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CONTROL OF NUISANCE PESTS IN SUBURBIA

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To a rancher or high-rise apartment dweller, problems with vertebrate pests in suburbia may seem insignificant. But when one stops to consider that last year over 2 million acres of farmland were converted into urban and industrial use, then it takes a different perspective.

Farmland usually provides good wildlife habitats. When a large housing or industrial developer moves in with bulldozers and clears and levels the land, this can mean but one thing - the animals are going to be on the move. Some will find temporary shelter, but most will keep moving until they find permanent food and cover. Of course, some will be killed trying to cross the freeways. Those that can dodge the trailer trucks, campers, boat trailers, and other motor vehicles may soon become your problem.

The problems often start before the buildings are completed. While a house is still under construction some furry creatures and some not so furry (snakes, black widow spiders, etc.) may enter the framework and insulation and subsist on the remnants of workmen's lunches. Others may burrow into the banks or hide under rubbish piles. When landscaping is started the area is invaded by a variety of pests.

Another less spectacular condition arises when individual homes are built in farming or rural areas. Often these areas have been open to hunting for a number of years, but eventually the human population becomes so great that entire cities, towns, or townships may be closed to hunting. This can be accomplished by simply prohibiting the use of firearms. Without hunting pressure on the game birds and mammals, they add to the suburbanite's problems.

I have had my share of problems, and may have talked myself right into the job of preparing this paper. I moved into a new tract close to the Box Springs Mountains in southern California, and made the mistake of being one of the first to put in a lawn and the accompanying landscaping. Jackrabbits and cottontails and pocket gophers soon moved in. Well, I figured to have a little more "know-how" on these matters than the average homeowner. I planted and replanted, and trapped and poisoned. This was partially successful, but my small green oasis was attracting animals from a vast dried-up mountainside.

Now let's see what animals are involved and the damage one may expect. This will vary in different geographical areas, but I will try to give some representative examples.

Some mammals are protected-game animals and fur bearers are usually protected by Fish and Game Departments. Cottontail rabbits, deer, and tree squirrels are examples of game animals, and muskrats, foxes, badgers, and raccoons are examples of fur bearers. In California a number of birds and mammals have no protection; these are English sparrows, American or black-billed magpies, crows, California or scrub jays, Steller's or crested jays, starlings, moles, opossums, coyotes, weasels, skunks, cougars, bobcats, and rodents including ground squirrels, rats, mice, gophers, and porcupines. Other birds and mammals may be controlled under varying conditions (see references). For example, blackbirds may be killed when they are committing or about to commit serious depredations upon ornamental or shade trees or agricultural crops. Still others may be killed under supervision of the Agricultural Commissioners or a permit from the Bureau of Sport Fisheries and Wildlife. Some of these classifications vary from state to state, and if you have any doubt about the legality it's best to contact your state fish and game department, the state department of agriculture, or the Bureau of Sport Fisheries and Wildlife.

Nonprotected animals are often taken with traps, guns, or poisons, but in suburbia or within city limits the use of these items may be restricted or too hazardous.

In most instances vertebrate pest control in suburbia is an individual problem and should be handled by the property owner or tenant. A lot of information is available to help the individual solve his problem, and a number of agencies, both private and governmental are available to assist. One big problem is communication-knowing what is available and how to apply it. Some sources are listed below.

Sources of information: (1) Agricultural Extension Service: Farm Advisors, County Agents, (2) State Department of Agriculture: County Agricultural Commissioners, (3) State Department of Fish and Game: Fish and Game Wardens, Conservation Officers, (4) State Health Department: Local Health Departments, (5) U. S. Dept. of the Interior: Bureau of Sport Fisheries and Wildlife, (6) Humane Society, (7) Society for the Prevention of Cruelty to Animals (SPCA), (8) Animal Rescue League.

All these except the Agricultural Extension Service and Health Departments can also provide services, supplies, or assistance, as can local pest control operators. All of the agencies listed should maintain up-to-date information on control methods, sources of supplies, lists of live traps, repellents, scare devices, poisons, etc., and the legal aspects.

The private agencies generally charge a fee, but they usually have the knowledge and equipment to accomplish the mission. The governmental agencies will often assist property owners where a health problem and public utilities are involved or where the animal has a wide daily range and many properties are involved. Examples of public health problems are skunks or other wild carnivores infected with rabies, or ground squirrels or other rodents infected with plague. Rats living in sewers or storm drains may create a community problem. An example of an animal with a wide home range involving many properties would be the coyote, which required control in the Hollywood section of Los Angeles County.

The services I am going to mention have all been in use at one time or another. I am not implying that they are the final answer for all conditions or circumstances, but they are examples of what can be done if there is sufficient interest.

(1) Where pheasants, cottontails or other game animals are causing damage, your state fish and game department may live-trap the animals and move them to other areas. (2) Where animals are infected with plague or rabies, some governmental agencies may assist in controlling the animals or furnish poisoned bait for use by the property owner or tenant. (3) In some instances the only safe and effective method for removal of the animal pest is trapping. Often special traps are necessary and these may be extremely costly or not readily available. Farm Advisors, County Agents, or Agricultural Commissioners sometimes sell these special traps or loan them for short periods. The loaning of traps was first viewed with considerable skepticism, but the percentage of traps returned has been extremely high and everyone has been greatly pleased. (4) Special poisons are sometimes available for sale by Agricultural Commissioners or the Bureau of Sport Fisheries and Wildlife. (5) Commercial pest control operators are often available and equipped to control vertebrate pests—the yellow pages in your telephone directory will list them. (6) In Los Angeles the Department of Animal Regulations, Superintendent of Shelters, will assist property owners in the control of miscellaneous wild animals by use of live traps, etc. Other cities may offer similar services. (7) In San Diego the Humane Society has completed the first year of its new program to relieve local citizens of problems with "odd" animals such as skunks, opossums, foxes, and bobcats by trapping. A charge is made to the citizen depending on the distance and service required. Twenty-four hour service is available.

