards the ridge-face, and on the left side towards the bulb-face. No. 33 is from Mount Sandal near Coleraine, and is dressed straight across the flake on the left side, so that that side shows a thick back, while the other side is more of an edge, though slightly dressed. At the point the part described as an edge is blunted or rounded by dressing or use. No. 31 is a very fine and thin implement, dressed along the sides towards both faces. It has originally been a very narrow pointed flake, and has a very fine and sharp point. If delicately used it could bore holes in fine skin or leather. Both sides of No. 40 are finely dressed towards the ridge-face, but on the bulb-face only the left side is dressed. No. 37 is slender, and has a sharp point. It comes from Glenone. No. 41 is like No. 33, dressed on one side to show a thick back, while the other side is sharp and knife-like, but either irregularly dressed or injured by use. The shoulder to the left of the top end, taken in connexion with its size, shows it to be similar to the pygmy implements found in various countries, and latterly in great abundance by Rev. R. A. Gatty at Scunthorpe in England. It was found at Glenone. No. 36 shows the ridge of the small flake from which it was made close to the right side of the
implement. The dressing on this side of the implement is quite perpendicular to the faces of the flake, showing a thick back and knife-like edge, but the part opposite the shoulder on the right side is rounded by dressing like the borers. This specimen has also the character of the pygmies. No. 38 is a fine specimen like No. 31, but dressed from the sides towards the ridge-face only. It was found at Culbane.

These are only samples selected out of a great number of specimens. It is hard to conceive what use these thin, delicate objects could have been employed in. They might have been useful in boring holes in fine leather, but that they might have been employed in the construction of fishing-hooks is, I think, deserving of consideration.

Before leaving the subject of the so-called boring-tools I must refer to the pointed flakes, which show a dressing all along the edge usually towards the ridge-face, sometimes being only slightly dressed when the flake is broad, but in some cases having the sides cut away close to the midrib, thus leaving only a stout triangular implement that could be used either for pointing a spear or for boring purposes. It would seem that there is often a regular gradation from one kind of implement to another. Taking the broader flakes dressed round the margins, we find, whatever their uses may have been, that they resemble the Mousterian points of Palaeolithic age. Some of these are very large and massive. No. 42 is a specimen of this kind. It has likely been made from a large flake or spall, though there is now no appearance of a bulb or a midrib as in ordinary flakes. Both faces are plain and flat, and the dressing is towards one face only, that shown. It was found at Culbane, and is 6 inches long, 3½ inches broad towards the base, and 1½ inches thick. The side not shown is plain and shows no dressing whatever. The implement is quite as massive and fills the hand as well as a Palaeolithic implement of the same dimensions. It is made of reddish-coloured flint. Fig. 43 is an implement somewhat similar to that shown in fig. 42, but in regrouping of the figures into Plates it is shown on its side with its point to the left. It was probably dredged from the bed of the Bann near Coleraine, as it comes from that place. It is formed of greyish flint, and shows part of the original nodule along the base. It is rather finely dressed along the two principal sides. There is no bulb visible, but it may have been dressed away. It is also massive, and is 4 inches long, 3 inches broad at the base, and 1½ inches thick. No. 44 shows an implement formed from a thick and heavy flake. It was found at Culbane, and is dressed by coarse chipping to a stout point. The implement is quite an inch thick, and the bulb-face at the point is slightly dressed. The implement represented in No. 45 was found at Gortgole. It is a stout implement and thick for its size. The point is somewhat curved, owing to the chipping.
dipping deeper on the right side near the point. This may have been mounted in a shaft as a spear or dagger or, perhaps, as some sort of pick. Owing to the coarse chipping on the side, there is no cutting edge. There is shown in No. 46 a flake considerably thinner than those last described. The edges are all neatly dressed, but in their present state they are not cutting edges, but would be suitable for scraping. It was found at Culbane. No. 47 shows one of those flakes which has the side hewn away to near the midrib. When the sides are removed, we have a stout triangular implement, with the bulb-face as one side of the triangle, and the dressed sides the other two. We could find a regular series of flakes from those having the edges only slightly dressed to No. 47, showing the sides dressed into the midrib. A section of this implement is shown. It was found in Augnahoy on the Oo. Antrim side of the Bann, near Portglenone.

There are various flakes of irregular form that have been turned to use, as we see by the dressing along the edges. No. 48 represents a thin knife-like flake that has the edges neatly dressed towards the ridge-side. It was, no doubt, used as a knife. It was found at Culbane. No. 49 is a flake of peculiar form. The bulb is at the left side, and the long projection to the top is a wing of the flake. Along the base, which now appears as its right side, it is dressed into scraper-like edges. It was found near Portglenone. No. 50 shows a thick flake with its three sides all dressed to scraper-like edges. It is formed of reddish-brown flint, and has a sort of glazed patina, like many flakes or implements that come out of the Bann. It was found at Gortgole. There is represented in No. 51 a thin flake of irregular form; the bulb is at the top on the underside, but there is no midrib on the side shown. There is a piece of the outer crust of the nodule from which it was derived, appearing round the base of the flake, and that part is dressed to a scraping-edge. The right and left sides are also dressed to scraper-like edges, but both are slightly concave. This implement and No. 49 are similar to the broad scraper described as a racloir by French archaeologists. It was found at Culbane. No. 56 is a doubled-edged scraper, but also dressed for scraping along the side-edges. The strong, deeply-dressed scraping-edges are, however, at the two ends. It also was found at Culbane. Fig. 57 shows a scraper of the beaked kind made out of a heavy flake very thick at the scraping-edge. It was found at Augnahoy, near Portglenone. These few scrapers that have been described fairly represent those found at various places along the river.

