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INSTRUCTIONS FOR DEALING WITH RABBITS

compiled by

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with a foreword by

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4B.—MAN VERSUS RABBIT (first edition May, 1932; second edition, November 5, 1934, revised to February 5th, 1935: 1s.) by A. H. B. Kirkman, F.R.C.S.E., L.R.C.P., Lond., F.Z.S.

4C.—REPORT ON A SOLUTION OF THE RABBIT PROBLEM: CYANIDE FUMIGATION (April, 1935: gratis) by Capt. W. H. Buckley, M.F.H.

4D.—THE RABBIT MENACE IN AUSTRALIA IN 1933 AND THE WAY OUT (Sydney, 1932, reprinted by ULAWS August, 1935; gratis) by David G. Stead, formerly Special Rabbit-Menace Commissioner to the Government of New South Wales.

4E.—INSTRUCTIONS FOR DEALING WITH RABBITS (Second edition, September 1937, gratis) compiled by Capt. C. W. Hume, M.C., B.Sc., F.Z.S., with a foreword by Sir Frederick T. G. Hobday, C.M.G., F.R.C.V.S., F.R.S.E., Dr. Med. Vet. (Zurich).

4F.—SOME FACTS AND QUERIES RELATING TO THE RABBIT PROBLEM IN BRITAIN (1937, gratis). A paper read at the Nottingham meeting of the British Association for the Advancement of Science, by the Hon. Secretary of U.L.A.W.S.

7B.—RAT-CONTROL (October, 1936; gratis) by J. D. Hamer, F.I.C., Consultant Chemist to the Orient line.

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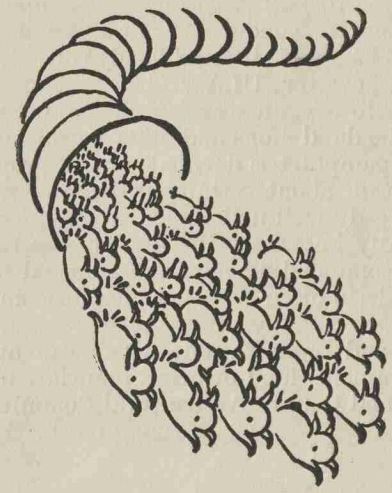
FOREWORD.

According to Jorrocks "A cockney looks upon a farmer as a sort of domestic conwict, condemned to wander in 'eavy 'ob-nailed shoes amid eternal hacres o' dirt and dandylions." In spite of the place of its birth, however, ULAWS has kept in close touch with the men who have to wrest a living from the dirt while defending their acres from the dandelions and other unwelcome intruders.

The present pamphlet is devoted, not to propaganda, but to practical information about certain methods of rabbit-repression which, though already well understood in some localities, deserve to be as universally known as the arts of ferreting and snaring already are. In commending it to the harassed farmer, I would endorse the compiler's often-repeated plea for combined action to be taken *at the same time* by all the farmers of a district. This needs leadership and organization, which can appropriately be provided by prominent land-owners, branches of the National Farmers' Union, and County Agricultural Committees.

FREDERICK T. G. HOBDAY.



INSTRUCTIONS FOR DEALING WITH RABBITS.

Compiled by Capt. C. W. HUME.

§1. INTRODUCTION.

For *keeping down rabbits* the most effective and most humane method is fumigation with hydrocyanic acid gas, §2, but carbon monoxide, §3, may be used for relatively small warrens. The latter is not, however, so universally successful as the former. For *catching rabbits for sale* the long net, §4, the dazzle light, §5, and the enclosure with valve traps, §6, are recommended. Certain other methods mentioned in §6 may be used for either purpose.

The arts of ferreting and snaring have not been described in this monograph because, apart from humane considerations, they are already well known in all parts of the country.

The gin trap, which is normally used for commercial exploitation of rabbits, is inefficient for keeping them down because (i) it catches only a fraction of the rabbits on a farm and scatters the rest; (ii) when rabbits have been thinned out, trapping is a very laborious and therefore costly way of dealing with the remainder; (iii) trapping disturbs the balance of nature by killing off the natural enemies of the rabbit; (iv) trapping for profit discourages the destruction of rabbits by more efficient methods; and (v) there is some reason to believe that trapping, at all events as it is usually practised, kills more bucks than does, though this has not been proved.

Although for rats and other ground vermin, as distinct from rabbits, amply efficient humane traps are available, ULAWS does not recommend any instrument as being a humane "substitute

for the rabbit trap''—i.e., as being usable in the same way, under the same conditions, and with the same effects as the rabbit gin. The rabbit-trapping industry is parasitic upon genuine agriculture and is associated with the undue increase of rabbits; the use of any humane equivalent for the trap would have equally undesirable economic effects. The methods described in this monograph are incomparably more effective for keeping down rabbits, while those described in §§4, 5 and 6 enable them to be caught for food with sufficient ease.

