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ON THE METHOD EMPLOYED IN USING THE SO-CALLED "OTTER OR BEAVER TRAPS." BY G. S. GRAHAM-SMITH, M.D., F.R.S.

Early in 1921 Mr Charles Pirrie, when digging peat on the Moss of Auquharney, Aberdeenshire, found, about 10 feet below the original surface, one of the so-called "otter or beaver traps," together with three fragments of a stout stick, apparently used in connection with the trap. In August 1921 Mr Pirrie very kindly allowed the writer to examine the trap and to make a full-sized model of it. The whole trap, and more especially the valve, had become shrunk and to some extent distorted since it was first discovered. It was presented later by Mr W. Yeats McDonald of Auquharney, on whose estate it was found, to the University of Aberdeen, and is now preserved in the Anthropological Museum, Marischal College.

This trap appears to be the only one of its kind hitherto discovered in Scotland. Munro (1919), who made a careful study of these traps, states that up to the year 1919 eleven such traps had been found in Ireland, one in Wales, and twenty-nine in widely separated localities, mostly peat bogs, on the continent, including places in Denmark, Lombardy, Germany, and Carniola. All the continental examples, except one found at Lubochin on the Vistula and now in the Danzig museum, have two valves, while all the British examples, including the specimen found at Auquharney, have only one valve.

Most writers have regarded them as traps to catch otters, beavers, wild-fowl, fish, etc., but no very satisfactory explanation of their mode of use has been given, while others have considered them to be machines for making peat blocks, musical instruments, models of boats, etc. Gillespie (1919) calls attention to a figure published by Allen (1897) illustrating a rubbing from a sculptured stone at Clonmacnois, Ireland, probably of the eighth or ninth century, in which a stag is shown with one fore-foot "fixed in a rectangular frame or hobble," and suggests that this object represents one of these traps.

The Auquharney trap resembles closely the single-valved traps illustrated by Munro, but in order to explain the writer's views on the manner in which it was used a detailed description is necessary.

The trap is about 45 inches long and 10 inches wide. It is made from an alder branch, which seems to have been split, presumably by wedges, down the centre and subsequently worked with a metal gouge, the tool marks being very distinct in many places.

An aperture (fig. 1, 1) 14 inches long by 4 inches wide pierces the machine at its centre. On the rounded surface of the trap the edges of the aperture are widely bevelled outwardly (fig. 2, 2), a feature common to most, if not all, traps hitherto found. On the split, flattened surface the wood round the aperture, except on one of the longer sides (fig. 1, 3) has been cut away to the depth of about 1 inch, so as to form a ledge. At each end of the aperture the ledge is about 2 inches wide (fig. 1, 4), but is not carried the complete width of the aperture, stopping about $\frac{1}{2}$ inch from the side (fig. 1, 5) on which the ledge is not continued. On the opposite side of the aperture the ledge is only 1 inch wide (fig. 1, 6), but is prolonged at each end as a groove (fig. 1, 7), about 3.5 inches beyond the aperture and more than 1 inch beyond the transverse ledge. The outer sides of these grooves are decidedly undercut. The result of

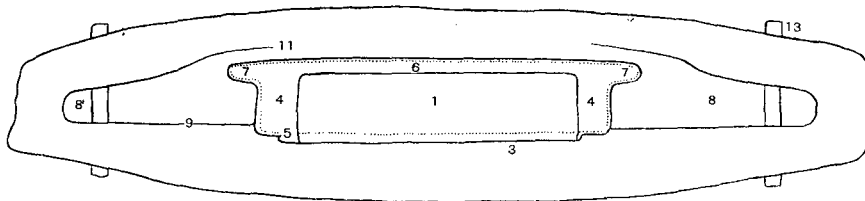


Fig. 1. View of the flat surface of the Trap.

1. Aperture ; 3. Side of aperture without ledge ; 4, 4. Transverse portions of the ledge ; 5. Region in which the ledge stops short of the full width of the aperture ; 6. Longitudinal portion of the ledge supporting the central portions of the hinge of the valve ; 7, 7. Prolongations of the ledge forming grooves to accommodate prolongations of the hinge of the valve ; 8. Excavations ; 8'. Deepest part of the excavation ; 9. Vertical edge of the excavation ; 11. Shallow margin of the excavation passing on to the surface ; 13. Peg inserted through transverse hole.