SPECIFIC CONTROL METHODS APPLICABLE TO SUBURBIA

The specific control methods recommended for suburbia are often less effective, more time consuming, and more costly than methods used in sparsely populated farm or ranch lands. The reason is simple—in suburbia there are more people (children) and pets, and the risk of accidental or secondary poisoning is greater. Therefore more reliance must be given to less toxic materials, live traps, and repellents. To temporarily complicate the procedure is the matter of registrations. Chemicals, whether toxic or repellent, can only be recommended for their registered use. A tremendous amount of time and money goes into the research necessary to register a product for a specific use. Later it may be found that this same product has other similar uses, but until the supplemental registration has been granted, the product cannot be officially recommended for these other uses. An example would be the anticoagulants; to my knowledge these are registered only for the control of rats and mice, but it is known that they are used for ground squirrels and jackrabbits with apparent success and with less hazard than registered products. Basically the regulation is a good one, even though it is causing some temporary problems.

Frightening devices such as acetylene exploders and exploding shotgun shells are frequently used to scare birds, but if used in suburbia one would probably be "ticketed" for disturbing the peace.

In the time allotted, it will be impossible to fully describe all the different control methods for the different species found in suburbia. However, I would like to mention some of the more frequent pests and my views on methods that can be safely used in densely populated areas.

RABBITS

Strychnine is probably the most commonly used poison to control jackrabbits, but I am not in favor of using it in suburbia. Most of the hazard involves "valuable" dogs eating the dead rabbits. If poisons must be used I prefer one of the anticoagulants in a protected bait station. An attractive bait will have to be exposed for several days before a lethal dose will be consumed. Box traps and wire cage traps may be used for cottontails, but jackrabbits seem to avoid them. Rabbits are easiest to trap when the ground is covered with snow. Where the damage is frequent a rabbit-proof fence may be the solution. A netting of 1-inch galvanized mesh wire 2 1/2 to 3 feet high will suffice. To prevent burrowing under the fence, it is usually advisable to bury 6 inches of the wire in an L-shape on the outside of the fence. If this fence is placed along the outside of a rail fence or border plantings it is very inconspicuous.

A number of repellent materials are available for use on flowers, shrubs, and trees. These may be sprayed or painted on the plants. During the growing season it is important that all new growth be covered, and this may require weekly treatments. During the dormant season one application in the late fall or early winter may be adequate. The most effective repellents contain thiram (Tetramethylthiuramdisulfide), Zac (Zinc dimethyl-dithiocarbamate-cyclohexylamine), TNBA (Trinitrobenzene-aniline complex), or nicotine sulfate.

POCKET GOPHERS

Specially designed traps are effective in removing gophers from residential areas. The animals will be more rapidly trapped if the traps are set in pairs—one pointing in either direction of the main runway. Treated baits containing not over 0.5% strychnine alkaloid or 1% zinc phosphide may be used. Strychnine is usually used on grains or a mixture of grain and dried fruit, such as raisins. Strychnine or zinc phosphide may be used on fresh carrots or sweet potatoes. All baits must be placed in underground burrows. The reason that strychnine is recommended for gopher control and not for rabbit control is that gopher baits are placed underground and practically all gophers die there, whereas rabbit baits are placed on the surface of the ground and all animals die above the ground.

A new chemical, a "gopher-cide" if you will, known as DRC-714, shows great promise, and you will hear more about that later in this conference.

MOLES

A variety of traps are available that are accurately described by their names: harpoon, scissors, and choker. The traps should be set in active runways, and it is important that the main runways be located because most runways are laterals and are used only once while the animal is searching for food. The main runways can be determined by stomping down short sections of a lot of runways and marking each with a flag or stake—those that are repeatedly pushed back up are the main runways and are the places to set your traps. A large part of the mole's diet consists of insects and worms found in the soil. Mole control can be indirectly accomplished if the insects and worms in the soil are removed by the use of proper soil insecticides. Sometimes small areas such as bulb plantings, seed beds, or "fish worm" plots sustain excessive and persistent mole damage; enough to justify the installation of a sheet-metal or hardware-cloth fence. Such a fence should begin at the ground surface, go to a depth of at least 12 inches, and then bend outward at a 90° angle for an additional 10 inches. Connections and joints in the fence must be secure and snug, since food-hunting moles will travel along the fence searching for an entrance. Dusting bulbs with thiram before planting tends to repel the moles and prevent them from eating the bulbs.

SQUIRRELS

Ground squirrels may be effectively controlled by gassing the animal in its burrow. A number of fumigants are available, and all must be used with great care because they produce highly toxic gases or present a fire hazard. Commonly used materials are carbon disulfide, cyanide, methyl bromide, carbon monoxide (car exhaust), or gasoline (a pint is

poured in the hole, which is then plugged with newspaper). When only a few burrows are involved I prefer cyanide dust because it is available in small quantities, it does not require any specific equipment, and there is no fire hazard.

Anticoagulants may be used as described for jackrabbits. Strychnine is not recommended in densely populated suburban areas because some of the squirrels will die on the surface of the ground and may be a hazard to pets. Number "0" or "1" steel traps or special choker traps may be used.

Tree squirrels frequently get into attics and become very annoying and often very destructive. Sometimes they can be prevented from entering buildings by being kept from jumping on roof tops from nearby trees. Metal bands about 2 feet wide, fastened around the trunks at a height of 6 to 8 feet, will keep squirrels from climbing isolated trees, but are useless if squirrels can jump from tree to tree. Squirrels may be prevented from gnawing into buildings by coating the wood with paint treated with repellents such as copper or zinc naphthenate. If these are not successful and the squirrel gets into the attic, it may be repelled by liberal use (4-5 lbs.) of para-dichlorobenzene crystals, naphthalene flakes, or moth balls. As a last resort, squirrels may be live-trapped in cage traps or any of the small mammal traps baited with nut meats, pumpkin or sunflower seed, peanut butter, rolled oats, etc. Anticoagulant rat baits with the addition of a small amount of ground nut meats or peanut butter are effective, although one always takes the risk of having the animals die in the house. Special permits are often required when traps or toxic baits are used.

SKUNKS, OPOSSUMS, RACCOONS, ETC.