Nos. 52, 53, 54, and 55 show four thin flakes that have rather a knife-like character. No. 53 is dressed with rather delicate flaking into knife-like edges on both right and left sides. It was found in the Bann at Coleraine. No. 52 was dressed over the greater part of the back with thin flaking running close.
to the surface; it was no doubt used as a sort of knife. No. 54 is also a thin flake similarly dressed with thin flakes running along the surface. The flaking covers the entire surface, and the edges are quite sharp and knife-like. The bulb is at the top on the under side; and along the base end on the under side there is about half an inch of the entire face chipped. No. 55 has also thin cutting edges, particularly on the edges to the left. It is slightly twisted so that the edges are not in the same plane. Nos. 53, 54, and 55 came from Culbane. In a great many flakes that are irregular in shape, especially those of small size, one can see small portions of the edge chipped, the chipping arising perhaps from repeated use of one spot. In Nos. 58 to 65, for example, there are eight small flakes which illustrate this use of the edges. No. 62 shows minute chipping along both edges, near the point, as if it had been used in scraping a hard substance like bone when the small chips would be removed from the fine edge by the pressure. No. 59 shows fine chipping, chiefly on the oblique edge, near the point. Nos. 58 and 64 show small indentures on the left side, as if the pressure of scraping had continued for a longer time than usual till sufficient flakes were removed to form a circular hollow. No. 61 shows dressing on the right side, making it a small side-scraper. No. 63 shows fine chipping on the oblique edges near the point, but on the under side, so that the dressing is not seen in the figure. Nos. 60 and 65 show little spots on thin edges where small chips have been removed. It is only by looking carefully that this minute chipping can be observed.

I have passed in review the various kinds of flakes produced along the banks of the River Bann and shores of Lough Neagh and the different ways they have been dressed by chipping, so as to form a considerable variety of tools or implements. Pointed flakes were the kind the people evidently wished most to produce, and in this they were largely successful, as I believe pointed flakes are the most numerous, though collectors as a rule reject unsymmetrical flakes, and we may underestimate the numbers of these. I have myself a large number of flakes which are not pointed, and in many cases I find the edges have been used for some purpose. There is one kind of flake referred to by Sir John Evans in his paper read before the Society of Antiquaries, which I have not mentioned. It is figured as No. 6 of the plate illustrating his paper. He says: "Other flakes again, more especially the very thick ones, have been chipped away at the two sides, leaving the flat face uninjured until the flint has assumed a boat-shaped form. The purpose of these scaphoid implements is at present unexplained." I have a few of these objects. The flakes used in producing them dipped deeper into the core and had a heavy pointed end.
They would seem to be accidental forms. Most of the other flakes passed in review have been dressed in a similar way to those Sir John Evans mentions—the sides having been chipped away, leaving the flat face uninjured. That kind of dressing was pretty general.

We see that the making of the flakes was a great industry along the shores of Lough Neagh and banks of the Bann. Where the raw material came from I cannot say with certainty. The banks of rivers and rivulets and the shores of the lake would supply some, the surface of the soil would yield some boulders, and probably the people may have gone to the outcrop of the Chalk on the county Derry side, or they may even have gone to the outcrop of the Chalk on the Antrim seashore. There is an outcrop of Chalk at Portrush and another at Downhill, and flints may have been procured at these places and carried up the Bann. However it was procured, the material was of large size and good quality, as one can see by the implements produced.

Other and larger implements have yet to be described, for instance, the kitchen-midden and other types of flint axes, the large pick-like implements also, some of which have sharp though very narrow cutting edges.

_Kitchen-Midden Axes._

Kitchen-midden axes are so named from being the characteristic axe found in the Danish kitchen-middens. The edge is clean-cut and formed entirely by fracture, and therefore different from, that of most other flint axes, which are produced by chipping and grinding. Sir John Evans' definition of the edge of a kitchen-midden axe is, that it was formed by the intersection of two facets. Sir John Lubbock (now Lord Avebury) describes the Danish axes as flat on one side and convex on the other; but while this is not a general characteristic of Irish axes of this kind, as far as my observations go, yet some are flatter on one side than the other. No. 68 shows a very typical specimen of the Irish kitchen-midden axe which was found at Culbáne. It is made of reddish-coloured flint, and is 3 1/2 inches long and 2 1/2 inches broad at the cutting edge. It is equally convex on both faces. No. 69 was found at Movanagher, near Kilrea, on the county Derry side of the Bann. It is made of a yellowish flint, and is equally convex on both faces. It is 3 1/2 inches long and 1 1/2 inch broad at the cutting edge. No. 66 was dredged from the Bann at the locks near Kilrea. It is 4 1/2 inches long and 2 1/2 inch broad at the cutting edge. It is weathered a dark brown colour. It is convex on the side shown, and nearly flat on the side not shown. No. 67 is an axe of same type found near Toome, on the Bann shore, and while the edge itself is not improved by grinding, yet the
angular ridge bounding the edge facet has been ground and smoothed. The corresponding ridge on the side not shown is similarly treated. This specimen is 4\(\frac{1}{4}\) inches long and 1\(\frac{1}{2}\) inch broad at the cutting edge.

Although the Danish kitchen-midden axes are not ground, yet the people who used them must have been acquainted with the art of grinding, as portions of ground or polished flint have been found in the middens. The Irish axes of this kind generally do not show any trace of grinding, yet there is the specimen shown in No. 67, showing grinding and smoothing near the edge; and I have another specimen, apparently an axe of this kind, the edge of which has been greatly injured by use, and has been undergoing repair by chipping and grinding. It could not be said that the users of kitchen-midden axes along the Bann were unacquainted with grinding; but I think a fracture edge as in the kitchen-midden axes must have been considered more lasting than one formed by grinding. In the axe factory near Cushendall many axes of kitchen-midden type have been found, and some intended to be ground even show a narrow line of the natural crust where the edge is to be made. I think the belief was that if the edge just reached that natural line and was not cut into by grinding it would be a better and more lasting edge. As I have here mentioned, this type of axe is not confined to the Bann. I have examples from many parts of Antrim; but it is plentiful everywhere in the Bann valley, and is a typical axe of that region. As regards the way in which the kitchen-midden axes were made, some authors have the idea that the facets forming the edge were struck off after the axe was otherwise completed. I do not believe that this was the way the edge of such implements was formed. I rather suspect that the edge was first observed on a broad spall or flake, which was then chipped down into the shape of an axe to suit the edge. On some specimens in my collection I have observed the bulb of percussion in the middle of one of the sides. In other examples the place the bulb formerly occupied on the side of an axe is easily observable by the extra amount of chipping that has taken place in order to smooth the bulb down. I have mentioned this theory to some antiquaries, who expressed themselves convinced of its truth. In some instances so much chipping may have taken place over the faces of the axe that traces of a bulb cannot be seen; but in such cases, and indeed in cases in general, the two facets forming the edge furnish evidence that the edge was the first to be formed, as the side chipping always cuts into one or both of the edge facets, but the latter never into the side chipping. In the case of two axes in my collection one of the facets is formed by the outer crust of the nodule from which the axe was formed. The smaller implements we call knives are formed somewhat similarly. Good edges are there, in the first instance, on a flake, and one is chipped off to form
a back, and one is preserved for cutting. Some of these are rather chisels, shaped with an upright stem like an axe, and we know that the edge was there before the small chisel was formed.

