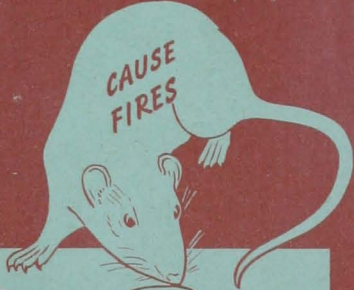
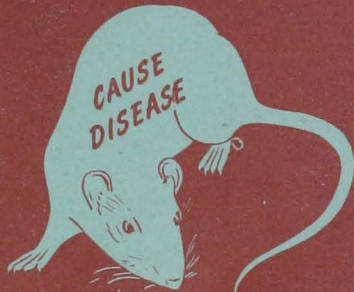


11  
214  
22

# RATS

*Let's  
Get Rid  
of Them*

Library  
Pacific Salmon Investigations  
U. S. Fish & Wildlife Service  
Seattle, Washington



UNITED STATES  
DEPARTMENT OF THE INTERIOR  
FISH AND WILDLIFE SERVICE  
CIRCULAR 22



## RATS COST PEOPLE OVER ONE BILLION DOLLARS A YEAR



### RATS VERSUS PEOPLE



Rats equal twice the number of people on farms.

Rats equal the number of people in towns.

Rats equal one-fifth the number of people in cities.

### RAT POPULATION

50 million on farms

30 million in towns

20 million in cities

### EACH RAT COSTS \$10+

|                                       |          |
|---------------------------------------|----------|
| A rat eats 40 lbs. of food yearly.... | Cost \$3 |
| A rat contaminates other food.....    | Cost \$6 |
| A rat damages property.....           | Cost \$1 |
| Loss from rat-borne diseases—         | Cost un- |
| known                                 |          |

100 million rats cost over \$1,000,000,000



## **RATS DESTROY FOOD**

Rats eat millions of bushels of grain each year. They attack it in the field, on the farm, in the elevator, mill, processing plant, store, and home, and in transit. These same rats waste many more millions of bushels by pollution.

*Grain is food—Keep it clean.* Even farm animals may refuse to eat rat-damaged and rat-contaminated grain.

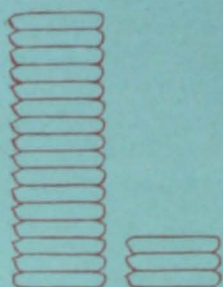
Rats are omnivorous. They eat nearly every kind of grain, fish, fruit, meat, milk product, or vegetable. Like humans, rats select and prefer choice, clean, and fresh food. They waste far more than they eat.

## **HOW RATS POLLUTE FOOD**

Food may be contaminated because each rat is (1) dropping 25 to 150 pellets every 24 hours, (2) voiding 10 to 20 cc. of urine each day, and (3) constantly shedding some of its coat of 500,000 hairs, which are distributed in the air, unseen by the human eye.

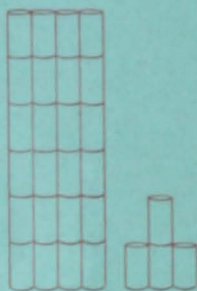


## EXAMPLES OF FOOD CONTAMINATION



A survey of cereal grain storage facilities in one State revealed 43% had infestations by rats and 59% by mice.

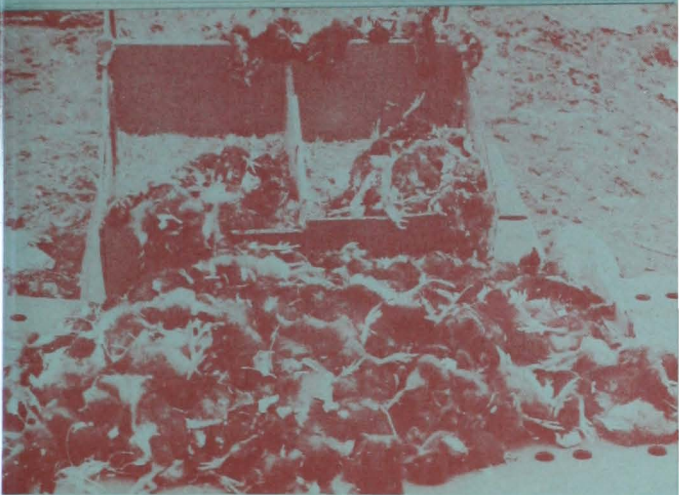
Only 3% of the corn shipped to terminal markets in one section of the country was free from rat and mouse filth.



