



HEALTH HAZARDS

From Pigeons,
Starlings and
English Sparrows

Diseases and Parasites
Associated with Pigeons,
Starlings and English
Sparrows which affect
Man and Domestic Animals

— SECOND EDITION —

By Phil Waldorf

Includes Expanded
Bird Control &
Cleanup Information

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SECOND EDITION



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All it takes is one pigeon!

Over 40 diseases, corrosion, blocked drainage, odors and slippery surfaces are only a few of the many problems associated with pigeons.

Metal and paint can't stand up to the corrosion caused by bird droppings.



Piled up high, bird droppings should be considered hazardous waste and treated as such.



*Bird control netting being installed
at the U.S. Post Office building in NYC.*

ACKNOWLEDGMENTS

Originally Compiled and Edited By Walter J. Weber,
M.S., Environmental Consultant, Registered Professional
Entomologist and Certified Pesticide Applicator.

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respectively stay indebted to everyone of them for their
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possible.

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about the dangers of pest birds.

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Before and after proper bird control has been installed!





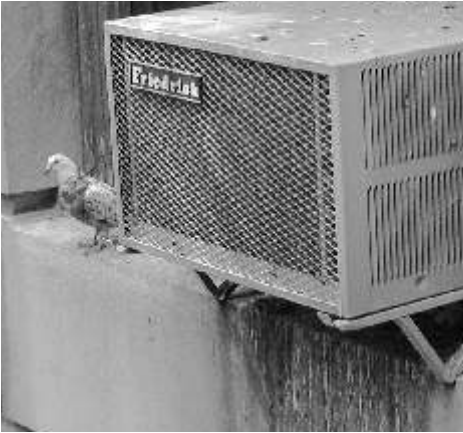
Not particular where they roost, even the scarecrow owl became a convenient perch.



These pipes will soon be spouting leaks. The corrosion caused by bird droppings can eat right through metal and paint.

Watching for their next target, these pigeons have found a comfortable perch and have no fear of mankind.





Even a small air conditioner can suck in pollutants from outside.



Picked the wrong long term parking spot.



Bird droppings, feathers and nesting material clogged this drain causing extensive water damage and structural damage.



It's safer to cross the street rather than walking past a building like this.



Spikes don't work at keeping pigeons out.



Under all these feathers and other debris are spikes - instead of keeping birds away they accumulate nesting material and make ideal nesting spots.



This electrical box is a fire waiting to happen.



Reserved seating for your favorite concert?

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PREFACE

At a time when there is great emphasis on bird conservation and millions of people maintain bird feeders to help support our “feathered friends,” it is difficult for many to realize that some birds are undesirable. The fact is, some of them can legitimately be termed pests. It is not simply a matter of birds being messy or noisy or destructive of our food crops; some are associated with diseases, some that can kill. As such they form extensive disease reservoirs from which diseases may be transmitted to man and other animals. This transmission may be direct or through an intermediate such as mosquitoes, which are vectors of encephalitis and West Nile Virus.

Walter Weber did a remarkable job of developing the original book. He thoroughly researched the literature, corresponded with authorities, and proceeded in an orderly manner to discuss the various diseases associated with birds. He identified over 60 diseases associated with pest birds. The approach he used in discussing each disease, the birds which are implicated and included a brief description with case histories where meaningful, was top notch. Phil Waldorf made this book even better by updating where appropriate, improving the bird control chapter and editing out most of the information not pertaining to modern, urban environments.

Phil Waldorf has edited the original book to keep it informative and focused on the dangers to mankind. His goal was to make it more appropriate to building owners, managers and actually anyone who is concerned for their health or are responsible for inhabitants health and well being. Phil also edited the medical jargon to keep it understandable and enjoyable reading.

Because of Phil’s association with Bell Environmental’s Bird Control Division, he has been involved daily with bird control, visited hundreds of infested sites and has seen firsthand the consequences of improper or no bird control. The efforts put into updating and making this book available only begins to show how active he has become in trying to educate the public about the true dangers involved with pest birds.