There are some examples of flint axes of the ground and polished kind found along the Bann and in the Bann valley, but I cannot say they are plentiful; I have only in all about ten or a dozen. I show two specimens in figs. 70, 71. No. 70 has been polished all over, but it has not been sufficiently ground to remove all traces of chipping. It is squared at the sides, and is 5 inches long and 2½ inches broad at the edge. It was found at Culbane. No. 71 is a fragment of a larger flint axe which has been very well finished. In the portion that remains not a trace of chipping is visible, and it has been nicely squared at the sides. A new edge has been first chipped and then ground, but the new edge has again got chipped and broken in use. It is in its present state 3½ inches long by 2 inches broad at the cutting edge. It was found at Culbane. I show in No. 72 a polished axe, so well ground and polished that not a single mark of chipping is visible. It is made not of flint but of fine hard rock of greenish shade, somewhat jade-like in character, and so hard that it cannot be scratched with a knife. It is nicely squared on the sides like the two flint axes last described, and is 5½ inches long by 2½ inches broad at the cutting edge. It was found close to the Bann, three miles north of Kilrea. The finder let it drop on a stone, and a small piece of the butt end was broken off. He then only brought away the larger piece, which was sold to me. I asked him to go back and try to find the smaller piece and bring it to me. This he did, and was successful in finding it. The break was a clean one, and now even in its mended state I should say it is a unique example. This is the only specimen of this kind of hard rock which as far as I know has been found in the neighbourhood of the Bann or Lough Neagh. From its hardness and superior finish it is more suitably classed with the flint axes than with those of other rock, afterwards to be described.

Rough-pointed Flint Implements.

Rough, unpolished flint implements are plentiful along the shores of Lough Neagh and banks of the River Bann and for some distance on each side of the river. The majority are pick-like implements made out of nodules of flint. Some are 8 to 10 inches long, heavy at the butt, and ending in a point or very narrow cutting edge. Those with cutting edges come nearest the kitchen-midden axes; therefore I shall describe that kind first. I show in No. 73 a very fine and typical specimen from Culbane, which was found while digging up the diatomaceous clay. It is 7½ inches long, rather cylindrical or rudely triangular near the butt, where it is 6 inches in circumference. The
half nearest the point becomes two-sided, and it ends in a very narrow cutting edge. No. 74 was found in the Bann, and is triangular till within 1\(\frac{1}{2}\) inch of the point when it becomes two-sided, and ends in a sharp cutting edge formed of two facets slightly broader than those in the last example. No. 75 was found on the shores of the Bann nearly opposite to Ballymoney. It is 6 inches long and 5 inches in circumference at the butt; it is dressed from two sides, and a section through it at the centre would be almost quadrangular. It ends in a cutting edge formed by the intersection of two facets as in the two previous examples. The majority of the specimens of this kind are like Palaeolithic implements that had been pulled out, thus gaining in length and losing in breadth. All the three specimens last described show more or less of the old crust of the nodule from which they were formed. There are also, as among Palaeolithic implements, specimens with an edge all round, but in this case also longer and narrower than the more ancient implements. I show in No. 76 a very fine, longish-oval specimen from Culbane, which has still the diatomaceous clay adhering to its chipped surface. It is 7\(\frac{1}{4}\) inches long and 2\(\frac{1}{4}\) inches broad in the centre, from which it gradually narrows towards the ends, terminating in narrow cutting edges, which show plainly that these edges were formed in each case by the intersection of two facets, but the edges are now somewhat blunted or chipped. The side edges are sharp and in the same plane. The flint composing the implement is reddish-brown. No. 78 is also an implement that has an edge all round, and the two side edges are in the same plane. It has a cutting edge formed by the intersection of two facets at each end, that on the thickest end of the implement being the broadest. It was found like No. 74 near the Bann, opposite to Ballymoney, and is 7\(\frac{1}{2}\) inches long by 2\(\frac{1}{4}\) inches broad at the thickest part. It is formed of brownish-coloured flint. No. 77 is also a very symmetrical implement, with two edges all round running in the same plane. At one end I see indications of an edge of the same kind as that on the last two specimens, and there was likely a similar cutting edge on both ends, but one end is now a good deal knocked or hammered, and it cannot certainly be decided whether it had an edge or not. It was found in the Bann at Coleraine, and is now patinated a yellowish-brown colour.