Box traps or wire cage traps may be used to trap the animals alive and move them to other areas for disposition. Usually (almost always) the skunk will not release its scent if you gently place a piece of burlap over the trap and handle carefully. Steel traps, shooting, and poisons are not recommended in suburbia for obvious reasons. To prevent animals from getting under buildings, porches, etc., all entrances should be closed. If they should get under a building, seal all openings except one; then sprinkle a patch of flour near the opening. Examine the area after dark. If tracks show the animal has left, close off this last opening immediately. A pound of moth flakes placed in the den may hasten its departure.

A 3-foot chicken-wire fence, extending 6 inches beneath the ground and then 6 inches outward, will deter most animals except the raccoon, which is a good climber. Sometimes an electrified single-strand wire, 8 inches out from the fence and 8 inches above the ground, is used, but this is not recommended in suburbia where children are present.

BATS, RATS, AND MICE

There is nothing particularly different about the control of these animals in suburbia and elsewhere. Therefore, I am referring you to the presentations by myself and others at the First Vertebrate Pest Control Conference held in Sacramento on February 6-7, 1962.

BIRDS

Birds in suburbia are more of a nuisance than anything else. They are fond of fruits from backyard trees and vines and of the berries from ornamentals. They also like newly planted grass seed and some flowers and vegetables. In addition, birds roosting on the house or in shade trees along the street may be quite annoying. Some birds are involved in the transmission of diseases to man, livestock, and poultry, and also spread certain parasites.

During the 3 days of this conference there has been a lot of talk about bird control. There have probably been more advances in bird control research during the past 5 years than in the previous 30. Much of the research is directed toward agricultural problems and bird problems associated with aircraft.

In suburbia, poisons are generally not to be recommended for use by individuals. If the problem becomes of such magnitude that removal of large numbers of birds is necessary, then someone with professional experience should be employed. I am referring primarily to the control of pigeons.

Although my talk is mostly about what the individual home owner can do, I first want to tell you how a group of residents got together in Denver and drove off 10,000-12,000 starlings that had been roosting in trees along the street. Some 41 residents in a 6-block area were loaned records of the starling's distress call. On three successive nights, as the birds came to roost, the residents played the recordings on portables, stereos, and hi-fi sets. On the fourth night no birds attempted to enter the trees and the roost was abandoned. In other areas, similar results have been accomplished by using amplifier equipment on a sound truck and driving up and down the streets.

Now, what can the individual do to prevent birds from nesting and roosting on buildings?. Chemical repellents may be applied to ledges, cornices, and other ornate stonework. Commercially available sticky substances (chicle, soybean lecithin, gun grease, or plastic), listed with the other supplies and devices in the appendix, are quite effective. These materials may also be used to prevent woodpeckers from pecking into clapboards or shingles, and some of them are available for spraying on trees to prevent birds from roosting. Probably the most spectacular use of sprays for this purpose has been along the inaugural parade route in Washington where thousands of starlings perched above the bleachers. The only permanent method of preventing birds from roosting is to eliminate ledges. Construction of new buildings and modernization of old ones should be planned with this in mind. Protruding signs or decorations and offset ledges should be eliminated. Boards, sheet metal, or mortar placed on a sharp slant will effectively keep all species off ledges or from under eaves that can be treated in this fashion. Ledges can also be protected with sharp, upright spines of stainless steel or electrically charged wires.

When birds are eating seed or damaging fruit they are extremely difficult to repel. The only sure method is to completely cover or enclose the vulnerable crops. A number of paper, nylon, or plastic netting materials are available, and although they are not economically practical to use for covering commercial fruit trees, they will protect a backyard crop.

A wide variety of noise-producing devices are available, but they are not recommended where one has close neighbors. Other devices such as imitation owls and snakes, inflated bags or balloons, paper or metal streamers, whirling objects, and countless other things have been used. Success is chiefly dependent upon timing, persistence, and constant shifting of both the devices and their locations.

REFERENCES

California Department of Agriculture, Bird Circular No. 29. Revised March 1, 1962.

California Fish and Game Code.

Federal Register, Volume 26, Number 229, Nov. 29, 1961, Title 50, Wildlife and Fisheries.

Bureau of Sport Fisheries and Wildlife, Wildlife Leaflet 469, Birds Protected by Federal Law, Compiled July 1965.

BIRD CONTROL DEVICES - SOURCES OF SUPPLY*

Since man began the tilling of crops, he has defended his fields against depredating birds and mammals, and to a great extent has been forced to depend upon his own ingenuity for the development of procedures or devices that will effectively do the job. Many devices and techniques have been developed and used successfully. Their value depends largely upon selection of the proper devices and the manner in which they are used.

The following devices and materials are sold for preventing bird damage to crops and/or discouraging unwanted roosts. This list is for the information of correspondents and is not necessarily complete. Listing implies no endorsement of either a product or the technique it represents. Names of reputable manufacturers will be added upon notification to the Bureau of Sport Fisheries and Wildlife that they are prepared to deliver the items concerned.

These manufacturers or importers have obtained registration with the United States Department of Agriculture for interstate sales and shipment. Registration is not required for mechanical devices, such as exploders, traps etc.

For other products pertaining to bird control or rodenticides, consult similar Wildlife Leaflets entitled "Manufacturers of Chemical Animal Repellents" and "Manufacturers or Importers of Rodenticides and Accessories".

Regulations

Feral domestic pigeons, English sparrows and European starlings are not protected by Federal law. Blackbirds, cowbirds and grackles are protected under the Migratory Bird Treaty Act. However, Section 10.62, Title 50 CFR, provides that "A permit shall not be required to kill yellow-headed, red-winged, bi-colored red-winged, tri-colored red-winged and Brewer's blackbirds, cowbirds and all grackles when found committing or about to commit serious depredations upon ornamental or shade trees or agricultural crops." When State and local permits are required to kill birds, they should be acquired before exercising the privilege conferred by Section 10.62.

Automatic Exploders

Machines that ignite acetylene or propane gas to produce loud explosions at regular intervals. Acetylene is produced by dripping water on calcium carbide (marked "C") or is obtained from a tank of compressed acetylene gas (marked "A"). One machine will also operate on propane gas (marked "LP"). Machines are not injurious to birds, but the loud reports may be objectionable in residential areas.