It should be mentioned, however, that important humane societies take a different view on the subject of humane rabbit traps. The Scottish S.P.C.A. have obtained very promising results with the Duncan trap, which kills outright, and the R.S.P.C.A. recommend the Phelps and certain other traps.

Reinfestation: *need for concerted action*. When land has been cleared of rabbits by any method, more rabbits will come in after a few days from neighbouring property if the latter is infested, and very large numbers will arrive if a neighbour starts trapping. For this reason it is important that *large areas should be cleared at one time, and arrangements should be made for neighbours to take action simultaneously*. Pending legislation to give effect to the recommendations of the Mersey report, a neighbour cannot be compelled by law to keep down his rabbits; but by means of an appeal to public spirit, concerted action can be organized by prominent land-owners, by local or county authorities, or by branches of the National Farmers' Union. Reinfestation can be prevented by the protective measures described in §7, but these are costly. The onus of fencing ought properly to be placed on those who wish to keep wild rabbits rather than on those who wish to keep them out.

Need for systematic effort; *destruction of harbour*; *predators*. Whatever the means adopted, work must be continuous both in time and in space. When once begun it must be carried through without interruption; it must also be carried out on a face, or line which moves across the area like a creeping barrage. Hollow fallen trees, which afford harbour for rabbits, must be destroyed. Old burrows should preferably be ploughed in; otherwise they must be watched and, if reopened, must be refumigated. A watch must be kept for breeding-holes, from which in due course the young rabbits can be removed for humane destruction. A sufficient population of dogs, foxes, stoats, weasels, owls and hawks helps to keep rabbits in check.

§2. CYANIDE FUMIGATION.

ULAWS is not at present recommending any fumigant other than the cyanide fumigants.

Full instructions for fumigation are published by the firms which supply the materials. The method consists in pumping

certain dusts into the burrows with a powerful pump. By reaction with the moisture in the burrow, the dust gives off hydrocyanic acid gas, HCN. This continues to be given off for some time, so that in porous soil the gas lost by diffusion is constantly replaced.

Cyanide fumigation is extremely humane. The effects of HCN do not in any way resemble those of the irritant poison gases used in war. Human beings who have been accidentally gassed with HCN during the fumigation of ships and buildings all agree that no pain is felt. Although in weak concentrations some time may elapse before the effects of the gas begin to be felt, rabbits gassed under observation are found to die in a very short time after symptoms have once made their appearance. If any distress is felt it is of very brief duration, even when the concentration of the gas is very weak, and with a strong concentration death is practically instantaneous. If an animal regains its liberty after a non-lethal dose it recovers quickly and completely from the effects of the gas. The humaneness of the method has been independently investigated on behalf of ULAWS, the R.S.P.C.A. and the Scottish S.P.C.A., with concordant results.

It occasionally happens that rabbits in a pocket or dead end will be protected from the gas by the body of a large rabbit killed nearer the entrance. In these comparatively rare instances the protected animals scratch out in due course either into the main burrow, where they are killed at once, or into the open air. An exception occurs in the case of very young rabbits, and for this reason complete humaneness cannot be secured unless operations are restricted to the season when rabbits are not breeding.

The carcases of rabbits killed with HCN are not poisonous. They have been eaten in this country by human beings and dogs without ill effect. In South Africa fowls roosting in the citrus trees are frequently killed during fumigation of the trees with HCN; they are freely eaten by natives without ill effects. Fumigation is not, however, an appropriate method for obtaining rabbits for sale.

Safety. Although HCN is a highly poisonous gas, fumigation can be carried out in the open air without danger if the operator follows instructions carefully. The manufacturers' instructions should be carefully observed in all cases. Gas masks are quite unnecessary for outdoor work, but can be obtained if desired from Messrs. Wallach Bros., Ltd., 49 Tabernacle St., London, E.C.2.

Failures. Cyanide fumigation should be successful in all rabbit burrows, and failures must be attributed either to mistakes on the part of the user or to reinfestation. It should be carried out when the soil is reasonably moist, in a systematic manner, over a sufficiently large area, and when rabbits have been driven underground. When loss of gas occurs through crevices or inaccessible holes, a dust giving rapid evolution of gas should be used.