The medical community should also shoulder some of the blame for not educating the public better. Many of the diseases associated with pest birds mimic respiratory and other common diseases. Failure to diagnose many bird related diseases can result in fatalities. In one case a 46-year-old man developed a chronic neurologic syndrome after dismantling a steeple. He was treated for tuberculous meningitis and the

symptoms went into remission. One year later he was hospitalized with chronic inflammation of the brain and diagnosed as having cryptococcal meningitis. By that late stage, treatment was unsuccessful and the man died. We suspect many diseases and deaths would trace back to direct contact with pest birds or inhalation of airborne dried feces if proper testing was performed.

There is a very informative chapter on diseases and another that discusses the many insects that are associated with birds and their nests. Birds are not the only problem. Frequently, their nests, especially on structures, are a source of certain pests which migrate into buildings and thus become pests to man.

Pigeons are by far the greatest threat to city dwellers but this book deals with three bird species: pigeons, starlings, and English sparrows. This doesn't mean that other species cannot sometimes be pests, but in fact these three birds have by law been declared as pests or nuisance birds in most states.

This book also goes into some detail on the biology of birds as related to various approaches to bird control. Phil has also updated and outlined recommendations for control methods and made recommendations from his own experience. Control methods that have been outlawed or are not realistic in an urban environment have been eliminated.

This book will be a valuable reference for building owners and managers, public health officials, pest control operators, naturalists, veterinarians, and educators. Many other people concerned with environmental health and the well-being of man and animals will find this book most informative and useful.

Preface updated and edited for this printing by:

Stephen J. Guyette
Environmental Consultant.

Original preface by John V. Osmun, Professor, Department of Entomology, Purdue University.

INTRODUCTION

The main reason for this book is to inform the public, building managers and owners of the hazards and potential diseases associated with pest birds.

We've tried to organize the information so that a reader can understand the dangers without becoming an entomologist. The first chapter deals with an overview of all the dangers without having to wade through all the medical information. We implore everyone to at least read the first chapter! Depending on your interest you can read further or skip to the chapters that cover bird control so you will better understand what can be done to protect yourself, your property and building occupants.

We've edited the original book extensively to eliminate the information that dealt with livestock and farming. If your interest is more into the farming, livestock and feed area we would recommend finding an original copy of HEALTH HAZARDS FROM PIGEONS, STARLINGS and ENGLISH SPARROWS by Walter J. Weber, M.S. The book is out of print but you may find a copy at university libraries that have an entomology department.

PIGEONS, STARLINGS and ENGLISH SPARROWS - These three birds have the potential for transmission of disease to humans and domestic animals as evidenced by the numerous laboratory tests and documented situations which have demonstrated that these three birds are capable of transmitting certain microbial and parasitic agents.

This does not mean that all birds are bad birds. I recognize that the vast majority of the more than 8,000 species of birds are very beneficial and a great pleasure to observe, but, unfortunately, the three pest birds are obnoxious because of the disease agents they carry, the health hazards they create, the pollution they produce and the staggering economic losses they can cause.

The new movement in health care makes people primarily responsible for their own health, with emphasis on avoiding disease in the first place. The trend is to maintain health, rather than fight diseases. It is the individual's responsibility to become and remain healthy. Many potential infections of humans and domestic animals silently exist in pest birds as infections which are not apparent. The control of pest birds may help break the chain of transmission of diseases.

The problem of pest birds will never be solved until building managers and the public is alerted to the fact that pest birds represent a serious hazard to mankind.

The importance of bird-associated problems does not mean that bird-transmitted diseases have suddenly come into their own. It just means that we are learning more about the details of the various and subtle ways in which pest birds may affect our environment and influence our lives.

The main objective of this book is to provide a general account of the diseases, endoparasites, ectoparasites, and other problems associated with the three pest birds, and to assess their importance.

People hear only the words they understand, so for this reason, the book is written in layman's language. There is only one exception, and there is a reason for it. In certain cases there is no common name for the organism, so it is necessary to use the scientific names for identification.

Nothing happens until somebody does something. Bird control happens only because there is a reason and someone does something about it. The bird control methods we have today have been developed because someone did something about the problem.

The pest birds never quit and neither must we. We must stay ahead of the pest birds at all times to prevent or at least reduce the inroads of their destruction. With knowledgeable people, and reasonable funds, those pest birds can be kept under control.

If any information in this reference is in conflict with the directions on the label of any EPA registered bird control product, the label directions prevail.

