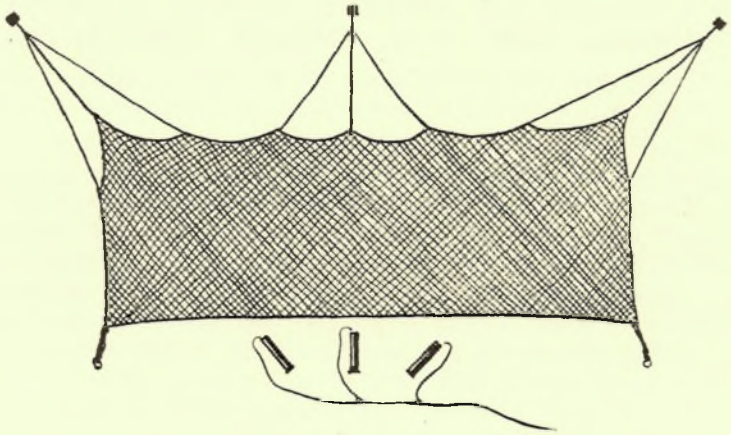


THE AMERICAN BOOM TRAP

By PETER SCOTT

DURING a visit to the United States I was most anxious to see in operation the ' boom trap,' or cannon net trap, used for the capture of wildfowl, and especially geese, for ringing.

It appears that the device was first used in December 1948[1] by Herbert H. Dill and William H. Thornsberry at the Swan Lake National Wildlife Refuge, Sumner, Missouri. They had decided to use a net propelled by projectiles fired from mortars and had begun experiments with it before hearing of the Trust's rocket-propelled nets.

Through the courtesy of Dr Clarence Cottam, Deputy Chief of the U.S. Fish and Wildlife Service, and J. Clark Salyer III, Chief of the Refuge Division, arrangements were made in Washington for my visit to Swan Lake Refuge in November 1951. I flew from New York to Kansas City on 27 November and was driven out to the Refuge on the following morning by F. C. Gillett, Regional Refuge Supervisor.

Swan Lake Refuge, which is situated in the middle of a plain of rather featureless farmland, sparsely wooded, consists of a series of large artificial lakes, some small marshes and some cultivated land planted with Japanese millet and other waterfowl foods. The Refuge covers 11,000 acres and at the time of my visit had a population of 40,000 Canada Geese, 8000 Blue and Lesser Snow Geese, and rather more than 100,000 ducks, mostly Mallards. There were also some Black Duck, Pintails and a number of American Mergansers (only subspecifically distinct from the European Goosander).

Immediately upon our arrival we climbed, with the Refuge Manager, Robert Russell, to the top of a silo tower which acts as a look-out. One of the boom traps is controlled by about 400 yards of electric lead from this tower, and it had been fired only half an hour before for a catch of thirty-two geese. We could see the net being reset. A few minutes later the banding party returned and I met the two inventors. Herb Dill, who had been Manager of Swan Lake Refuge when the trap was invented, was now Manager of Sand Lake Refuge, Columbia,

[1] The rocket-nets developed by the Trust were constructed during the summer of 1947 and the first catch was made on 18 February 1948.

South Dakota, and had returned especially to demonstrate the trap, for the main concentrations of geese had already moved south from Sand Lake. W. H. Thornsberry, the co-inventor, was still working at Swan Lake as maintenance man.

I was taken at once round the lake to a white barn. On the shore in front of it the second boom trap was set and baited with corn (maize on the cob). We approached the barn bent double and, once inside, climbed to the loft, whence we could see the lake shore through a window shrouded with sacking, and sundry knot-holes in the wall. During our approach the geese had flushed out from the trap—quite possibly through no fault of ours—and now some hundreds of the great birds were sitting on the glass-calm surface of the lake. Among them were also hundreds of Mallards, and some of these were already swimming back towards the baited shore, about forty yards in front of us.

Two nets were laid along the shore, each set to cover a rectangle of 75 feet × 25 feet. The baited rectangles were about 30 yards apart on either side of a small point. When the geese finally swam in again to start feeding they came in front of one net only, but in a surprisingly short time there was a tight crowd round the strip of conspicuous corn cobs. A plunger was pushed home by 'Hawkshaw' Thornsberry, there was a puff of smoke, a rather muffled boom, and the net was out and down, covering forty Canada Geese. They were extricated more quickly than I had expected from the coarse twine two-inch mesh net, crated in large wire cages, loaded on the truck and taken back to the Refuge headquarters to be ringed, sexed and X-rayed.[1] Only one net had been used.