Cost of fumigation. The chief factor in the cost is the bill for labour, which depends on the nature of the ground; but since the rabbits are killed in bulk, far less labour is required than in trapping them one by one. When fumigation is done by the men regularly employed on a farm, it can be put in hand when work is slack provided that when once begun the job be carried through without any interruption. When fumigation is undertaken by outside contractors the cost will necessarily be greater, but the services will be more expert and efficiency and success will be guaranteed. The charges will depend on local conditions.

Cyanide dusts and briquettes.

Cymag is sold by Imperial Chemical Industries, Ltd., Millbank, S.W.1, and Scottish Agricultural Industries, Ltd., 35 Charlotte St., Leith, and costs, according to the quantity bought, from 1s. per lb. in 1-cwt. cases each containing sixteen 7-lb. tins, up to 2s. per lb. in a single 7-lb. tin. From 28 lb. to 1 cwt. will usually clear a farm of 200 acres.

Cyanogas is sold by Geo. Monro, Ltd., Waltham Cross, Herts., and 108, West Bow, Grassmarket, Edinburgh. It costs from 1s. 9½d. per lb. upwards.

Calcid is sold by the London Fumigation Co., Ltd., Marlow House, Lloyd's Avenue, E.C.3. It consists of briquettes which cost £1 1s. 0d. for a 2-kg. tin of 100. A warren of 39 holes occupying 500 sq. yards took 7½ briquettes, and a hedge-row 130 yds. long riddled with holes took 28 briquettes.

Pumps.

The Australian foot pump, sold for use with Cyanogas by Geo. Monro, Ltd., Waltham Cross, Herts. Price £2 15s.

The Early Bird Rotary Blower has been found very satisfactory for use with Cymag. It is sold by W. J. Craven & Co., Ltd., 50 Port St., Evesham. Price £4.

Calcid pump and grinder, sold for use with Calcid briquettes by The London Fumigation Co. Ltd., Marlow House, Lloyd's Avenue, London, E.C.3. Price £10 10s.

The Vermorel Rotary Fan Dust Gun sold by Cooper, Pegler & Co., Ltd., 24 and 26 Christopher St., Finsbury Sq., London, E.C.2. Price £3 19s. 6d.

Comparison of different materials.

No quantitative experimental comparison of the relative merits of the materials sold by different firms has been made, and it is therefore impossible to assess them fairly. All have proved satisfactory in practice. Cyanogas is calcium cyanide dust which

yields from 23½ to 29 per cent of its weight in HCN. Cymag dust is a mixture of sodium cyanide and magnesium sulphate, which yields 20 per cent of its weight in HCN. Cymag is the cheaper material pound for pound, and one may probably infer that it is the cheaper in actual use. Cyanogas gives off the gas a good deal more rapidly than does Cymag, and therefore maintains a higher concentration; this probably gives it advantages from a humane point of view or under conditions in which there is a specially rapid loss of gas through crevices or porous soil. Calcid is a less impure calcium cyanide and gives off 50 per cent of its weight as HCN. It is sold in the form of briquettes and is therefore specially safe to handle, but necessitates the use of a special pump containing a grinder.

Firms which undertake fumigation by contract.

Darlington.	Teeside Farmers Ltd., 13 Horse Market, Darlington.
Glasgow.	Guarantee Exterminating Co. Ltd., 93 Waterloo Street, Glasgow, C.2.
Hexham.	W. A. Temperley & Co., 9 Beaumont Street, Hexham, Northumberland.
London.	Associated Fumigators, Ltd., 112 Victoria Dock Road, E.16.
	Fumigation Services, Ltd., 20-21 St. Dunstan's Hill, E.C.3.
	London Fumigation Co. Ltd., Marlow House, Lloyd's Avenue, E.C.3.
	Rodent and Insect Pest Destruction Co. Ltd., 69a Sancroft Street, S.E.11.
	Rural Service Association (England) Ltd., 39 St. James' Street, S.W.1.
	H. W. Seymour, Chiswell House, 133/139 Finsbury Pavement, E.C.2.
Maidenhead.	Lloyds Chemical Co., Maidenhead, Berks.
Newcastle-on-Tyne.	W. A. Temperley & Co. Ltd., 2 St. Nicholas Buildings, Newcastle-on-Tyne.
Penrith.	Thos. Edmondson Ltd., Chemists, Penrith.
Scarborough.	S. Brooke Dyde, 1 Seamer Road, Scarborough.

ULAWS would be glad to receive the names of firms for addition to this list.

Action of County Agricultural Committees.

Certain County Councils contemplate assisting farmers to keep down rabbits, and farmers would be well advised to address enquiries to the Agricultural Organisers for their counties.

§3. MOTOR-CAR EXHAUST GAS.