A few examples of flint implements with points at the smaller ends and without cutting edges are shown in figs. 79 to 84. No. 80 is a very fine and typical example of the pick-like implements. It is carefully though coarsely made, and is quite triangular in section. It resembles No. 74, only that the one has been made with a point and the other with a cutting edge. It was found at Lough Tammin, about two miles up the slope of the valley opposite Portglenone. It is 6\(\frac{1}{4}\) inches long and 5\(\frac{1}{4}\) inches in circumference.
near the base. At this part portions of the original crust of the nodule out of which it was made are still visible. No. 81 is also finely pointed. Half of the implement towards the base is rudely triangular, but the half near the point has two side edges with the face shown in the figure coarser than the other. It was found at Culbane, and is 6\frac{1}{2} inches long by 3\frac{1}{2} inches in circumference in the thickest part. There are several examples of this longish-pointed kind of implement, but they are not so numerous as those which have narrow cutting edges. There are also specimens pointed at both ends. I shall now show three short pointed implements with heavy butts, a class which is fairly numerous. No. 85 is an example with a curved but fine point. It is representative of several other implements with similarly curved points. It is somewhat cylindrical in section, and shows very coarse and irregular chipping. It was found in the Bann at Coleraine, and is 4\frac{1}{4} inches long by 7 inches in circumference at the base where it shows part of the original crust. It was evidently a hand weapon, as the base fits the hand well. No. 86 is a similar weapon found also at Coleraine. It is 5 inches long and 7\frac{1}{4} inches in circumference at the thickest part. The point has a slight curve, but it is not so fine as in the last described specimen. No. 87 was also found in the Bann near Coleraine. It is rudely triangular in the worked portion towards the point. It has been formed by very coarse chipping, and has a well-rounded base to fit the hand, showing the original crust of the nodule from which it was made. It is 4\frac{1}{2} inches long by 7\frac{1}{4} inches in circumference round the base. Although the last three specimens come from the Bann near Coleraine, they are quite typical of a series found at other parts of the Bann and the shores of Lough Neagh. I show in No. 83 a pointed implement of flint from Lough Neagh. A nodule has been split into four, and the implement figured has been made out of one of the quarters. It is somewhat triangular in section. The chipping is finer on this specimen than in those shown in 85, 86, and 87. It was found during the excursion of the Ballymena antiquaries already referred to. It is 5 inches long and 6\frac{1}{4} inches in circumference. Nos. 79, 82, and 84 represent a series of small implements of the pointed kind, which are numerous and found at all stations along the Bann. They appear to be all pointed, as I have not found one of this small variety with a cutting edge. Like the larger kind, these small implements are mostly formed by coarse, irregular chipping. No. 79 comes from Gortgole. It is triangular in section, 3 inches long and 2\frac{1}{4} inches in circumference. The example shown as No. 82 was found at Culbane, and is somewhat quadrangular in section. It is 3\frac{3}{4} inches long and 3\frac{1}{2} inches in circumference in the thickest part. No. 9 was found in the Bann near Coleraine. It is 3 inches long and 2\frac{1}{4} inches in circumference. These smaller pointed
implements are, on the whole, more numerous than the larger kinds, and there are many similar implements of sizes intermediate between the two kinds. All these pointed implements have one general character in common—that is their formation by coarse, irregular chipping.

It is not easy to form an idea of how these coarse-pointed implements were used. I do not think they could have been used as agricultural implements of any kind, as they are seldom met with far from the banks of the river; and the banks of the Bann, subject as this river must have been to periodical flooding, were not suitable for farming, if the inhabitants were inclined or had knowledge to practise that industry. I think we might speak with certainty of those having sharp-cutting edges. I believe they were used without doubt as cutting tools. Some years ago I bought from Mr. W. G. Lawrence, of Wandsworth, London, two coarse flint implements from the Thames. They struck me at the time as being very like those from the Bann. I have made inquiries since as to whether any other implements of the same kind were found in the Thames, and have been informed that some English collectors have a series of these; but if anything has been published on the subject, it has escaped my notice. They are shown in figs. 89 and 92 for comparison with the Irish implements. No. 92 is flat on one side and highly convex on the other, that shown. It has a cutting edge at the lower end of the figure. No. 89 is triangular in section and pointed.

Besides the coarsely chipped implements already brought under notice, many very finely made arrow and spearheads have been found in the Bann valley, the lozenge and kite-shaped kinds being the most numerous. Some of these I have described and figured on more than one occasion. Hammer-stones and fabricators that have been used in the manufacture of the various implements are often found, and the cores from which flakes have been struck are abundant, especially small cores. Figs. 93 to 96 show four examples of these small cores. They all show that they had been used for the purpose of producing very small flakes.

Besides the flint implements that have been passed in review, the Bann valley and shores of Lough Neagh have yielded a large quantity of axes, chisels, and various implements made of rocks of other kinds, that most used being a kind of metamorphic shale, generally called clay-slate.

** Implements of Clay-slate.**

The black rock which yields the greatest number of implements is, I believe, that known as Carboniferous slate. It appears to be of nearly general distribution over Ireland. The fine axe 22 inches long in the Royal Irish...
Academy's Museum was found in the River Blackwater, Co. Armagh, and is formed, I believe, of the same rocks as those I am going to describe from the Bann. Sir William Wilde calls the material clay-slate. In the Bann implements various laminae of rock differing in shade are often visible, and that some layers are more easily affected by the weather than others, can be seen in the implements that have been long exposed. I have some stone hatchets greatly disfigured by such weathering.

Sir John Evans in his paper on "Archaeologia," 2 on "Discoveries of Stone Implements in Lough Neagh," says: "The stone hatchets or celts, as they are commonly called, have been made principally of the following materials:—clay-slate, green-stone, lapis Lydius, serpentine, basalt, hornblende, schist, talcose-slate, and various other metamorphic rocks. A few occur in flint." Lapus Lydius, according to Sir William Wilde, is the chert or black substance derived from the Carboniferous limestone, corresponding to flint, and at Bundoran, in Co. Donegal, I got many implements made of this substance. It had a shiny fracture, and was quite black. I have searched among my finds from the Bann on various occasions, but have not found any articles made of material similar to that of the Bundoran implements. Lapis Lydius may, however, show different degrees of fineness, though I have seen it of the same texture and fineness in Galway as in Donegal. There is no reason why lapis Lydius should not be found, and if found made into implements, but it evidently has not been found in any quantity.