During the afternoon, while we motored round the Refuge, 'Hawkshaw' made another catch at the White Barn, in the other net this time, and fifty-five geese were marked.

As we drove through the Refuge on a beautiful sunny afternoon, there were Canada Geese and Mallards everywhere. The geese were in great flocks in the fields. One small field of sprouting wheat contained an estimated 6000 and many more held up to 3000. Many half-flooded fields of Japanese millet (grown especially for the birds) were full of geese and ducks, and the ducks rose in thick clouds from the creeks and ditches quite close to the road. At one point we came upon about 2000 Blue and Snow Geese packed tight into one end of a field, and when the car stopped they rose with glorious clamour into the winter sunset. In the evening many of the Canadas were flighting out in big skeins to the fields outside the Refuge, for there is no shooting after 4 p.m. and the geese know precisely when it is safe to venture forth.

On the next morning—29 November—soon after a frosty dawn we were creeping once more into the White Barn. There were more geese on the lake than there had been on the previous day and they were feeding in front of both nets.

[1] Geese and ducks are X-rayed in the U.S. whenever a portable fluoroscope is available, in order to discover what proportion carry shot from wounds. The ratio of birds wounded to birds killed cannot at present be determined, but, so long as shooting methods remain more or less unaltered, it is fair to assume that this ratio remains constant ; thus if the proportion showing shot increases it can be assumed that the kill has also increased and vice versa. In the case of Canada Geese in the Mississippi Flyway more than sixty per cent. flying north to breed in the spring are wounded and carrying shot. These percentages can be used as a measure of what is called 'Hunting Pressure.' The fluoroscope also discloses the number of pellets eaten by ducks in marshes where much shooting has been done. The pellets are taken in mistake either for food or for grit. In many species less than ten pellets constitute a lethal dose. Ducks have been found with more than seventy pellets in the gizzard, having eaten the last sixty before the first ten could kill them. In some parts of the U.S. lead poisoning has become a serious problem. It applies only to pellets which have been eaten.

But there were frequent alarms, usually started by the ducks, so that as one net began to look good the birds would suddenly flush from in front of the other. There were some hundreds of Blue Snow Geese with a few Lesser Snows quite near to the nets, but when the Canada Geese came to the bait they kept the Snow Geese away. Eventually both nets looked good enough for a catch and the plunger was pushed down. I watched one net go over as carefully as I could. The wind was blowing on to the shore, so that, at the first sight of danger, the geese would flush back to the water, into wind and away from the net. The net had got to go out over them, catch them up and drop on them before they could fly clear. This is precisely what it did. The three six-pound projectiles went out low—about four feet over the heads of the geese. Before the great birds could get into the air the net was fully extended and dropping on them. In the two nets seventy-nine geese were caught, as well as twenty or thirty Mallards. Thus in two days 206 geese had been caught in four catches.

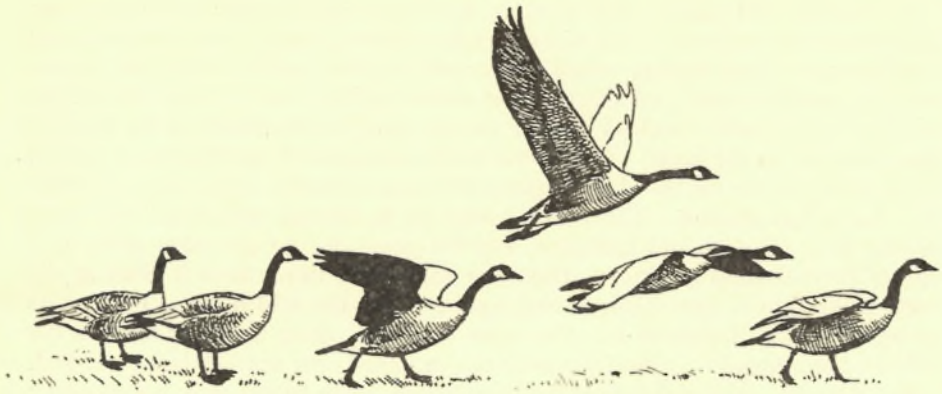
There is no doubt that for birds which can be baited into a very small area, the method is extremely efficient but its application to the capture of geese in open fields is more problematical.