Processed foods may also be contaminated by rats and mice. A State chemist found rat hairs in 13 out of 43 different brands of canned products.

Packaged goods are contaminated by rats in warehouses and on grocery or pantry shelves. A single incident involved 1,800,000 lbs. of sugar spoiled by rat urine.





## RATS ATTACK POULTRY AND LIVESTOCK

These rodents destroy hundreds of baby chicks in one night. They attack broilers and even adult hens. They relish ducks, geese, and wild birds. Rats have seriously injured baby pigs, lambs, and calves. Most rats kill birds or animals for their flesh and blood; others simply have a lust for killing.

## RATS CAUSE DISEASES



Infected fleas, lice, mites, and ticks carry diseases like plague and typhus fever from rats to man and to other animals.



Amebiasis, infectious jaundice, Salmonella food poisoning, and tapeworm infections are spread by rats. The germs are transmitted to man by polluted food and water.



Rat bites may cause ratbite fever. Cities annually report hundreds of babies bitten by rats.



## RATS SPREAD DISEASES TO ANIMALS

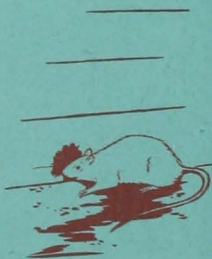
Many diseases are distributed by rats to livestock, poultry, pets, and other animals. They are transmitted by their feet and fur, by excreta, and by other methods. Among the diseases are contagious abortion, distemper, equine influenza, mange, mastitis, paratyphoid, pseudorabies, rabies, swine erysipelas, tracheitis, trichinosis, and tuberculosis.

## RATS DESTROY PROPERTY

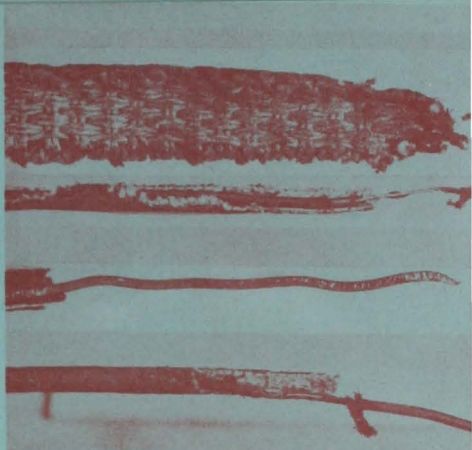


### By Gnawing . . .

Rats gnaw many substances to keep their incisor teeth sharp and worn down. These teeth grow about 5 inches a year. Rats will gnaw through almost anything in their path to obtain food. Hard substances like concrete, brick, metal, and hardwoods will be gnawed at their edges. Grain bags, paper cartons, and wooden containers are easily damaged.







## By Starting Fires . . .

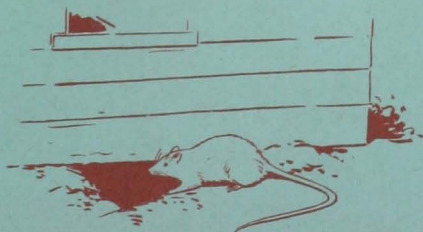
Rats start fires by damaging the insulation of electric wiring. A survey of 39 cities showed that 530 fires were started by rats and mice. It has been estimated that 25% of fires of undetermined origin may have been caused by rats.

Rats use flammable materials like oily rags and matches for building nests, and fires occur through spontaneous combustion.

Rats create short circuits by crossing open switches. As a result they have thrown whole cities into darkness, ruined motors and transformers, paralyzed telephone and telegraph lines.

## By Burrows . . .

Extensive damage is done by the burrowing of the Norway rat. Foundations and lower floors of buildings have been weakened and some have collapsed when rats burrowed under them. Concrete slabs crack when burrows hollow out the space beneath them. Burrows into dikes and outdoor embankments cause erosion and floods.



## By Nesting . . .

Property is ruined by the rat's attempt to build a well-protected nest to raise its young. Norway rats tend to use ground burrows. Roof rats find concealed places in the upper floors, in double walls, or in stored products. Any soft material like cloth, paper, shavings, or excelsior will be carried to the nest. Lace, silk, nylon, and even paper money are used.