Figs. 88, 90, 91 show three implements of black rock, which are pointed and unpolished. They could all be matched by similar implements in flint, and therefore, I should say, form a connecting link between the flint and black stone implements. No. 91 has a thick butt at the top of the figure, and is pointed at opposite end. No. 88, like some coarse flint implements, has a rude point at each end. Both are made of very hard rock, which cannot be scratched with a knife; and though they do not show the smooth fracture and lustre of the Carboniferous chert I am acquainted with from Bundoran, yet this might be the kind of rock which Sir John Evans describes as lapis Lydius. It is certainly different from the clay-slate rock, of which so many implements are made. The fine-pointed implement shown in No. 90 is made of fine black rock, but is very light as compared with the size of the implement. We find very fine large flakes pointed like those of flint, and stone axes having the same form and character as the axes of clay-slate, made of this light material. The rock would seem to have been formed of fine mud; and I have an axe made of it, which the owner has used as a hone

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1 Cat. Mus. R.I.A., p. 43.
2 Vol. xii, part ii, p. 409.
for sharpening his razor. It is supposed that some substance has dissolved and oozed out of the stone since the implements were made. No. 90 was found at Culbene, and is 6$\frac{1}{2}$ inches long by 7$\frac{1}{2}$ inches in circumference in the thickest part. While some pick-like objects have also been made of the clay-slate, the most numerous implements made from this rock are axes and chisels. The largest of the axes in my own collection is 18$\frac{1}{4}$ inches long, and the smallest is 1$\frac{5}{16}$ inches long by $\frac{7}{8}$ inch broad near the cutting edge. This small implement is well made and finished after the manner of a larger axe. Rev. James O'Laverty, in the "Ulster Journal of Archaeology," old series, vol. v, p. 122, mentions the finding of three stone clubs during the deepening of the Bann by the Board of Works; and he gives an outline of one at page 127 of same volume, grasped by a hand to show how it was probably used. I had the opportunity of seeing these so-called clubs at the sale of Monsignor O'Laverty's collection of antiquities in Belfast, in June, 1906; I believed that I had purchased the specimen in question with some other axes, and had removed them, and they were some days in my possession; but as another gentleman claimed the lot that I supposed I had purchased, I gave them up. While these articles were in my possession, I had a drawing made of the so-called club, which I now reproduce in fig. 113. Anyone having a knowledge of antiquities will see that the implement is an axe, and not a club. One of the other implements, described as a club, had a very broad edge, prepared for cutting, and was also undoubtedly an axe. Broad-edged axes, made from the clay-slate, were not uncommon. I show a specimen from my own collection in fig. 121. It was found near the watershed between the Bann and the Maine; but it is made of the clay-slate, and belongs to the Bann series of implements. It has not the usual shape of stone axes, and its handle-like butt-end might suggest to some persons that it was used as a club; but as it has an edge at the lower broad end, like other axes, I would call it, like fig. 113, an axe. I show in figs. 117, 124, and 125 three axes made of clay-slate. No. 117 is the longest axe from the Bann valley that has come into my possession. It is 18$\frac{1}{4}$ inches long, and has been longer, as the original edge has been broken off, and a new one ground in its place. It is 3$\frac{3}{4}$ inches broad and 1$\frac{1}{2}$ inches thick, and weighs 3$\frac{3}{4}$ lb. It was found at Culbene while digging up the diatomaceous clay for making into brick—an extensive industry at this place. No. 124 is a flat, thin axe, 15$\frac{1}{4}$ inches long, 3$\frac{3}{4}$ inches broad, and five-eighths of an inch thick. It is in appearance like the large axe from the Blackwater, described by Sir William Wilde, and which he suggests may have been the coulter of a plough, though he says it bears no evidence of having been so employed. The arras on my specimen is intact, and it has the same thickness throughout. It was broken by a clean fracture near the centre;
and it has suffered a little injury at one corner of the edge by the spade of the finder striking it. Otherwise the edge is good and sharp; and I am convinced that the edge was the only part intended for use; and that such a specimen could not have been intended for the coulter of a plough, or any other use than that of an axe. I have also another of those thin axes, 18\(\frac{1}{2}\) inches long, but not quite symmetrical, and the edge is oblique. It has suffered from weathering. No. 125 shows an axe made of the clay-slate, and exhibiting along the edge several layers. It is 14 inches long, 3 inches broad, and 2 inches in thickness, and was found at Culbane, in August, 1904. It was found after digging away about a foot of peaty soil, then about two feet of the diatomaceous clay, when the axe appeared standing upright, with the edge uppermost. It is a very perfect specimen, ground only, with no trace of polishing. I have several specimens nearly similar to No. 3, varying from 13 to 16 inches in length. Some are nearly cylindrical in section. I have a good many axes 10 to 12 inches long; some very perfect specimens from 5 or 6 to 8 inches long. In fig. 128 I show two views of an axe 8\(\frac{1}{2}\) inches long, 2\(\frac{1}{2}\) inches broad, and 1\(\frac{1}{2}\) inch thick. The view to the left is in perfect condition; but the face shown in the right-hand figure has been much exposed to the weather; and we see how softer layers have been eaten into or removed while harder layers are scarcely affected. No. 98 is another axe with one straight side, probably formed by sawing, while the other side is worked into shape by coarse chipping. The ground edge shows several layers of the clay-slate. It is 6\(\frac{1}{2}\) inches long, 2\(\frac{1}{2}\) inches broad near the edge, and 1\(\frac{1}{2}\) inch thick. The edge is the only part ground. It was found at Culbane while digging the diatomaceous clay. No. 99 shows a very perfect axe from Ballyscullion bog, on the borders of the Bann, on the County Antrim side. It is made of clay-slate, but has been ground all over till not a trace of original chipping is visible. There is no trace of polishing, and the striae of the grinding are still quite plain on the surface. It is 7\(\frac{1}{2}\) inches long, 3\(\frac{1}{2}\) inches broad near the edge, and 1\(\frac{1}{2}\) inches thick. The base of the axe is ground to a sharp cutting edge. Many of the Bann axes and chisels have a cutting edge at both ends; but the edge at the butt-end of the axe is always narrower than the usual edge.