The dotted line represents the margin of the valve when in position.

this work is a T-shaped ledge on which the trap door or valve of birch rests.

The valve, which is about 1 inch in thickness, is T-shaped so as to rest on the ledge just described, but owing to the ledge being not so wide as the aperture the valve fails to cover the opening by half an inch or more. It was noticed in the Coolnaman trap also that the valve was narrower than the aperture. The cross piece of the T acts as a hinge and its outer surface is rounded. Its projecting ends, which occupy the grooves, are oval with their long axes vertical, when the valve is in place. When, however, the valve is opened the long axes become engaged in the undercut parts of the grooves. The consequence is that when the flat surface of the trap is downwards and the valve is forced open it cannot fall away from the trap. This ingenious method of construction points to the trap having been set with its flattened surface below, as also does the pronounced outward bevelling of the aperture

on the rounded surface, which would tend to direct the foot of any animal treading on the bevelled edges on to the valve. Again, the slit provided between one side of the aperture and the free edge of the valve would tend to arrest a foot slipping over the surface of the valve and cause it to exert pressure on the free edge of the valve. At the centre of the valve is an oval hollow about 1 inch in diameter and nearly 1 inch in depth. Towards the ends of the flattened surface of the trap excavations (fig. 1, 8) have been made. They are exactly similar so that one only need be described. The deepest and narrowest part of the excavation (fig. 1, 8') is situated about 3 inches from the end of the flattened surface and is 3.25 inches deep and 1.5 inch wide. From this point the excavation widens and becoming shallower approaches the aperture. On the side of the trap on which the free edge of the valve is situated the wall of the excavation is straight and vertical and continues the line of the free edge of the valve (fig. 1, 9). This vertical wall prevents the bow, mentioned later, from being displayed towards this side in such a manner as to hinder the opening of the valve. The excavation itself is prolonged up to the ledge supporting the valve, but at this point it is only about $\frac{3}{4}$ inch deep, and its base is therefore well above the floor of the ledge (fig. 2, 10). On the side of the trap on which the hinge of the valve is situated the excavation as it approaches the aperture widens and becomes shallower till it passes on to the surface 1 inch outside the margin of the aperture (fig. 1, 11). On this side the deeper portions of the wall of the excavation are undercut. The arrangement is such that when the valve is forced open the ends of the displaced bow can lie in the curved grooves which have been provided.

An oval hole (fig. 2, 12) has been bored through the substance of the trap at right angles to its length about 1 inch below the flat surface and 1.5 inch from the end of the excavation. In these holes pieces of wood, or pegs, were present when the trap was found (fig. 1, 13).

Together with the trap were found three portions of a stick of willow, which when united showed that it had been in the form of a bow (fig. 2, 14), about 1.5 inch in diameter at its middle and tapering to each end. The ends were oval in section, with the long axis parallel to the arch of the bow.

Pieces of stick 1.5 inch thick were found with the trap in the moor of Samow, and pieces of stick, including a forked stick, with a trap at Fontega. Part of the bow was found in place in the Clonetrace trap, and a complete bow in position in one of the Larkhill traps.

In attempting to discover the way in which the trap was used experiments were made with the full-sized model. It was found that by fixing the ends of the bow in the excavations and inserting a forked

stick with a stem about 2.5 inches long between it and the valve, the bow acted as a strong spring tending to close the valve after it had been pushed open. The opening of the valve not only displaces the bow out of its original position but also, by the force on its centre exerted through the forked stick, increases its curvature, and thus causes a constant pressure to be exerted on any object caught between the edge of the aperture and the valve.