## Miscellaneous Damage . . .

Many unusual things are damaged by rats. In printing shops, press rollers and paste brushes are attacked. Leather goods such as shoes, horse collars, and driving belts are gnawed. Soap or lye is eaten. Rats are fond of flowers, bulbs, and seeds. Fire hoses, lead pipe, tires, books, rugs, and tapestries are not immune to attack.





## RATS DISTRIBUTE FILTH

Filth is carried on the bodies and in the mouths of rats. It is distributed from their sewer homes over their travel routes.



As rats move over refuse, their feet, oily hair, and bodies pick up germs and filth.



Rats feed at open refuse cans. Decayed food sticks to their fur, feet, and mouth, and drops off as they travel.

These filthy rats may run over and contaminate your food, table, cooking utensils, and clothing.

(Photo by Sam Caldwell, St. Louis Post-Dispatch)



## **RATS CAUSE FEAR, FRIGHT, AND EMBARRASSMENT**

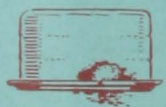
The presence of rats is disturbing. They may attack children and pets. Cornered rats are extremely dangerous. Rats are found in and about homes, offices, factories, and many other places where humans work, rest, and play.

### **Face to Face**



Surprised rats may jump out when a door is opened. When walking home at night, you may be confronted by rats. Hungry rats may appear as the garbage is emptied.

### **Embarrassment**



Have guests heard or seen rats? Smears and tracks may be noticed. Rats may have licked off the cake frosting or damaged other food. Their depredations may ruin a good housekeeper's reputation.



### **Sleepless Nights**

Rats in attics and double walls may prevent sleep.

## **RATS WASTE OUR TIME**

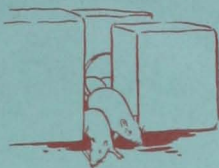
They make us spend considerable time and money in repairing and cleaning up their damage. They do not pay us 1 cent in return.

# HOW TO INSPECT FOR RATS

Some ways to detect rats are—

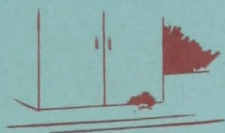
## Live rats:

Switch on lights in a dark room and look and listen for scampering rats. Move long-stored merchandise to uncover harborages.



## Gnawings:

Look for signs around doors, windows, utility lines, and packaged goods, especially in food storages.



## Burrows:

Holes and fresh diggings about foundations, under floors, sidewalks, platforms, embankments—all may mean rats.



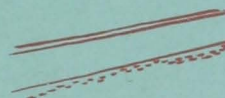
## Droppings:

Fresh droppings are a sure sign. Look behind objects near walls and in places seldom cleaned or disturbed.



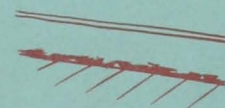
## Tracks:

Examine dusty places for rat tracks. If not visible, dust flour along suspected runways and observe for a few days.



## Smears:

Look for darkened areas along walls adjacent to pipes, beams, and openings where rats travel.



## Test baiting:

Place food where rats can find it and observe results.





## HOW TO CONTROL RATS

There are four essentials for good rat control: (1) Eliminate the sources of food. (2) Remove shelter. (3) Rat-proof. (4) Kill rats.

### STARVE THEM OUT

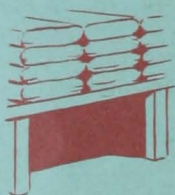


Keep garbage and refuse in tightly covered metal containers.

Store food in ratproof buildings, rooms, or containers.

Keep entire premises clean.

### REMOVE THEIR SHELTER

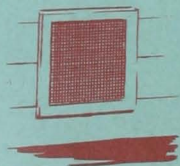


Keep all storage places orderly.

Stack grain, boxes, lumber, and other objects on racks at least 1 foot above floor.

Avoid double walls, spaces between ceilings and floors, etc., where practicable.

### BUILD THEM OUT

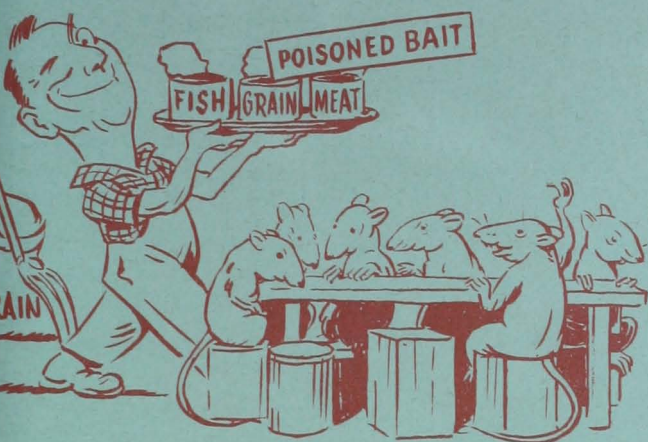


Close all holes in exterior walls. Buildings without ratproof foundations should be raised 18 inches above ground level.