In Plates XVI and XVII are shown some axes and chisels of various types. No. 97 is a small axe somewhat lozenge-shaped. It is formed of clay-slate, and shows several layers on the edges—the two lower sides of the lozenge are both cutting edges—the other sides are rounded. It is 3\(\frac{1}{2}\) inches long, 3\(\frac{1}{2}\) inches broad, and 1 inch thick. This is the only specimen I have of this shape, and I am of opinion that the original form of the small boulder from which it was made has suggested its present shape. However, neither No. 100 nor 101 is of the ordinary type of axe, and they were, no doubt, specially designed, and
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therefore so may no. 97. no. 100 is one of several axes in my collection of the
same shape. i believe the axes of this kind, with straight squared sides, have
been formed by sawing thin slabs of the clay-slate. no. 100 is 4½ inches long,
2¼ inches broad at the cutting edge, and ½ inch thick. it is ground at the
edge only. fig. 101 has expanding edges caused by the grinding of the sides
in the centre. i have an axe similarly shaped by chipping the sides. no. 101
is 3 inches long and 2 inches broad at the cutting edge, and is ¼ of an inch
thick in the centre. it was found at culbane. no. 102 is evidently a portion
of a larger implement, perhaps an axe like no. 103. it supplies the best
evidence of the sawing of the slabs of clay-slate rock which i have already
referred to. the method of sawing adopted was to saw the slab partly on
both sides, and when nearly met in the middle not to spend time sawing all
the way through, but to tap it till it broke. on the right side of this chisel
it can be seen that the sawing from the two sides had nearly met, and only
one thin raised portion shows the part that was broken. the cuttings on each
face on the right side were exactly opposite each other, but on the left side,
while the lines of sawing were opposite at the lower end or edge of the figure,
they moved away from each other towards the top or butt end, and the
difference between the lines was at that part three-sixteenths of an inch. on
the side view is seen distinctly the portion broken off, which has been
smoothed down, but not to the level of the sawn portions. this specimen
was found at culbane.

i formerly did not believe that the prehistoric people in ireland had
resorted to sawing of rocks, like the new zealanders and inhabitants of
the swiss lake-dwellings, to form axes and chisels. i thought the hardened
shale rock had broken naturally into the various shapes we found exhibited
in the axes, but no. 102 has thrown a new light on the subject,
and now i believe that the straight sides observed in many axes
and chisels are the result of sawing the clay-slate. we thus see a new
industry along the banks of the bann which we did not previously suspect.

i have not met with any saw-like flints, nor would any flake be long enough
or straight enough in the edge to cut the long, straight sides of many chisels
and axes found in the neighbourhood of the bann. if this people felt the
necessity for sawing the rock, i do not think it would be beyond their
ability to invent some such saw as is shown in fig. 28, pl. xiii. they
evidently struck off large quantities of small flakes, and it would not be hard to
fix a number of these in a frame of wood to use as a saw. they may, however,

have worked patiently with the point of a flake in one groove till the
sawing was completed. however it was done, i believe the act of sawing to
form the axes and chisels cannot now be disputed. no. 103 is an axe with
straight sides like No. 100. It is ground at the cutting edge only, and has evidently been shaped by sawing. It was found at Aughnahoy, on the banks of the Bann, three feet below the brick-clay, and is 7\(\frac{1}{8}\) inches long by 2\(\frac{1}{2}\) inches broad at the cutting edge, and 8\(\frac{1}{8}\) inch thick. No. 104 is a chisel which was found at Culbane. It has been shaped by sawing, and is 7 inches long by 1\(\frac{1}{4}\) inches broad, and \(\frac{1}{4}\) inch thick. A number of chisels of various sizes are seen in figs. 105, 106, and 107. No. 105 is a thin, sharp-edged chisel which was found at Culbane. From the sharpness of its side edges it might as readily be called a knife as a chisel. It is 5\(\frac{1}{2}\) inches long, 1\(\frac{1}{4}\) inches broad, and three-eighths of an inch thick. No. 107 is a stout little chisel which was found at Culbane, and has been shaped by sawing. It has got a slight grinding on the two principal faces, and is 3\(\frac{1}{4}\) inches long, \(\frac{3}{4}\) of an inch broad, and \(\frac{3}{4}\) of an inch thick. It has a sharp-cutting edge. No. 106 was also found at Culbane, and has been formed by sawing. No grinding is visible except at the edge. It is 4\(\frac{1}{4}\) inches long, 1 inch broad at the cutting edge, \(\frac{1}{4}\) an inch thick. No. 4 was also found at Culbane. It has apparently been formed by sawing, but has been ground all over, and has an edge at each end, both equally sharp. No. 5 may, from its weight, be rather looked on as a narrow axe. It is 10 inches long, and has been formed on the right side by sawing. It is 1\(\frac{1}{2}\) inches thick at its thickest part, and 1\(\frac{1}{4}\) inches broad. It was found in the bottom of the Largy bog near the Bann on the county Antrim side. No. 6 comes from Culbane. It is 8 inches long, \(\frac{7}{8}\) of an inch broad, and \(\frac{1}{4}\) an inch thick. It has been formed by sawing, and has got a slight grinding on both faces. There is only one edge, which is shown at the lower end of the figure. There are many other axes and chisels having long, clean-cut sides, which could hardly be formed by continuous rubbing in one groove by the point of a flake. Some are 7 to 10 inches long, and I believe the straight sides in these implements could only be formed by one long saw, and the only saw I can imagine that would fit the case is a rod or frame of wood having flint teeth fixed therein.

In figs. 111 and 112 I show two axes of a kind which Sir John Evans draws attention to in his paper "Discoveries of Stone Implements in Lough Neagh." One kind is ground flat crosswise, while it is convex lengthwise. No. 112 is of this kind, two views of which are given: that shown to the left has the usual convexity of an axe; that to the right gives a three-quarter view, showing position of the other face that is ground flat crosswise, while it is convex lengthwise. It was found at Grangemore, within about a mile of the mouth of the Bann, and is 3\(\frac{1}{2}\) inches long. No. 111 is an axe which for the greater part is equally convex on both faces, but has been ground flatter on one side at the edge, thus making it into a sort of
gouge. There are many specimens of this kind, No. 111, from about an inch above the edge, is equally convex on both faces, but towards the edge it is ground flatter, and even hollowed at the edge, thus forming a complete gouge. It is 3 3/4 inches long, and was found at Portglenone. Two views are also given of No. 112.