The process of setting the trap is as follows. It is placed on the ground with the rounded surface below, and the valve, with the hollow in its centre uppermost, is laid on the shelf. The end of the bow is placed in one of the excavations and held in position by a peg above it inserted into the transverse hole. The stem of the forked stick is next fitted into the depression in the valve, and the centre of the bow is carried

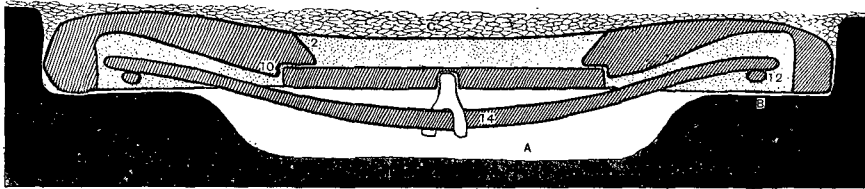


Fig. 2. Longitudinal section of the Trap when set in an excavation in the ground. The black represents earth.

- A. Excavation in the earth accommodating the bow; B. Niche in the bank of the excavation, supporting one end of the trap; C. Leaves covering and hiding the trap; 2. Bevelled edge of the aperture on the rounded surface of the trap; 10. Ledge supporting the valve; 12. Oval transverse hole admitting a peg to hold the end of the bow in position; 14. Bow passing over pegs and under forked stick.

over the fork. Then the further end of the bow is forced into the other excavation and held in place by a peg thrust through the other transverse hole.

The machine was probably placed in position with its rounded surface uppermost over a small pit (fig. 2, A) dug in a path followed by animals, the ends being supported in niches in the bank (fig. 2, B). Doubtless it was hidden by placing leaves, earth, or grass over it (fig. 2, C).

It was found that a bow made of a thick green stick formed so strong a spring that great pressure was required to open the valve, but that if the stick was left in position a few days it took the required shape and that moderate pressure on the free edge of the valve caused it to open. The foot of a large animal depressing the valve and slipping down between the free edge of the valve and the side of the aperture would be caught, and owing to the strong action of the spring could not be withdrawn. The trap is so heavy and cumbrous that no animal could drag it far.

It was noticed that the bow was less likely to become displaced after setting, and that it acted more efficiently if the ends were trimmed in such a manner that sharp edges fitted into grooves in the pegs passing

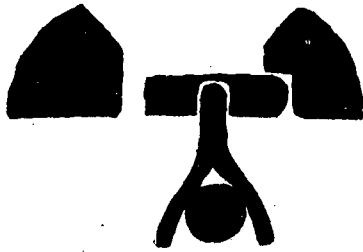


Fig. 3. Transverse section at the centre of the Trap, when set.

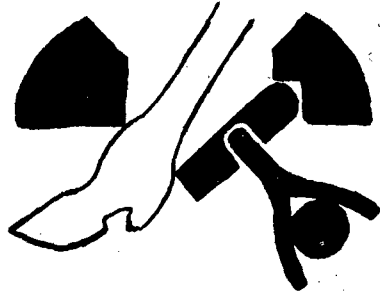


Fig. 4. Transverse section at the centre of the Trap showing the position of the valve when an animal's foot is caught between the valve and the edge of the aperture.

through the transverse holes. It is of interest in this connection to mention that Munro (1891) noticed that the pegs found *in situ* in the Clonetrace trap were "worn nearly half through."

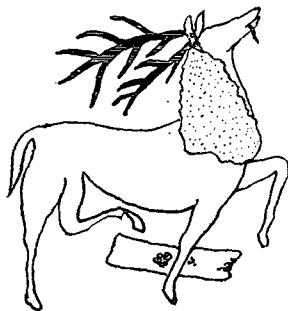


Fig. 5. Tracing of "a Stag with its tongue protruding and its right fore foot fixed in a rectangular frame or hobble," from a rubbing by D. Griffith Davies of a cross-shaft at Clonmacnois, published by J. Romilly Allen (1897).

Of the traps found in the British Isles the Coolnaman trap seems to resemble the Auquharney trap very closely except that the hole in the valve is represented in the illustration as a complete perforation. The Clonetrace and Welsh traps are very similar but no valves were found with them. In all these the arrangement of the shelf is such that a slit must remain between the free edge of the valve and the aperture.