Alexander-Tagg Industries, Inc., 395 Jacksonville Rd., Warminster, Pa. 18974 (A)
Bird-X Inc., 325 W. Huron St., Chicago, 111. 60610 (A,C)
B. M. Lawrence & Co., 24 California St., San Francisco, Calif. 94111 (A,C,LP)
Reed-Joseph Co., Highway #1 North, Greenville, Miss. 38702 (A,C)
Salt Lake Stamp Co., 380 W. 2nd South, Salt Lake City, Utah 84101 (A,C)
Shure Shot Mfg. Co., 2504 Vernon Dr., Muncie Ind. 47304 (A)
Smith-Roles, Ltd., Box 907, Saskatoon, Saskatchewan, Canada (A)
(Has warehouse in Minneapolis, Minn.)

Chemical Coatings to Prevent Roosting

These are "sticky" materials (available in various forms) to keep birds from roosting on ledges, sills, trees and other places.

A - Aerosol; C - Cartridge for caulking gun;
G - Paste; S - Spray (for trees etc.); T - Tube.

Aegis Bird Stop Laboratories, Inc., 6817 S. Stony Is. Ave., Chicago, 111. 60649 (C,G,S,T)
Animal Repellents, Inc., P. O. Box 168, Griffin, Ga. 30223 (A)
Baum's Castorine Co., Inc., 200 Matthew St., Rome, N. Y. 13441 (G)

*information taken from Wildlife Leaflet 409, Revised, Dec. 1964. Slightly Revised, Feb. 1967 (for this publication only.)

A. Z. Bogert Co., 1000 E. Mermaid La., Philadelphia, Pa. 19118 (C)
Chem-O-Craft Specialties, P. O. Box 208, Argo, Ill. 60502 (C)
National Bird Control Laboratories, 5315 W. Touhy Ave., Skokie, Ill. 60078 (A,C,S)
Tanglefoot Co., 314 Straight Ave., S. W., Grand Rapids, Mich. 49502 (A,C)

Electric Devices

Wires are permanently installed on ledges to disrupt bird roosting by means of electrical impulses. The birds are not killed. Consult local building contractors especially those in the scaffolding, roofing or insulating fields or pest control operators. Some of them may be experienced in bird control installations. These devices would not be a specific product although wire, insulators and transformers are used.

Electropel, Inc., 491-495 Bergen Street, Brooklyn, New York, 11217

Exploding Shotgun Shells

This is a 12-gauge shotgun shell, except as noted, containing, instead of pellets, a king-sized firecracker, which is projected a distance of 150 yards or more before exploding

W. V. Clow Seed Co., 1401 Abbott St., Salinas, Cal. 93903 (Bomb used in special pistol)
Penguin Associates, Inc., Pennsylvania Ave., Malvern, Pa. 19355
Stoneco, Inc., 5403 Federal Blvd., Denver, Col. 80221
Western Fireworks Co., Route 1, Box 308, Canby, Ore 97013
Colt's Inc., Firearms Division, Pyrodynamics Operation, RD 1, Atglen, Pa., 19310

Metal Projectors or Wires

These are sharp wire devices that are installed along building ledges, window sills etc. to discourage birds from roosting.

Nixalite Company of America, 2509 Fifth Ave., Rock Island, Ill. 61202
Stan-Gard Pigeon 6 Bird Repellent Co., Inc., 523 W. 184th St., New York, N.Y. 10033

Live Traps

The following companies or individuals manufacture live traps or parts designed for the capture of small birds:

Animal Trap Company, P. O. Box 327, Lititz, Pa. 17453 (hawks, owls)
Bob-N-Jack Trap, 110 8th St., Farmington, Minn. 55024 (pigeons)
Concourse Feed Co., 1146 N. 2nd St., Philadelphia, Pa. 19123 (bobs 6 bobs in frame)
Russell S. Davis, Clayton, Ill. 62324 (small land birds and sparrows)
Havahart, P. O. Box 551, Ossining, N. Y. 10563 (pigeons)
Johnson's, Box 33, Waverly, Ky. 42462 (sparrows)
Richwood Box Mill, R.F.D. #2, Box 307, Detroit Lakes, Minn. 56501 (sparrows)
Sagen & Brown Associates, 13 Genesee St., Skaneateles, N.Y. 13152 (rents and sell various pigeon traps)
Charles Siegel & Son, 5535 Lynch Ave., Chicago, Ill. 60630 (bobs, bobs in frame and completed traps for pigeons)
Twin City Pigeon Eliminating Co., 5108 Grand Ave., Downers Grove, Ill. 60515 (leases and services pigeon traps--none for sale--branches locally)
Roy Vail Company, 103 Wentworth Rd., Antwerp, Ohio 45813 (sparrows)

Moving and Whirling Novelties

Comfort Specialty Co., 1611 Locust Street, St. Louis, Mo., 63103 (Airplane Spinners)

Whirling, bright-colored or shiny objects act as scare devices; move or change them frequently.

Bird Repellent Co., 433 E. Mound Street, Decatur, Ill., (2-faced owls)
The Bower Co., 8440 Warner Dr., Culver City, Cal. 94601 (20-foot reinforced streamers, sold by the dozen)
Germain's Inc., P. O. Box 3233, Los Angeles, Cal. 90054 (10 flying disks in a package)
Gomar Mfg. Co., Inc., 1501 W. Blancke, Linden, N. J. (plastic discs)

Poisoned Perches

This is a metal rod device containing a wick immersed in a lethal solution. When birds land upon the perch, their feet will pick up the toxic chemical.

Rid-A-Bird, Inc., P.O. Box 22, Muscatine, Iowa 52761

Protective Netting

Light, non-metallic netting is manufactured for use in protecting trees, plants and small shrubs from bird attack. In some cases, a supporting framework will be necessary.