To produce gas rich in carbon monoxide. Run the engine till it is warm, and keep it running at moderate speed. Enrich the mixture till smoke appears. Then weaken the mixture by opening the air-choke till smoke just disappears. The maximum of carbon monoxide will thus be obtained.

To convey the gas to the burrow. Use a 1-inch hose pipe, which may be 20 or 30 ft. long if unkinked. Connect this to the exhaust pipe either (1) by means of a short sleeve made of radiator tubing or (2) by means of a funnel made out of sheet metal, about 9in. long, 1¼in, in diameter at the wider end and ¾in. in diameter at the narrow end, the latter being inserted into the exhaust pipe while the hose is inserted into the wider end. Insert the free end of the hose-pipe into the rabbit hole, and pack the hole to prevent escape of gas. Block up all holes from which the fumes escape. Remember that neighbouring holes do not always communicate with each other.

Duration. The time required will depend on the amount of gas lost by diffusion. The aim should be to maintain a good concentration of carbon monoxide in all parts of the burrow for some minutes. Fifteen or thirty minutes in all will usually suffice.

Humaneness. From human experience and from observation in lethal chambers, poisoning by carbon monoxide is known to be painless. Carbon dioxide, on the other hand, would produce suffocation, and for this reason a rich mixture should be used to ensure that the combustion of the fuel shall be incomplete.

Utility. The method is suitable for small and accessible warrens in ground where the gas is not lost too rapidly. Rabbits killed by it are unsuitable for food, as the flesh is unsightly.

§4. THE LONG NET OR POACHER'S NET.

Net. The net should be 4 ft. deep and about 80 yards long, of three-ply or four-ply hemp, with 2¼ in. mesh; of good quality, about 37s. or 40s. per 100 yards; cheap nets are unsatisfactory. It should be treated with rot-proofing, and should be freed from thorns after each set.

Line or cord (8s. per double 100 yards). This should be joined so as to be endless, and threaded through the top and bottom meshes of the net. All joints should be sewn, not tied, to permit of free running, and lines should be greased with mutton fat occasionally.

End pegs (1s. each). The line is run through the eye of an iron peg at each end, so that the two iron pegs are permanently on the line.

Wooden poles or pegs (4s. per dozen). These should be of birch or hazel, not thicker than the finger, and of mixed lengths from 22 inches to 30 inches. Sufficient poles to be set at intervals of 8 yards should be carried in an old golf bag.

Clothing. Buttons or buckles should not be worn where they can catch in the netting.

Setting net: duties of pegger. No. 1 (pegger) drives the end iron peg into the ground; goes 7 yards in the direction of laying and spreads the net; returns towards the end-peg and puts in the first pole 3 yards away from it; puts in a further pole every 8 yards (or at longer intervals if rabbits are few), using the longest poles for hollows in the ground; shakes up the net as he goes and apportions it carefully; and fastens the bottom and top lines by making a single turn round each pole, the bottom line being fast on the ground. He holds the top line between his teeth when necessary.

Setting net: duties of layer. No. 2 (layer) lays out the net, keeps 12 yards in front of No. 1, and pulls the net taut. When the wind is endways it is preferable to lay up wind rather than down. Strict silence must be observed.

Driving. Rabbits should be driven into the net at high speed with trained dogs or with a line held at each end and carried forward so as to sweep the ground rapidly.

Killing. Rabbits should be killed in the net and turned out later by shaking the top line. Instead of striking the neck in the usual way, grasp the head firmly in one hand and the shoulders in the other, and force the hands together. Death should be instantaneous.

Choice of position. The net is set between the feeding-ground and the burrow, wood or hedgerow, 12 or 15 yards from the latter. In a small field the net should be run a little way up the side hedges.

Weather conditions required for netting. A dark, warm, breezy night should be chosen, with the wind blowing from the rabbits towards the net.

Time for catching. All night in September, October, November and February. From dark till 9 p.m. in January and December. When one place has been netted several times in the evening, a change should be made to early morning.

To fold the net. Leave one iron end-peg in the ground. Pick the other up with the left hand, so that the top and bottom lines come together. Grip the lines every yard or so with the right hand and hang the net over the peg. When the far end is reached, wind the remainder of the lines round the net.

To expel rabbits from burrows. When the burrows are among rocks or tree roots, throw calcium carbide into the rabbit-holes and block up some of these; or use renardine or anomoil. In the

course of 24 hours the rabbits will leave the burrow. Artificial cover, such as a pile of brushwood, may be laid in a convenient position to attract them.