Nos. 118 and 120 show a flake and an axe of the kind which is light in weight as compared with the size. The flake is a very well-formed specimen, slightly injured at the point, and the axe is well and finely ground, with an edge at both ends. It is similar to the axes of clay-slate, and I consider these implements of light weight must have been formed of a thicker layer of extra fineness in the formation to which the clay-slate belongs. Implements of this light substance, as far as anyone can conceive, could be of no use to the early inhabitants along the Bann, and therefore I should say it must have been of normal weight when the people formed it into implements. The theory that some ingredient forming the rock had dissolved and escaped since the implements were made was first suggested to me by Canon Greenwell, and is, I believe, a plausible one. Kinahan, in his "Geology of Ireland," frequently mentions beds of "Calcareous Shale" as part of the rock comprised in the Carboniferous Slate. He mentions rocks having the same characteristics of the Lower Limestone Shale and Old Red Sandstone as occurring in the valley of the Blackwater, where the axe 22 inches long, formed of clay-slate, was found.1 The clay-slate of which the Bann implements are formed must have occurred in the form of small boulders, which have supplied the people on the banks of the Bann and Lough Neagh with material for axes. If among this material were some Calcareous shale, we might have such a rock as would probably explain these light stone implements. If they were originally made of Limestone shale, the lime would probably dissolve out of the implements when exposed to the waters of Lough Neagh and the Bann, which have a strong tendency to dissolve limestone. As a proof of this, I find that flints from the Bann which have had little cavities filled with chalk when they were made into implements have now lost the lime, and only the empty cavities are to be seen, thus detracting greatly from the symmetry of these objects. Flint implements from Larne, or other parts where exposed to sea-water, are not affected in the same way, and such cavities as were filled with chalk when made into implements still remain in their original condition.

Some of the implements from the Bann and Lough Neagh have a pointed character, and are like ground or polished picks; others are knife-like, with a

1 Wilde's Catalogue, R.I.A.
thin cutting edge. Figs. 105 to 107 show a few examples. No. 119 is a sort of double pick, with slight indentures formed by chipping at each side at the centre, as if to have a place for a withe or other handle, so that either of the two ends which are pointed could be used. The two principal faces are somewhat flattened. It is 10\frac{1}{2} inches long; but as one end is a little injured, it was slightly longer in its original state. It is 2\frac{1}{2} inches broad by \frac{3}{4} of an inch thick, and appears to be formed of clay-slate which has been ground and smoothed over or polished. It was found near the shores of Lough Neagh, opposite Randalstown. No. 116, which was found at the same place, is 10\frac{1}{2} inches long, and made also, I believe, of clay-slate; but, like No. 1, of a fine quality. It has a flat side, which would appear to have been used as a hone. The side shown is convex, and it terminates in a point, that is cylindrical in section. No. 114 is a knife-like implement, with sharp sides and point, but somewhat injured. It is 6\frac{7}{8} inches long and 1 inch broad at the widest part. It was found on the shores of Lough Neagh, at Toome. No. 109 is a knife-like implement, thin, with a sharp cutting edge on each side. A portion at the point end has been broken off, and the break has been ground and smoothed. It has a handle which is pierced with a hole. It was found at Culbane, and is still 6\frac{1}{2} inches long. No. 123 was evidently made for a knife. It is 4\frac{1}{2} inches long and 1\frac{1}{2} inches broad at the widest part. It has been ground to a cutting edge all round both sides, and has a sharp point. It was found on the banks of the Bann, one mile from Toome, on the Portglenone side. No. 122 is only a broken-off point of a knife. It was found at Culbane. In addition to those figured and described, I have several other interesting examples of a similar kind from Lough Neagh and the River Bann.

Grinding-stones.

This paper would not be complete without some account of the stones on which the clay-slate, axes, and chisels were ground into shape. A considerable number of sandstone boulders have been found along the Bann, and many have been dug out of the brick clay, which are smoothed or grooved on one or more sides, presumably by grinding the stone axes on them. This, with the exception of some small hand-specimens, seems to have been the only kind of grindstone used from first to last, as the striae caused by rubbing backwards, forwards, and across on the sandstone are still visible on the faces of the axes, crossing and recrossing in all directions. I have from fifteen to twenty of these grinding-stones of various sizes. The New Zealanders not only sawed their rocks into the form of axes and chisels in the way the early inhabitants along the Bann did with clay-slate, but they ground their axes on
slabs of sandstone, just as the Bann people did. I have one grinding-slab from New Zealand which I could match with some of those from the Bann. I show in Plate XIX, fig. 126, a sandstone slab, ground on both its flat faces, which was found in the brick clay of Culbane, 4 feet from the surface. Close to it was found a nest of six stone axes, ground and completed. Possibly the person who ground these axes intended to return next day and grind some more; but I suppose a flood—a thing which must have been of frequent occurrence along the Bann—had come in the meantime, and either was long in subsiding, or covered all with a deposit of mud, so that the place where the grinding-slab and axes had been laid down could not be found. This or some other cause prevented them from being found until they were brought to light a few years ago. This slab of well-rubbed sandstone is 13 inches long by 8 inches broad. I show an axe resting on this grindstone.

Axe-hammers.

All the implements I have previously described might, I should say, be looked on as those of one people, and to represent one stage of culture, but other objects of stone have been found in the Bann which may be of later age and belong to a higher stage of culture. There is no doubt that a succession of peoples came to this beautiful valley abounding in food, each bringing superior implements, and perhaps a higher degree of culture. We can easily judge for ourselves that such waves of culture succeeded each other by the finding of bronze implements and of an early type of iron implements in the Bann and Lough Neagh. I am not, however, dealing with metal objects on the present occasion, but only with those of stone, and, owing to stone axe-hammers and other pierced stones having been found in the Bann, I am taking notice of them.