Bemis Bros. Bag Co., Visinet Mill, 2400 S. 2nd St., St. Louis, Mo. 63104 (plastic paper, 1/2" openings, widths 40 and 80 feet)

Chicopee Manufacturing Co., Lumite Division, Cornelia, Ga. 30531 (Lumite saran shade cloth is one type)

Moodus Net & Twine, Inc., Moodus, Conn. 06469 (Nylon type, 1" openings, widths of 9 and 18 feet)

Nichols Net and Twine, R.R. 3, Bend Rd., East St. Louis, 111. 62201 (Various types of cotton or nylon netting, cannon nets, custom nets)

Union Carbide Corp., Plastics Div., 270 Park Ave., New York, N. Y. 10017 (One type is polyethylene netting, 1" openings, 84 ft. wide, 300 ft. long)

E. I. du Pont & Co., River Rd., Buffalo, N. Y., 14207 (Vexar Plastic Netting)

Pyrotechnics: Fireworks

Firecrackers, salutes, skyrockets, Roman candles and other devices have been used to drive birds from crops and discourage roosting. These are standard items and may be purchased from regular firecracker manufacturers. Many States and most cities have laws or ordinances prohibiting the use of fireworks. Investigate local city ordinances and State laws regulating the possession or use of fireworks or explosives. Firecrackers, inserted at intervals in slow-burning fuse ropes, have been useful in keeping birds away from agricultural crops. The first two dealers make and distribute completed ropes of firecrackers designed to explode at approximately 20-minute intervals. The J. E. Fricke Co. specializes in cotton rope known as Caw-Caw fuse rope.

Alpha Enterprises, Inc., P. O. Box 12242, Houston, Texas 77017

Red Devil Fireworks Co., Division of Clipper Fireworks Co., P. O. Box 63, Lynwood, Cal. 90262

The J. E. Fricke Co., 40 N. Front St., Philadelphia, Pa. 19106

Revolving Lights

The lights revolve automatically, flashing alternate color beams. They may repel birds from both inside and outside of buildings.

Bird-X, Inc., 325 West Huron St., Chicago, 111. 60610

R. E. Dietz Co., 225 Wilkinson St., Syracuse, N. Y. 13201

The Huge Co., Inc., 884-6 Hodiament Ave., St. Louis, Mo. 63112

Trippe Manufacturing Co., 133 N. Jefferson St., Chicago, 111. 60606

Sound Devices

These devices produce sounds which repel or attract birds.

Bio-Sonics Control Co., 15259 Highway 128, Calistoga, Calif., 94515 (Unit has tape that reproduces the starling distress call. Company gives custom service on other species by using alarm or distress calls.)

Electronic Game Calls, Inc., 210 W. Grand Ave., Wisconsin Rapids, Wis. 54494 (A portable unit with records to call in crows, can use other records)

B. M. Lawrence 6 Co., 24 California St., San Francisco, Cal. 94111 (A portable unit of Klaxon horns with batteries)

MANUFACTURERS OF ANIMAL TRAPS*

*Information taken from Wildlife Leaflet 263, Revised, June 1964.

This list of manufacturers of animal traps is prepared for the information of correspondents and is not necessarily complete. The inclusion of names implies no endorsement as to quality or prices. Names of reputable manufacturers will be added upon notification to the Bureau of Sport Fisheries and Wildlife that they are prepared to deliver the item concerned.

Live Animal Traps

Hancock Trap Co., 901 So. Chicago St., Hot Springs, S. Dak. 57747 (beavers)
Havahart, P. O. Box 551, Ossining, New York 10563
Kness Manufacturing Co., Albia, Iowa 52531 (mice)
Johnson's, Box 33, Waverly, Kentucky 42462
National Live Trap Corp., P. O. Box 302, Tomahawk, Wisconsin 54487
E. E. Nupp & Sons, Starford (Indiana County), Pa. 15777 (rabbits)
Shawnee, 3934-A Buena Vista, Dallas, Texas 75204 (primarily a fish trap but will catch mink, muskrats, etc.)
H. B. Sherman, P. O. Box 683, De Land, Florida 32721 (Primarily for gophers, mice 6 rats but will custom make other traps)
H. J. Spencer and Sons, P. O. Box 131, Gainesville, Florida 32601 (Primarily for rats and mice but will custom make other traps)
Sullivan's Sure Catch Traps, P. O. Box 1241, Valdosta, Georgia 31602
Worcester Wire Novelty Co., Inc., Timonium Road, Timonium, Md. 21093 (rats)

Mole Traps

Animal Trap Company, P. O. Box 327, Lititz, Pa. 17453 (prong & scissors-jaw)
Nash Mole Traps, R. F. D. #1, Scotts, Michigan 49088 (choker-loop)
Tyler Products, 4525 5th St., N. E., Puyallup, Wash. 98372 (diamond-jaw)
Washburn Company, 1802 Preston St., Rockford, Ill. 61101 (prong or harpoon) and 28 Union St., Worcester, Mass. 01608

Pocket Gopher (Salamander) Traps

Animal Trap Company, P. O. Box 327, Lititz, Pa. 17453
Z.A. Macabee Gopher Trap Co., 110 Loma Alta Ave., Los Gatos, Calif. 95030
Tyler Products, 4525 5th St., N. E., Puyallup, Washington 98372

Rat and Mouse Traps (Deadfalls)

Animal Trap Company, P. O. Box 327, Lititz, Pa. 17453
McGill Metal Products Company, 110 Prairie St., Marengo, Illinois 60152
J. R. Schuyler and Company, 152 West 4th St., Bloomsburg, Pa. 17815

Snares

Aldrich Spring Activated Animal Snare-Trap, Box 253, Castle Rock, Wash. 98611
Animal Trap Company, P. O. Box 327, Lititz, Pa. 17453

Steel Traps

Animal Trap Company, P. O. Box 327, Lititz, Pa. 17453
Bigelow Trap Company, 305 W. 3rd St., Marysville, Ohio 43040
The Hawkins Company, South Britain, Connecticut 06487
Oberto Trap Company, P. O. Box 88, Iron Belt, Wisconsin 54536

The following companies or individuals manufacture live traps or parts designed for the capture of small birds:

Animal Trap Company, P. O. Box 327, Lititz, Pa. 17453 (hawks, owls)
Bob-N-Jack Trap, 110 8th St., Farmington, Minnesota 55024 (pigeons)
Concourse Feed Co., 1146 N. 2nd St., Philadelphia, Pa. 19123 (bobs & bobs in frame)
Russell S. Davis, Clayton, Illinois 6234 (small land birds and sparrows)
Johnson's, Box 33, Waverly, Kentucky 42462 (sparrows)
Richwood Box Mill, R.F.D. #2, Box 307, Detroit Lakes, Minn. 56501 (sparrows)
Sagen 6 Brown Associates, 13 Genesee St., Skaneateles, New York 13152 (rents and sells various pigeon traps)

Charles Siegel & Son, 5535 Lynch Ave., Chicago, Illinois 60630 (bobs, bobs in frame, and completed traps for pigeons)
Twin City Pigeon Eliminating Co., 5108 Grand Ave., Downers Grove, Ill. 60515 (leases and services pigeon traps--none for sale--branches locally)
Roy Vail Company, 103 Wentworth Road, Antwerp, Ohio 45813 (sparrows)

MANUFACTURERS OR IMPORTERS OF RODENTICIDES AND ACCESSORIES"

This list is for the information of correspondents and is not necessarily complete. Listing implies no endorsement of either a product or the technique it represents. Names of reputable manufacturers or importers will be added upon notification to the Bureau of Sport Fisheries and Wildlife that they are prepared to furnish the items concerned.

All the firms given below have registration for their products (when required) with the U. S. Department of Agriculture. Such registration is given only for the control of specific animals.

Write the manufacturer or importer as to distributors, packaging, prices, or possible trade-name products either as a basic chemical or containing the active ingredient. Manufacturers of commonly available chemicals are not listed.

Gases

Calcium cyanide Made as a fine dust ("A") or granules ("G") American Cyanamid Co., P. O. Box 400, Princeton, N. J. 08540

Carbon bisulphide

Quinton Co., Division of Merck & Co., Inc., Rahway, N.J. 07065
Stauffer Chemical Co., 636 California St., San Francisco, Calif. 94119

Cartridges

W. F. Barthel Chemical Co., 22 - 52nd St., Gulfport, Mississippi
Destruoxol Corp., Lt., 1450 W. 228th St., Torrance Calif. 90501
Nip-Co Manufacturing Co., 200 Main St., New Rochelle, N.Y. 10802

Chloropicrin

Morton Chemical Co., 110 N. Wacker Drive, Chicago, Ill. 60606

Combination of gases (A fumigant for striped gophers and ground squirrels)

Stauffer Chemical Co., P. O. Box 222, Omaha, Nebr. 68107
(Carbon tetrachloride, carbon bisulphide, petroleum ether)

Methyl bromide (Firms marked "*" will supply it with chloropicrin added)

American Potash & Chem. Corp., 3000 W. 6th St., Los Angeles, Calif. 90054
*Dow Chemical Co., 825 E. Main St., Midland, Mich. 48640
Great Lakes Chemical Corp., 500 Fifth Ave., New York, N.Y. 10036
*Michigan Chemical Corp., 500 N. Bankson St., St. Louis, Mich. 48880

Rodenticides

Antu (Alphanaphthathiorea)

S. B. Penick & Co., 100 Church St., New York, N.Y. 10008

Diphacinone (An anticoagulant, soluble and insoluble types)

Neochem Products Co., Inc., 6028 N. Kent, Milwaukee, Wis. 53217

Fluoroacetamide (Restricted sale) Firm has distributors in the U. S.

Rentokil Laboratories, Ltd., Felcourt, E. Grinstead, Sussex, England

Fumarin (An anticoagulant, soluble and insoluble types)

Amchem Products, Inc., Ambler, Pa. 19002

*Information taken from Wildlife leaflet 465, December 1964

Norbormide (A specific chemical to kill rats, much less toxic to other animals)
Tavolek Laboratories, Camp Hill Road, Fort Washington, Pa. 19034.

Pival (An anticoagulant, soluble and insoluble types)
Motomco, Inc., 89 Terminal Ave., Clark, N.J. 07066

P.M.P. (An anticoagulant, mixture of two indandiones, soluble and insoluble)
American Fluoride Corp., 855 Avenue of the Americas, New York, N.Y. 10001

Red squill

American Exterminator, Inc., 9th 6 Race Sts., Cincinnati, Ohio 45202
Biocerta Corp., 303 Fifth Ave., New York, N.Y. 10016
Chemical Insecticide Corp., 30 Whitman St., Metuchen, N. J. 08840
Gallard-Schlesinger Chemicides, Inc., 580 Mineola Ave., Carle Place, N. Y. 11514
Louisiana Fortifying S Mixing Plant, Box 688, Abbeville, La. 70510
S. B. Penick & Co., 100 Church St., New York, N.Y. 10008
Ratin Laboratory of New England, 23 Concord St., Haverhill, Mass. 01830

Sodium fluoroacetate (1080) Restricted sale

Pyrrole Chemical Corp., 817 Spring Lane, Portsmouth, Ohio 45662
Tull Chemical Co., P. O. Box 246, Oxford, Ala. 36203

Strychnine Powdered alkaloid and sulfate (All importers)

American Fluoride Corp., 855 Avenue of the Americas, New York, H. Y. 10001
Gallard-Schlesinger Chemicides, Inc., 580 Mineola Ave., Carle Place, N.Y. 11514
S. B. Penick & Co., 100 Church St., New York, N.Y. 10008
Prentiss Drug & Chemical Co., Inc., 101 W. 31st St., New York, N. Y. 10001
Walker Chemicals, Inc., 22 W. 1st St., Mount Vernon, N. Y. 10550

Thallium sulfate

American Fluoride Corp., 855 Avenue of the Americas, New York, N. Y. 10001
American Smelting and Refining Co., 120 Broadway, New York, N. Y. 10005
Gallard-Schlesinger Chemicides, Inc., 580 Mineola Ave., Carle Place, N. Y. 11514

Warfarin (An anticoagulant, soluble and insoluble types; can also be obtained with sulfa-quinioxaline added called Prolin)

Motomco, Inc., 89 Terminal Ave., Clark, N.J. 07066
S. B. Penick & Co., 100 Church St., New York, N. Y. 10008
Prentiss Drug & Chemical Co., Inc., 101 W. 31st St., New York, N.Y. 10001