Method described by Major Van der Byl. A net set 2 feet high is quite high enough to catch rabbits at night. The meshes must be large enough for them to get their heads through, so that they become entangled. It should be of very fine twine, so as to be as invisible as possible. It is useless, however, to attempt to drive rabbits into a net in daylight, as they will see it and run round the ends. Poachers prefer a net 80 yards long, and would sooner set up two nets of this length than be bothered with one that is longer and more cumbersome to handle. Their method is as follows:—The end iron peg is placed in the ground, and the net, which is carried looped up on the other peg, is run out to its full extent, when the other end peg is also placed in the ground. The net is now lying more or less flat on the ground between the two end pegs. Starting from one end, one turn of the top and bottom lines of the net is then taken round the top and bottom of the supporting sticks (which are usually of hazel, ½ in. thick, about 2 ft. 6 in. long, and pointed at one end). As the net is attached to it, each stick is placed upright in the ground; usual intervals 10 yds. apart, or 8yds. if the catch is expected to be a large one. If an assistant is available, he should carry the sticks and hand one to the net-layer at the required intervals. If the net has to pass over any hollows, small hooked pegs are used to keep the bottom lines on the ground. A dark night should be chosen, and strict silence is essential. The rabbits should be driven at speed into the net, and killed by breaking their necks before they are removed. To take up the net, one end peg is taken up and held in one hand, and the net is picked up at every yard by the top and bottom lines held together and looped over its point, together with one or two of the meshes of the net. An assistant should walk in front and withdraw one stick at a time, holding it horizontal so that the net hangs down like a hammock. It is then easier for the gatherer to take hold of the top and bottom lines. This method avoids all entanglement, and the net will be ready to run out again quickly from off the peg when required. Great care must be taken to avoid thorns; the net should therefore be set up several yards from a hedge or edge of a wood. With a little practice two men can erect or take up an 80-yard net in about five minutes.

Daylight setting devices. Particulars of devices for enabling the long net to be laid out during daylight and dropped into the operative position at night by pulling a cord can be obtained from (i) The R.S.P.C.A., 105, Jermyn St., S.W.1; (ii) Accles and Shelvoke Ltd., Aston, Birmingham; (iii) Major Van der Byl, Wappenham House, Towcaster. These devices are suitable for use by inexpert netters.

Prices of netting per 100 *yds.* Gilbertson and Page, Ltd., Hertford, 4ft., 3½ft. or 3 ft. wide: 41s., 37s. 6d., 34s. Gripper Manufacturing Co., Portland Road, Leicester, 3ft. wide (with end pegs only), 32s. 6d.; 4ft. wide for looping up, complete with special plaited release line, end pegs and supports, 50s. Spratt's Patent, Ltd., 58, Mark Lane, London, E.C.3, 4ft., 3½ft., or 3ft. wide, 55s. and 63s., 51s. and 58s., 46s. and 52s. S. Young and Sons (Misterton), Ltd., Misterton, Somerset, 4ft. or 3ft. wide, 35s. and 27s. 6d. Netting can also be obtained in 80-yd. lengths.

§5. DAZZLE LIGHT (SPOTLIGHT) AND DOG.

DESCRIBED BY L. PARKER.

The demonstration described was given by a farmer in North Devon (Mr. A. S. Fry of Ettiford) who had practised the method for eight years and by its aid, together with a limited amount of ferreting, had kept down the rabbit population on his 230-acre farm most successfully. Neither traps nor snares had been used. Other farmers in the district were using the dazzle light with equally satisfactory results. While its main recommendation may be its utility, the sporting interest of this method is certainly a close second. The rabbit's end when it has been caught is swift and painless; one apt remark was that "the only cruelty was to those who carry the rabbits!" Dogs are amazingly keen on the work; one I saw, usually an excellent ratter, ignored completely any rat seen whilst rabbiting. A good walking distance was covered and the work when the light was on proceeded so swiftly and methodically that no disturbance of stock in the field was noticeable.

The number of rabbits which might perhaps be considered a satisfactory night's catch—a rather vital point—can only be indicated very generally. Mr. Fry caught recently over 80 and 60 on two nights respectively on land other than his own; on his own farm, where rabbits are fortunately well in hand, he may average perhaps 25 for a night's work. A correspondent in South Wales, using a different type of lamp, mentions 50 as the average.

The light employed was from a small 6-volt car head-lamp; i.e., simply a good-sized reflector and a small electric-light bulb, together with a screw for focusing. By adjusting the screw the beam of light could be either lengthened or spread out fanwise. The reflector was, for convenience, fastened to a strip of wood forming a rough handle; on this handle was fastened also an ordinary electric-light switch operating the light. Current for the lamp was supplied from a battery which was carried conveniently in a haversack.