Permit no spaces over  $\frac{1}{4}$  inch around doors, windows, or other openings.

Install self-closing devices on all doors frequently used.

# HOW TO KILL RATS



## 1. POISONED BAIT

Poisoned bait is suggested where it can be used safely. A complete kill may require two or more different poisons. Permanent-type bait may also protect against future invasions of rats.

### Kinds of Poisons

Red squill and anticoagulants are relatively safe poisons. Red squill is a single-dose poison for Norway rats only. The anticoagulants are multiple-dose poisons and kill all kinds of rats (and house mice) after several days of repeated feeding.

Arsenic, phosphorus, thallium, and most other poisons are much more dangerous. Only experienced persons should handle highly toxic poisons.

### Kinds of Bait

Red squill is used with freshly ground meat or fish baits. Anticoagulants are usually mixed with cornmeal, rolled oats, or other dry baits; some may be dissolved in drinking water.

## 2. GASSING

Control of rats with poisonous gas includes gassing of burrows and fumigation of buildings. The latter should be done only by experienced operators.

Gassing of rat burrows out-of-doors is an excellent means of control. The material most commonly used is the dust form of calcium cyanide. It is safe to use in the open when reasonable precautions are taken to avoid breathing the fumes or dust. It is easily blown into rat burrows with a foot pump or garden duster. The gas kills rats quickly wherever it is concentrated. Most of the rats as well as their parasites die in the ground, and there is no secondary hazard to pets and other animals.



## 3. TRAPPING

Traps are an effective way to kill rats, but require skill and much time. They are recommended for small infestations, where poisoned baits or gases are impractical, or as a follow-up after other methods. The simple wooden-base and metal traps are both effective.



## COMMERCIAL PRODUCTS AND SERVICES

Rodent-control supplies can usually be obtained at local stores. Gases and poisons are sold under various trade names, with the active ingredient given on the label.

The pest-control industry offers professional service in rat control. Elimination, ratproofing, and advice on sanitation can be obtained from your local pest-control operator or exterminator.

## COMMUNITY ACTION

Since rats move from one place to another, control is the responsibility of everyone.

Community action by governmental agencies and public-spirited groups in rural, town, and city projects has reduced rat populations. Temporary campaigns help, but a permanent working organization is essential for effective long-time control. All plans should include the basic principles of food protection, shelter removal, ratproofing, and killing rats.



## 2. GASSING

Control of rats with poisonous gas includes gassing of burrows and fumigation of buildings. The latter should be done only by experienced operators.

Gassing of rat burrows out-of-doors is an excellent means of control. The material most commonly used is the dust form of calcium cyanide. It is safe to use in the open when reasonable precautions are taken to avoid breathing the fumes or dust. It is easily blown into rat burrows with a foot pump or garden duster. The gas kills rats quickly wherever it is concentrated. Most of the rats as well as their parasites die in the ground, and there is no secondary hazard to pets and other animals.



## 3. TRAPPING

Traps are an effective way to kill rats, but require skill and much time. They are recommended for small infestations, where poisoned baits or gases are impractical, or as a follow-up after other methods. The simple wooden-base and metal traps are both effective.

## COMMERCIAL PRODUCTS AND SERVICES

Rodent-control supplies can usually be obtained at local stores. Gases and poisons are sold under various trade names, with the active ingredient given on the label.

The pest-control industry offers professional service in rat control. Elimination, ratproofing, and advice on sanitation can be obtained from your local pest-control operator or exterminator.

## COMMUNITY ACTION

Since rats move from one place to another, control is the responsibility of everyone.

Community action by governmental agencies and public-spirited groups in rural, town, and city projects has reduced rat populations. Temporary campaigns help, but a permanent working organization is essential for effective long-time control. All plans should include the basic principles of food protection, shelter removal, ratproofing, and killing rats.