Zinc phosphide

American Fluoride Corp., 855 Avenue of the Americas, New York, N. Y. 10001
Gallard-Schlesinger Chemicides, Inc., 580 Mineola Ave., Carle Place, N. Y. 11514
Hooker Chemical Corp., P.O. Box 344, Niagara Falls, N. Y. 14302
Pfaltz & Bauer, Inc., 153 Waverly Place, New York, N.Y. 10014

Specialty Products

Mole and gopher baits (These firms formulate a bait containing thallium sulfate)

Arnott Chem. & Ext. Co., Inc., 353 Mass. Ave., Indianapolis, Ind. 46204
Bonide Chemical Co., Inc., 382 N. Genesee St., Utica, N. Y. 13502
Carajon Chemical Co., Inc., 505 S. Division St., Fremont, Mich. 49412
O. E. Linck Co., Inc., 1234 State Highway 46, Clifton, N. J. 07015
Private Brands, 300 S. Third St., Kansas City, Mo. 64106

Rodent cakes (These firms formulate a bait of paraffin with an anticoagulant)

American Chemical Co., Box 22, Muscatine, Iowa 52761
J. T. Eaton & Co., Inc., 3110 W. 65th St., Cleveland, Ohio 44102

Accessories

Black light (Equipment for detecting rodent urine)

Black Light Eastern Corp., 24 Kinkel St., Westbury, N. Y. 11591
Ultra-Violet Products, Inc., 5115 Walnut Grove Ave., San Gabriel, Calif. 91778

Dispensers (These firms make separate units to dispense rat and mouse baits)

Amchem Products, Inc., Ambler, Pa. 19002 (A styrene plastic container holding one quart of liquid)
B & G Company, Plumsteadville, Pa. 18949 (Small paper jiggers for liquids)
J. J. Dill Co., P.O. Box 788, Kalamazoo, Mich. 49003 (A small plastic tray to feed 3 oz. dry bait and 1/2 oz. liquid)
E. C. Helland 6 Co., 7138 Oakland Ave., Minneapolis, Minn. 55423 (A polyethylene jar for liquids)
Hub States Chem. & Equip. Co., 1255 N. Windsor St., Indianapolis Ind. 46201 (A round plastic container with built-in cheese aroma)
Pest Control Equipment Co., 24 N. Bond St., Mount Vernon, N.Y. 10550 (A waxed fibre board box - collapsible - to hold 3 lbs. dry bait)
J. E. Ronicker Co. Laboratories, West Milton, Ohio 45383 (A rat and mouse control station 8 x 19" for dry and liquid baits)
Solvit Chemical Co., 3734 Speedway Rd., Madison, Wis 53705 (A galvanized steel container for dry and liquid baits)
Tull Chemical Co., P.O.Box 246, Oxford, Ala 36203 (A liquid bait dispenser with plastic reservoir and bowl)

Pumps for gases (Especially designed for each product)

Calcium cyanide

Acme Brass 5 Machine Works, 609 E. 17th St., Kansas City, Mo. 64108

Carbon bisulphide

Stauffer chemical Co., 636 California St., San Francisco, Calif. 94119

Methyl bromide

Tyler Products, 4525 - 5th St., Puyallup, Wash. 98372

Rat proofing device (A protected device for drains, only for rats)

Marlex Manufacturing Co., P. O. Box 148, Caro, Mich. 48723

Burrow Builders (These machines are used to produce artificial burrows in the ground in which poisoned bait is placed automatically)

Pocket gophers

Blackwelder Manufacturing Co., P. O. Box 808, Rio Vista, Calif. 94571

Nan Conifer Company, Zimmerman, Minnesota 55398

Rue R. Elston Co., Inc., 815 E. 79th St., Minneapolis, Minn. 55420

Schneidmiller Industries, P.O. Box 521, Fort Collins, Colo. 80522

Trail builder (This machine is used to make trails or burrows in the ground in which poisoned bait is placed.)

Mice

Rue R. Elston Co., Inc., 815 E. 79th St., Minneapolis, Minn. 55420

Hawbuck Orchards, O. C. Doe 6 Sons, Harvard, Mass. 01451

MANUFACTURERS OF CHEMICAL ANIMAL REPELLENTS*

This list of manufacturers of chemical animal repellents (mammals and birds) is for the information of correspondents and is not necessarily complete. The inclusion of names implies no endorsement of the product. Names of reputable manufacturers will be added upon notification to the Bureau of Sport Fisheries and Wildlife that they are prepared to deliver the items concerned.

These manufacturers have registration with the U. S. Department of Agriculture when required. Separate listings for each manufacturer of the more common repellents, such as naphthalene flakes, will not be given. For information on repellents to control cats, dogs and other domestic animals, write the Bureau of Animal Industry, U. S. Department of Agriculture, Washington, D. C. 20250

Many of these products may be purchased locally, especially when the trade name is known. These manufacturers may be contacted for details on local distributors, packaging and prices.

Ready-to-Use Products

*Information taken from Wildlife leaflet 464, December 1964

Birds

Chemical Bait: Grain treated with a chemical designed to frighten sparrows, pigeons, starlings and certain blackbirds. It can have a lethal effect if it is eaten. There are other formulations for restricted sale.

Phillips Petroleum Company, Bartlesville, Okla. 74004 (Trade name: Avitrol 100)

Chemical Coatings: These are "sticky" materials to keep birds from roosting on ledges, sills, trees and other places. Code: A - aerosol; C - cartridge for caulking gun; G - paste; S - spray (for trees etc.); T - tube.