The dog used on this occasion was a greyhound. Almost any dog capable of sufficient speed and trained to retrieve promptly would apparently do equally well; both whippets and sheep dogs are used in the district. When two dogs are used it is usual to hold

one in, allowing each to make three or four courses in turn. Dogs do not work well together and are likely to follow the same rabbit. The dog goes all out when he starts a rabbit, and almost as fast in his eagerness of search.

When the first field was reached, with little disturbance or noise by the party on foot, the lamp was switched on, a part of the field was swept with a strong beam of light and within a few seconds the dog had caught and retrieved a rabbit, practically unharmed, which was promptly killed by one of the party. The dog worked on its own, moving rapidly over the field. Within a very little time it caught and retrieved a second rabbit, and so on. The light, it should be noted, was kept continuously on any rabbit started by the dog. The only rabbits to escape were one or two which had been feeding near cover. When further victims appeared unlikely to put in an appearance, the light was switched off and the party proceeded in the darkness to another field to repeat the operation. The point of this, as of all dazzle methods, would appear to be that the rabbit is put, for a brief time at least, at such disadvantage that it can easily be caught by a dog. As the light sweeps the field, rabbits in the beam promptly flatten themselves on the ground. Their eyes, shining in the light, betray them; and although, on the approach of the dog travelling at speed, they endeavour to escape, their handicap is then too great. One may fall an easy victim; the next may delay capture for a few seconds by rapid twists and turns, but instincts and powers of escape of all are below normal in face of the blinding light.

The light must, however, be kept on the rabbit in all its twists and turns, and to ensure this being possible *the focus, as adjusted earlier, must allow a reasonably good breadth of beam*; equally important is it that *there should be a strong dazzling light*, the stronger the better.

As the season advances the rabbit population undoubtedly shows an increasing awareness of danger. For a day or two following a raid they will feed near cover; after a respite of a few days, however, they are again found feeding in the open and on any night sufficiently dark the method is as effective as ever. *A windy night or wind and rain together* bring the heaviest captures. Quietness of approach is a great advantage, and for this reason *a car, which is sometimes used by farmers, is not advisable*; it may be used with some success in the early part of the season and fail later.

The correspondent mentioned as writing from South Wales uses a lorry head lamp, with calcium carbide, which he considers to give a wider range for the dog; he has available two dogs, a greyhound which occasionally turns the rabbits and misses, and "a little corgy, which is a sure snip."

I desire to express my indebtedness to Inspector Liddicott of the R.S.P.C.A. for his help in this enquiry and to Mrs. Onslow for having called our attention to the spotlight method.

§6. MISCELLANEOUS METHODS.

Methods described in chapter 6 of *Man versus Rabbit* include, in addition to the above, *ferreting* with purse nets, bolt nets or guns; *shooting*; removal of *young rabbits* by hand from the breeding-holes; *digging out*; use of the *gate net*; and the use of some the following devices.

Humane snares. These can be used under all conditions where ordinary snares are applicable. They include (i) the knotted snare sold by the R.S.P.C.A., 105 Jermyn St., S.W.1, a cheap snare which holds without strangling provided the rabbits be not disturbed; and (ii) various relatively quick-killing snares which are either drawn tight by a spring or tightened by a non-return eyelet.

Enclosures with valve traps or smooses. Small hanging gates into an enclosure are left swinging freely about a horizontal axis so that rabbits form the habit of pushing through them. When rabbits are to be caught the gates are rendered one-way or non-return by means of any suitable device. Major Van der Byl states that the following catches were obtained by this method on a 2,000-acre estate in Derbyshire: 205, 235, 155, 75, 108, 50, 46, 220 97, 207, 55, 245, 118, 28. Rabbits were regularly fed inside the enclosure, which was sown with a mixed green crop. The enclosure should be ½ or 1 acre, and should have a narrow angle at one corner into which the rabbits can be driven for picking up. A smoose is a short wooden tunnel containing the hanging gate; a pin can be inserted through the side when the gate is to be made non-turn.

The pitfall trap is much used in Australia in juxtaposition to rabbit-proof fencing. It is known in Yorkshire as a "tipe" or "type" trap. A description was given in the *Gamekeeper* for May, 1937.

Other devices are described by the R.S.P.C.A., 105 Jermyn St., S.W.1; by the Scottish S.P.C.A., 19 Melville St. Edinburgh; and by Major Van der Byl, Wappenham House, Towcester.

§7. RABBIT-PROOFING.

Protection of trees.