The Larkhill traps seem to differ in several respects, judging by the photographs of two of them published by Munro (1897). The excavations have no lateral expansions to receive the bow when the valve is open. The hinge of the valve was held in position by pins inserted above the grooves accommodating its ends. Such pins also occur in some of the continental traps (Fontega). "In the centre of each of the existing valves is a hole of oval shape, which seems to have been burned through rather than bored with a tool, and the back of the valve is marked with a groove

for the spring to work in." In the photograph the grooved side of the valve is shown but no hole is evident, so that it apparently did not penetrate the valve. It is also of interest to note that in one of the specimens illustrated there seems to be a hinge groove on both sides of the aperture. "In a piece of wood which appears to have formed part of the mechanism of the trap portions of two small iron bolts remain."

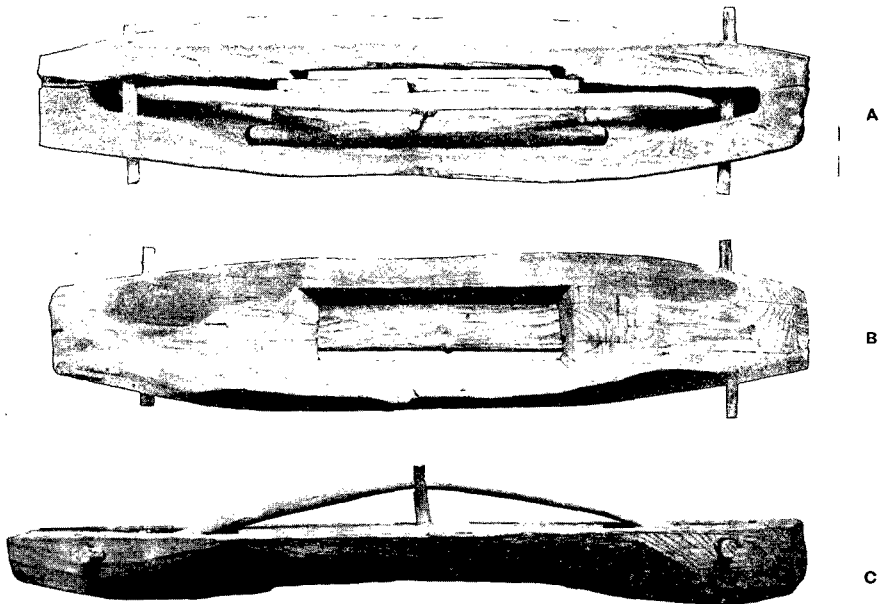


Fig. 6. Photographs of the full-sized Model of the Auquharney Trap.

- A. Flat surface, showing the position of the bow and valve when the trap is set;
- B. Rounded surface (uppermost when the trap is set), showing the beveling of the sides of the aperture, and the space between the free edge of the valve and the side of the aperture; C. Side view.

Nearly all the continental traps have double valves. Many show oval notches cut in the free edges of the valves, but none seem to have holes in or grooves on the valves. Perhaps with two valves a sufficient opening was obtained by setting the trap with the bows passing over the valves without Y sticks. Most examples have paired excavations similar to those in the Auquharney trap.

Munro early (1891) realised that the valve was controlled by a bow, but always considered that the flat surface was uppermost, for in describing the Larkhill specimens (1919) he speaks of the rounded surface

as the "under side." Hence he had difficulty in understanding how the trap was used. After seeing the remains of the bow in the Clonetrace trap he apparently concluded that when the trap was set a bait was placed behind the valve, which was kept open by a piece of stick, and made the following statement:—"The fragmentary stick was part of an elastic bow which extended from the extreme ends of the hollows, passing over the valve but beneath the transverse bars. As a consequence of this simple mechanism the forcing open of the valve would bend the bow upwards and backwards, and so cause its ends to slip nearer the centre. . . . Moreover, as the downward pressure of the valve would be in proportion to the strength and elasticity of the bow, it would follow that if the counteracting force which retained the valve open (probably a bit of stick to which the bait was attached) were suddenly removed, the latter would close with a bang, and so jam the intercepted neck of the animal against the edge of the aperture."

The writer is of opinion that these traps were constructed for the capture of large animals, such as deer, and suggests that their remains are only found in peat because in other situations they have perished.

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