The whole equipment is smaller and much more sturdy than the rocket-netting equipment. The net is 25 yards by 8 yards, compared with 66 yards by 20 yards for a rocket-net. It is 'mounted' on (i.e., surrounded by) a $\frac{3}{8}$-inch *diameter* manilla rope, whereas the rocket-nets are mounted on blind cord (about $\frac{1}{8}$ inch diameter). It weighs 40 lb. with 2-inch mesh (knot to knot), whereas a rocket-net of 1-inch mesh covering about five times the area only weighs 75 lb. in cotton and 25 lb. in nylon. The boom trap is carried out by three projectiles fired from small $2\frac{1}{2}$-inch diameter mortars made from the axle casing of Model T Ford cars. The explosive used is potassium chlorate mixed with sugar and detonated by a blasting cap. The mortars are placed fairly close together near the centre of the net, the two outside ones firing their projectiles diagonally to pull out the two corners and the central one firing straight forward.

Dill gave me the following details of successes with this net. The biggest catch he had made at Canada Geese with a single net was 117 geese and ten ducks at Swan Lake. From Horseshoe Lake Refuge, Illinois, a catch of 128 Canadas in one net was reported, and two men using two boom traps there had caught 1000 geese in ten days.

At Swan Lake the best season had yielded a catch of 2100 Canadas, and the total there since the net was invented (to 29 November 1951) was 4800. Just over a month earlier, between 19 and 28 October, at Sand Lake Refuge, South Dakota, he had caught 500 Richardson's Geese (*B. c. hutchinsi*) and 200 Blues and Snows. The biggest catch had been 185 geese—Richardson's with some Blues and Snows—using two boom traps together. Two other catches were just over 100.

Large catches of ducks had also been made with the boom trap. At Sand Lake the best had been 160 banded, although forty more escaped through the meshes and under the sides of the net. At Swan Lake 256 ducks were taken in two traps during the Fall of 1951 and several other catches had been over 200. The best catch of all had been at Swan Lake during the previous year: at dusk there had been a great mass of birds in front of the net. It was too dark to see them clearly, but from the noise they were thought to be mostly geese. When the shot had been made it turned out that the geese were in



the water beyond and that the catch was all ducks—at least 500 of them. But the party had no duck rings with them, so the birds were released unmarked.

One of the advantages of the boom trap is that it can be managed by quite a small party. Indeed, one man alone, during the month of April at Swan Lake, marked 1500 birds, of which nearly 1000 were coots—the rest ducks. At the Missouri State Management Area at Fountain Grove, five miles north of Swan Lake, two men caught 500 Blue-winged Teal in four days, and marked and X-rayed them.

On the morning of my second day at Swan Lake, Mr Melvin O. Steen, Chief, Division of Game for the State of Missouri, and Dr William Elder, of the University of Missouri, drove up to Swan Lake from Columbia. Dr Elder was an old friend from my various visits to the Delta Waterfowl Research Station. He developed the X-ray technique for the measurement of Shooting Pressure (invented by Herbert Miller of the Michigan Conservation Dept.), and we were able to discuss proposals for a visit to England which he is planning to make, bringing his equipment with him. It would be extremely interesting to use his methods on European waterfowl.

I had to leave Swan Lake after lunch on my second day, in order to drive back to Kansas City and thence fly to New York. I had spent only twenty-eight hours at the Refuge, but in that time I had assisted at the capture of 119 Canada Geese and about forty Mallards, I had seen one of the finest wildfowl sanctuaries in the Mississippi Flyway, and had made a dozen new friends whose cordial reception and friendly hospitality I shall not easily forget.

On the return journey and many times since I have considered the advantages and disadvantages of the boom trap when compared with the rocket-net. The following are the conclusions I have reached.

Advantages of the Boom Trap

1. Speed. The net is pulled out very much faster by the projectiles fired from the mortars than it is by the black-powder rockets which have been used in the past. The new cordite rockets, however, will be nearly, if not quite, as fast as the projectiles. Higher speed means that the net can be fired at a lower angle and is over the geese before they are properly airborne.

2. Cost. The boom trap is very much cheaper both in initial outlay and in operation. The actual charges are so cheap that each shot costs only two shillings and sixpence whereas each shot with a black-powder rocket-net costs £6.

3. Smoke and noise. The mortars make very little smoke and rather less noise than the rockets. The black-powder rockets make a lot of flame and smoke and a loud tearing sound. The new cordite rockets make no smoke and the sound is short and sharp. It is worth noting that the smoke and noise of the black-powder rockets appear to be much more alarming to humans than they are to the geese. On several occasions parts of the flock have settled back on top of the net (no doubt attracted by the captured ones under it) before the smoke has cleared. The rockets seem to be treated with much the same disregard as thunder and lightning, and the geese do not associate them with any of their natural enemies. Thus one wildfowler firing from a ditch at the edge of the field is more likely to make geese desert the field than twelve rockets going off in the middle of it. On many occasions geese have returned to the field and attempted to settle in it while the captured ones are still being marked.