Young forests are usually protected by netting, but it is difficult to prevent occasional rabbits from entering, and they must be prevented from breeding. Possibly the most effective way is to encourage stoats and other predators, or to use dogs.

On the other hand Mrs. Hoare Nairne writes as follows: "Never wire in enough woodland to make a grassy or flowery surface. The rabbits will get to it somehow. I dress dozens of trees each year with a dressing made of equal parts of Woolworth's paint, paraffin oil, and some other oil containing enough disinfectant to make the mixture smell. For larger trees we buy 220-yds.

rolls of rabbit netting from Timothy White, who cuts it free of charge into 1½-yd. or 2-yd. lengths. We link up each of these *loosely* round one tree and the rabbits take no more interest in that tree. We grow beech, larch, spruce, ash and oak, in a small way."

Some relatively rabbit-proof plants.

Hungry rabbits will attack almost any plant, especially if it has been newly introduced into a locality. However, although cuniculo-gastronomic tastes vary somewhat with locality and circumstances, the following plants are said to be relatively immune. The list has been compiled, by kind permission, from various published lists collected by Mr. C. Nicholson, of Tresillian, Cornwall.

Abutilon vitifolium, Aconitum (especially napellus, pyramidale, fischeri, japonicum, autumnale), Acrodinum paseum, Aesculus parviflora, Andrachne, Anagallis, Anemones, Antholyza paniculata, Arabis, Arbutus unedo, A. menziesii, Asphodelus ramosus, Aster novae angliæ, A. novi belgii, Aster puniceus pulcherrimus, Astilbe, Aubretia, Azaleas.

Bamboo, Bartonia aurea, Berberis vulgaris, B.v. atropurpurea, B. mahonia, Box, Broom, Buddlea, Bupthalmum grandiflorum, B. speciosum.

Cacalia coccinea, Caltha polypetala, Campanula latifolia, Camassia cusickii (in variety), C. esculenta, Canterbury bell, Cassinia fulvida, Catananche caerulea, Chrysanthemum (annual varieties), Chrysanthemum maximum, Clematis, Clethra alnifolia, Colchicum (all species), Columbine, Cordyline australis, Cornus alba, Cortaderia conspicua, Cotoneaster frigida, C. horizontalis, Cowslips, Cratægus.

Daffodil, Daphne laureola, Datura chlorantha, Deutzia, Dogtooth violets, Doronicum austriacum, Double gorse, Dracocephalum virginicum.

Erica arborea, E. lusitanica, Escallonia exoniensis, E. langleyensis, E. macrantha, E. philippiana, E. rubra, Elder, Eschscholtzia (many beautiful colours), Epilobium augustifolium, Euonymus europæus, E. latifolius, Eutoca viscida.

Ferns, Fuchsia globosa, F. macrostemma, F. riccartoni, Forget-me-nots, Forsythia, Foxglove, Fritillaria, Funkia, Garrya elliptica, Gentiana asclepiadea, Geranium endressi, G. ibericum, G. phænum, G. pratense, G. sanguineum, G. sylvaticum, Golden rod, Gorse, Grape hyacinths.

Hedera helix, H. helix angularis aurea, H.h. elegantissima, H. hibernica, Helichrysum, Hellebores, Hemerocallis (in variety), Heracleum giganteum, Hibiscus, Hippophaë rhamnöides, Holly, Hollyhock, Honesty, Honeysuckle, Hyacinth, Hypericum, Hydrangea hortensis, H. vestita.

Iris aurea, I. kæmpferi, I. pseudo-acorus, I. delavayi, I. sibirica. Jasminum, Juniper. Kniphofia.

Laburnum, Lactuca alpina, L. gigantea, L. plumieri, Laurustinus, Lavatera, Leycesteria, Lilium gigantea, L. pyrenai-

cum, L. pardalinum, Lily of the valley, Lilacs, Limnanthes douglasii, Lysimachia clethroides, L. vulgaris, L. nummularia, Lythrum (in variety, especially salicaria rosea), Lycium.

Magnolia, Malope grandiflora, Marigold (all kinds), Melittis melissophyllum, Mimulus (in variety), M. luteus, Monkshood, Montbretias, Mulleins, Muscarus, Myosotis, M. palustris. Narcissus, Nicotiana affinis, N. sanderae, Nasturtium. Olearia haastii, Orchids, Ornithogalum, Oxlips.

Pæony, Pampas grass, Periwinkles, Phacelia campanularia, Philadelphus coronarius, Phlox, Phormium tenax, Physostegia virginiana, Polygonum, Poppies (all kinds), Primroses, Primula (esp. officinalis), Privet, Prunus, Pyrus japonica, Pyrethrum uliginosa.