Aegis Lab., Inc., 6817 S. Stony Island Ave., Chicago, Ill. 60649 (C,G,S,T)
Grosley's No Roost

Animal Repellents, Inc., P. O. Box 168, Griffin, Ga. 30223 (A)
Bird-Stop

Baum's Castorine Co., Inc., 200 Matthew St., Rome, N. Y. 13441 (G)
Repel-0-Film Bird Repellent

A. Z. Bogert Co., 1000 E. Mermaid Lane, Philadelphia, Pa. 19118 (G)
4-The Birds

Chem-0-Craft Specialities, Box 208, Argo, Ill. 60502 (C,P)
Bird-Ban Bird Repellent Compound

National Bird Control Lab., 5315 W. Touhy Ave., Skokie, Ill. 60078 (A,C,S)
Roost No More

Tanglefoot Co., 314 Straight Ave., S.W., Grand Rapids, Mich. 49502 (A,C)
Bird Tanglefoot

Seed Protectants: These are formulations applied to seeds primarily designed to repel birds from eating or disturbing them.

Bonide Chemical Co., Inc., 382 N. Genesee St., Utica, N. Y. 13502
Crotox Powder & Crotox Liquid Seed Protector

Borderland Products, Inc., 733 - 739 Perry St., P. O. Box 366, Buffalo, N. Y. 14210
Stanley's Crow Repellent

California Chemical Co., Lucas & Ortho Way, Richmond, Cal. 94804
Isotex Seed Treater and Ortho LM Seed Protectant

Coahoma Chemical Co., Inc., P.O. Box 231, Beacon, N. Y. 12508
Red Panther Seedgard Crow Repellent-Insecticide

Hayes-Sammons Chemical Co., 116 E. 10th St., Mission, Texas 78572
Mission Brand Mo-Crow Bird Repellent-Insecticide

The Kilgore Seed Co., 214 S. Collins St., Plant City, Fla. 33566
Watermelon Seed Protectant (a kit of three packages)

Parson's Chemical Works, P. O. Box 146, Grand Ledge, Mich. 48837
Parson's Seed Saver Crow Repellent

Pearson 6 Co., P. O. Box 431, Mobile, Ala. 36603
Pearson's Seed Saver

Stauffer Chemical Co., 636 California St., San Francisco, Cal. 94119
Endrin 50-W Seed Protectant

*Deer and Rabbits: These are formulations, prepared by adding water, which act as repellents when applied with certain restrictions to animal food plants, such as flowers, shrubs and trees. Most of the products include a sticker. None are poisons.

Cornell Chemical & Equipment Co., 115 N. Rolling Rd., Baltimore, Md. 21228
Cornell Rabbit & Deer Repellent

E. I. duPont de Nemours & Co., Industrial 6 Biochemical Dept., Wilmington, Del. 19898
Arasan 42-S Thiram Fungicide 6 Repellent

J. O. Ehrlich Chemical Co., 30 N. 8th St., Reading, Pa. 19601
Magic Circle Deer Repellent and Magic Circle Rabbit Repellent

Goulard and Olena, Inc., Skillman, N.J. 08558
G & O Rabbit Repellent

H & H Enterprises, Inc., P.O. Box 333, Duvall, Wash. 98019
Double H Brand Deer Repellent

Hydroponic Chemical Co., Inc., P.O. Box 97-C, Copley, Ohio 44321
Nobonex No-Nib'l Rabbit Repellent & Nibonex Liquid Rabbit Repellent

*Some of the above rabbit and deer repellents may have some repellency against meadow mice.

Deer and Rabbits (cont'd)

O. E. Linck Co., 1234 State Highway 46, Clifton, N.J. 07015
Tat-Go Repels Deer/Rabbits
Morton Chemical Co., 110 N. Wacker Drive, Chicago, Ill. 60606
Z. I. P. Deer and Rabbits
Nott Mfg. Co., 200 S. Water St., Poughkeepsie, N. Y. 12602
Nibble-Not Repellent Rabbits and Deer
Pennsalt Chemicals Corp., 309 Graham Bldg., Aurora, Ill. 60504
Penco Thiram Animal Repellent Deer and rabbits
Selco Supply Co., Collins Ave. & RR, Eaton, Colo. 80615
Selco TMTD-Rhoplex Rabbit and Deer Repellent
Sudbury Laboratory, Dutton Rd., Sudbury, Mass. 01776
Deer and Rabbit Repellent

Moles and Field Mice;

Nott Mfg. Co., 200 S. Water St., Poughkeepsie, N. Y. 12602
Notts Bulb Saver

Other Rodents: There are many chemicals with varying degrees of effectiveness in repelling various rodents, such as mice, rats and squirrels. There are many manufacturers of wood preservatives with various ingredients which act as repellents, such as creosote, pentachlorophenol, copper or zinc naphthenate. There are two manufacturers who have registration of their product for this specific use.

Coopers Creek Chemical Corp., West Conshohocken, Pa. 19428
Tree Wound & Pruning Dressing (applied at base of tree to prevent gnawing)
Premier Creosote Co., Cedar Falls, Iowa 50613
Tree-Wood Oil Refined Creosotate & Penta Preservative (applied to wood)

Manufacturers of Basic Ingredients

The following products are used in making deer and rabbit repellent formulations. Home-mixing will usually be less costly when 20 or more gallons of the final solution are required.

Hexadecanol A defoaming agent. Cetyl alcohol 70%

E. I. duPont de Nemours Co., Polychemical Div., Wilmington, Del. 19898
Rohm & Haas Co., 222 N. Washington Sq., Philadelphia, Pa. 19105

Latex 512-R A sticking agent. Styrene-butadiene emulsion.

Dow Chemical Co., 825 E. Main St., Midland, Mich. 48640

(Orders taken from any of their 18 field offices for 5 gallons or more)

Methocel Antiflaking agent. Powder, technical, 1500 c.p.s. viscosity.

Dow Chemical Co., 825 E. Main St., Midland, Mich. 48640

Rhoplex AC-33 A sticking agent. Acrylic ester polymer emulsion.

Rohm & Haas Co., 222 N. Washington Sq., Philadelphia, Pa. 19105
(Manufacturer will accept orders for 5 gallons or more)

Thiram A basic repellent. Tetramethylthiuramdisulphide or "TMTD".

E. I. duPont de Nemours Co., Biochemicals Dept., Wilmington, Del. 19898
Arasan 75 (powder) and Arasan 42-S (emulsion)
Pennsalt Chemicals Corp., 309 Graham Bldg., Aurora, Ill. 60504
Penco Thiram Tech. 99% and Penco Thiram S-42