An old man now living in Portglenone, over eighty years of age, and who worked at the excavations made in the bed of the Bann by the Board of Works, remembers Rev. James O'Laverty collecting the antiquities found during the deepening of the river. He was down along the banks of the Bann every morning to procure, if possible, whatever was found, but he had a competitor, a dealer or pedlar, who was there every morning also for a similar purpose. No doubt his Reverence got the lion's share, as he obtained a very large and good assortment of prehistoric implements. Father O'Laverty did not write much about the objects he found, as far as I have been able to discover. I know of only one paper of his,1 in which he deals chiefly with the age and succession in point of time of the various kinds of implements found while deepening the bed of the Bann. He allows the editor of the "Ulster Journal of

1 Ulster Journal of Archaeology (O.S.), vol. v, p. 122.
Archaeology” to describe and figure an axe-hammer from the Bann in vol. iii, p. 234, of that journal. We learn both from him and Father O‘Laverty’s paper in vol. v, that this axe-hammer was found in the bed of the Bann. At the sale of the late Monsignor O‘Laverty’s collection of antiquities in Belfast a few years ago I purchased the axe-hammer referred to above. I also purchased a hammer of miscellaneous stones mostly perforated, and found in it one other complete axe-hammer, and another shaped but only partly bored. The boring does not seem to have been done by rotary motion, but by punching. It is possible that these axe-hammers and other perforated stones may belong to a time when there were metal punches to bore them; but while that may have been the case, and if we found the punches it would help to prove it, yet I am of opinion that the small pick-like flint objects, three of which I have shown in Nos. 79, 82, and 84, and which are very abundant in all parts of the Bann valley, could usefully have been employed in boring holes in other stones. If held between the finger and thumb in one hand and struck repeatedly with a hammer-stone held in the other after the manner in which quarrymen use their steel-pointed jumpers when boring holes for blasting purposes in the present day, the boring of an axe-hammer could easily have been accomplished. One flint borer employed in this way might soon be used up, but what would it signify if a dozen or a score of these coarsely, and evidently hastily, made articles were required for boring a single hole? The partly bored axe-hammer I have mentioned is bored to a depth of \(\frac{1}{2}\) an inch on one side and \(\frac{3}{4}\) of an inch on the other.

The axe-hammer in my possession, which is described in the “Ulster Journal of Archaeology,”\(^1\) is 6\(\frac{1}{2}\) inches long and 4 inches broad at the widest part, and weighs two pounds. I show two views of it in fig. 127. Sir John Evans in his “Stone Implements and Ornaments”\(^2\) refers to an implement of this kind: “This Irish axehead is formed of pale green horn-stone, and is now in the British Museum.” On a late occasion, when in London, I called to see the axe-hammer which Sir John Evans said was in the British Museum, and I was shown one which is very like my specimen in make and finish, but smaller and lighter in colour than its dark and bigger brother in my collection. The specimen in the Museum is labelled, “Pierced Axe-hammer, River Bann, Ireland, Ulster Journal of Archaeology, iii, 234. Given by Rev. G. Wilson, 1883.” This specimen may have been bought from the pedlar above referred to. From the finish, shape, and likeness of the ornamentation, I should say that both implements were made by the same artist. They were probably found in the Bann at the same time.

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1 Vol. iii, p. 234.  
2 2nd edition, p. 198.
Sir John Evans in his paper on “Discoveries of Stone Implements in Lough Neagh” says these discoveries may almost be ranked with those of the prolific caves of Dordogne or those of the Pfahlbauten of the Swiss lakes. That was in 1867, nearly half a century ago, and during the intervening time finds of implements and flakes have increased largely, I should say to four or five times the quantity recorded by Sir John Evans. The finds of stone implements from the Bann and Lough Neagh ought certainly to occupy a very important place in the prehistory of Europe. Referring to the age of these implements, Sir John Evans puts before us the state of civilization of the north of Ireland about the year 1600, and adds that “the picture he gives is by no means inconsistent with the extensive use of the readiest materials which come to hand, such as bone, wood, and stone, for most of such simple implements and weapons for the chase as might be required, rather than that of metal, which was not readily accessible, or only to be procured by commerce or barter;” but later on he adds, by way of qualification of the above statement, that he does not desire that the observations he has made as to the method of life or degree of civilization existing in Ireland in the days of Elizabeth should be understood as implying that the implements he has been describing do not date back to a period far more remote than three centuries ago.

The implements of flint and clay-slate have been found in the brick clay or diatomaceous formation which passes under the ordinary peat, and I have one implement (fig. 103) marked as being found three feet below the brick-clay. These facts, and the fact that the forms of many of the implements show that they were survivals from a more ancient period, would lead me to believe that they were of Early Neolithic age.

In order to give a general idea of the numbers of the various kinds of objects found, I append a summary of those in my own collection:

Flint.

Flakes—One-half of which show work on some part, . 3,296
Cores—Mostly small, . . . . . 669
Pointed implements, with cutting edge at one end, . . . . 88
Do. with point at one end and edge at the other, . . . . 10
Oval implements with cutting edge at both ends, . . . . 21
Do. small size without distinct edges or points at the ends, . 25
Pointed implements without a cutting edge, long,   .   .   22
  Do.       do.      do.,  medium,  .   .   55
  Do.       do.      do.,  small,  .   .   70
Pointed implements finely made and slender,   .   .   10
Implements with a point at each end,   .   .   4
Pointed implements, stout and short, with heavy butts (hand weapons),  .   .   42
Kitchen-midden axes,   .   .   82
Ordinary flint axes (some polished),   .   .   16
Scrapers,   .   .   241
Miscellaneous—Including hammer-stones, fabricators, flint-knives, and arrow-heads, under-estimated at   .   .   100

<table>
<thead>
<tr>
<th>Item</th>
<th>Quantity</th>
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<tbody>
<tr>
<td>Axes ground, light weight</td>
<td>23</td>
</tr>
<tr>
<td>Chisels, ground at edge</td>
<td>115</td>
</tr>
<tr>
<td>Flakes, light weight</td>
<td>5</td>
</tr>
<tr>
<td>Grinding-stones</td>
<td>21</td>
</tr>
</tbody>
</table>

Total, 5,633
Knowles.—Prehistoric Implements from River Bann.
(All figures $\frac{1}{4}$.)
Knowles.—Prehistoric Implements from River Bann.
(Figs. 31–41 ¼. The others ¼.)
Knowles—Prehistoric Implements from River Bann.

(All figures 1/4.)
KNOWLES.—PREHISTORIC IMPLEMENTS FROM RIVER BANN.

(All figures 1.)
Knowles.—Prehistoric Implements from River Bann.

(All figures \( \frac{1}{2} \))
Knowles.—Prehistoric Implements from River Bann.
(All figures 1/2.)
KNOWLES.—PREHISTORIC IMPLEMENTS FROM RIVER BANN.
(All figures ¼.)
Knowles.—Prehistoric Implements from River Bann
(All figures $\frac{1}{4}$.)