Ranunculus lingua, Rheum palmatum rubrum, Rhododendrons, Rosa (esp. rugosa and virginiana), Ribes sanguinea, Rosemary, Rubus, Ruscus, R. aculeatus.

Saxifraga geum, S. granulata, S. megasea (in variety), S. peltata, S. umbrosa, Scillas, Sedum family, Senecio clivorum, S. tanghutians, Snakes' heads, Snowdrops, Snowflakes, Snowberry, Solidago, Solomon's seal, Spanish gorse, Star of Bethlehem, Syringa vulgaris, S. persica, Spiræa aruncus, S. arguta, S. bracteata, S. douglasii, S. gigantea, S. lobata, S. filipendula plena, S. ulmaria.

Tamarix, Torch lilies, Trachycarpus fortunei, Trillium grandiflorum, Trollius (in variety), Tropælum speciosum, Viburnum, Violets (in variety). Weigela, Willow, Winter aconite, Wistaria. Xanthoriza apiifolioa. Yew, Yucca. Zinnias.

Compositions for rabbit-proofing.

Anomoil is sold by Young & Sons (Misterton) Ltd., Misterton, Somerset, at 2s. 3d. per sample tin, 3s. 6d. per quart, 6s. per half-gallon and 11s. per gallon, carriage paid.

Norabite is sold by W. J. Craven & Co. Ltd., 50 Port St., Evesham. In liquid form, 2s. per pint, 3s. 3d. per quart, 5s. 9d. per half-gallon, 11s. per gallon. In paste form, 1s. 9d. per lb., 2s. 9d. for 2 lbs., 7s. 9d. for 7 lbs., 14s. 6d. for 14 lbs., carriage paid.

Renardine is sold by Gilbertson and Page Ltd., Hertford, at 4s. per quart, 7s. 3d. per half-gallon and 13s. 6d. per gallon, carriage paid.

See also under "Protection of trees," above.

Rabbit-proof fencing.

The *line of fence* should first be cleared level to the ground for a distance of at least 4 ft. on each side. The existence of overhanging trees or old tree-stumps near the fence may enable rabbits to jump over it; where it is impossible to remove such trees or

stumps, the line of fence should be chosen to be at least 4ft. away from them.

The *wire netting* should be of gauge 19 with 1¼-in. hexagonal meshes. It should be 60 inches wide, with 12 inches let into the ground, 6 inches downwards and 6 inches outwards, to prevent rabbits from burrowing underneath.

The *supports* should be 6-ft. chestnut or larch stakes standing 4½ ft. out of the ground at intervals of 15 ft. Their bases should be barked, and pickled in copper sulphate. A single strand of 10-gauge plain wire or barbed wire should run along the tops of the stakes and the netting should be clipped to it every 3 ft. 9 in. In Australia it is the practice to run three wires at the top, bottom and middle of the netting, to provide vertical battens at intervals of 6 ft., and to make every fifteenth post a heavy straining-post.

Where wooden *stays* are used they should be provided with hoods or funnels of wire netting similar to the funnels used on a ship's hawsers to prevent rats from boarding the ship. The narrow end of the funnel should closely clasp the stay and the wide end should face the incoming rabbits. A safe stay that will afford no passage for a rabbit consists of a four-ply wire twitched from the post to a butt 8 in. across. The butt should be sunk to a depth of 3 ft. into the ground and should be slanted similarly to a tent-peg.

Gates should be hung on independent posts in such a way that they slam against a post and do not swing inside it. They should be hinged in a similar way. A board of wood should be sunk in the gate-way to a depth of 6 in. so as to be flush with the bottom of the gate when this is closed. The gate should, of course, be covered with netting.

Where the line of fence crosses a rapid *stream*, a heavy wire should be strained across the stream and strips of netting should be suspended from the wire. Each strip of netting should overlap its neighbours and should have a heavy piece of timber, which lies down-stream, attached to the bottom.

It is useless to incur the heavy expense of fencing if a single hole is left through which rabbits can enter, or a single vantage point from which they can jump. They will run along the fence till they find it. A young rabbit can squeeze through a hole 1½ in. in diameter or a crevice 1½ in. wide, or sometimes even 1¼ in.

The lower part of the wire netting may with advantage be tarred by allowing *tar* to drip on it from a nail hole in an old oil can carried at a moderate walking pace.

Cost of fencing. This depends on the locality and the amount of fencing required, but may be reckoned at upwards of 8d. or 9d. per yard exclusive of gates—about £35 for a 7-acre field or £60 for a 30-acre field at pre-rearmament prices.

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The Rydal Press, Keighley.

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