4. Weight. The charges for the mortars are much lighter than the rockets ; on the other hand the total weight is not much less than that of the rocket-net equipment, and area for area the rocket gear is lighter. The new nylon nets which are being tried out will make the rocket gear very much lighter than the boom trap.

5. Risk of burning the nets. The boom trap nets can be set to fire towards each other and to cover the area between more or less completely. Rocket-nets when fired towards each other must be laid out so that space remains between them when they are fully extended, otherwise the rockets from one net burn the other.

6. Wind disregarded. The boom trap goes out so fast that winds up to fifteen m.p.h. have little effect and can be disregarded. For example, in the catch of seventy-nine geese made on my second day at Swan Lake the net was projected against a ten m.p.h. wind. With a slow-moving net this has a double disadvantage : first, the net is slowed down still more by the wind, and, secondly, the geese rise upwind, and therefore out from under the net. At Swan Lake there was yet another disadvantage ; the wind was ' on-shore.' At the first sign of danger a goose has two instincts : one is to head the wind and take off, the second is to get back over water, which it always feels is safer than land. In spite of the on-shore wind, with all its disadvantages, so fast is the boom trap that a good catch was made. The fast cordite rockets with which we are now experimenting will, of course, have the same advantages as the boom trap.

Disadvantages of the Boom Trap

1. Small area covered. A single net is 25 yards $\times$ 8⅓ yards and covers only 208 square yards. A rocket-net is 67 yards $\times$ 20 yards and covers 1340 square yards—nearly six and a half times as much.

2. Bulkiness of net. In order to cope with the strains of projection the boom trap net has to be made of rather thick string. Even a small net made of such bulky material becomes hard to hide. Hiding the net among the debris on the banks of a lake is not difficult, but doing so in the middle of a grass field would be almost impossible.

3. Hiding the cannons. These cannons or mortars are twenty-four inches long. This is longer than the rockets, and very much longer than the new cordite rockets which are only about ten inches long. Since, in a field, everything has to be completely hidden below the level of the grass, far deeper holes would have to be dug for the cannons, thus increasing the time taken to set the net, an all-important factor in goose-netting in Britain. At Swan Lake

the cannons were not hidden at all. The lure of the conspicuous corn cobs overcame any suspicions which the geese might otherwise have entertained.

4. Mesh sizes. These are too large on the boom trap nets for the rather more delicate and easily damaged European species of geese. On the other hand, as described elsewhere in this report, if the meshes are reduced below the size through which a goose's head will pass, which they should be in order to reduce the risk of damage to an absolute minimum, then a fold or bag of net is necessary to prevent the geese running about under the net, getting to the edges and escaping. With so small a net in the first place bags of three-feet width would reduce the 'catching area' of a boom trap net from 208 square yards to 142 square yards.

5. Layout of cannons. The present layout of three cannons in a fan leaves twenty-five yards as the maximum practical length of the net. Any increase in net size would require a new set of experiments.

6. Casualties. The boom trap goes so fast that any goose standing on or very near the net is likely to be killed. This has been obviated by placing the bait at a safe distance from the net. Dill told me that only four geese had been killed in 800 marked. Without bait the problem might become serious with any fast-moving net. It will have to be watched carefully with the new cordite rockets.

Conclusions

The problems of catching wild geese in a country where food supplies for geese are comparatively short and artificial baiting is highly successful are essentially different from those in Britain, where goose food (oats gleaned from stubbles, potatoes, sprouting wheat and grass) is plentiful.

At a sanctuary such as the Swan Lake Refuge, where migrating geese are passing through, many catches of between fifty and a hundred are probably more useful, scientifically, than few larger catches. In Britain, where the geese are resident in winter, the larger the catches the better.

A flock of 1000 geese soon after it has landed in a field covers an area of about sixty yards square. Ideally it would be desirable to catch all the geese within such an area—with a potential maximum catch of 1000. This is quite outside the scope of the boom trap as at present developed. It is also outside the scope of the rocket-nets so far used. It seems, however, that the reserves of power necessary to throw a net over 3600 square yards in about one second are more likely to be obtained from rockets than they are from mortars. This is the view of Lt.-Col. C. F. Tumber, of the Military College of Science at Shrivenham, who has made a number of ballistic calculations. Col. Tumber, who has been helping the Trust in the development of its goose nets, is therefore concentrating on the cordite-type rockets. We are extremely grateful to him for the time and thought and practical assistance which he has given to the project.

Meanwhile a complete set of boom trap fittings is being sent over by arrangement with Dr William Elder and my good friends at Swan Lake.