It is appropriate to acknowledge that certain disease organisms, parasitic infections, pollution, and property destruction are often associated with specific avian species other than pigeons, starlings and English sparrows. However these three nuisance birds have frequently been identified with parasitic and other infections that are often responsible for anemia, fatigue, diarrhea, lack of coordination, emaciation, and poor health or even death of humans, pets and domestic animals.

Phil Waldorf
Bell Environmental

Chapter One

Environment, Pollution, Ecology & Diseases Pigeons, Starlings And English Sparrows.

Four words have become an integral part of nearly everyone's vocabulary. They are environment, ecology, pollution and disease, and each has a different meaning for different people.

Environment refers to the surroundings in which humans and all life must live. That is an inclusive term. Anything not inherited at birth is environment.

Ecology refers to the interrelationship of organisms and their environment. Ecology is not new. The word has been in use over a hundred years. Knowledge of ecology should include the dangers of cleaning up or playing in areas contaminated with bird excreta.

Pollution is officially defined as loss of purity and cleanliness through contamination. Here is where the pest birds come in. Any pest bird problem is a public problem if its solution involves a great number of people who are not directly involved.

Disease is defined as any departure from good health. With over 60 diseases associated with pest birds people should be thinking more seriously about the protection of their health by the control of problem birds. For a complete list of diseases associated with pest birds refer to Chapter Six.

The Environmental Protection Agency (EPA) is concerned about pollution. It requires an environmental impact statement for practically every proposed use or change in use of either new or established chemical products or procedures. The three pest birds don't file any impact statement, but they certainly have an impact on your environment, your food supply and your health.

Each of these pest birds survives in close association with people frequently causing serious problems. Many people recognize the undesirable activities of these pest birds as evidenced by the state of Virginia, which passed the "Nuisance Bird Law". This law designates pigeons and starlings as nuisance birds.

PHYSICAL ENVIRONMENTAL POLLUTION is an important factor. It implies fouling of what ought to be clean and pure. Pest birds are not

clean. When portions of a building, sign or statuary appears to have been partially painted with an unattractive whitish cast, one can justifiably conclude that certain nuisance birds have made a contribution. The defacing of public buildings, private dwellings, ledges, windows and sidewalks is quite visible. The evidence is seen inside the buildings on tools, machinery, structural timbers and clothing. The accumulated moist droppings may serve as media for fly breeding and development. Can you visualize bird excrement two feet deep on ledges and building tops? It has been observed. Whether one uses the metric system, the new math or the old-fashioned arithmetic, those droppings and contamination add up to environmental pollution.



This roof was so thick with bird droppings and nesting material it had to be replaced years before it should have needed replacement.

PROPERTY DESTRUCTION needs to be emphasized. Pest birds frequently stop up gutters and down spouts, causing the roofs to leak. Roofing life can be cut 50% or more by concentrated bird usage. The droppings are often responsible for rust and corrosion. Prolonged exposure of uric acid from bird droppings can peel off paint from automobiles, machinery and buildings.

One single English sparrow once caused damage at the rate of \$964.80 per hour. It happened when the bird fell on the press rollers in one of the country's largest printing establishments. It became necessary to shut down the press and clean up the equipment. This cost the management \$2.68 per second or \$964.80 per hour.

One example of pigeon problems was in Reno, Nevada. There was a neon sign across the main street entrance that proclaims Reno to be the biggest

little city in the world. The problem was that pigeons liked that sign as a roosting spot. After the pigeons had deposited close to a ton of droppings in it, the methane gas created by the decomposing material became ignited by a short circuit, damaging the sign.

When pigeon droppings accumulate on neon signs and storefront awnings of business establishments it results in economic destruction. Much of the effort to control pigeons has been for economic reasons, not health problems.

AIR POLLUTION involves more than noxious gases from automobile exhausts and belching smokestacks. One serious air pollutant is air-borne fungi that causes disease. *There are over 50 species of fungi which are agents for infectious diseases to humans and animals, but only a few are important.*

Infection with a disease caused by a fungus is referred to as a mycosis. When it involves the respiratory system it is considered respiratory mycoses. Examples of important respiratory mycoses are aspergillosis, blastomycosis, coccidioidomycosis, cryptococcosis, and histoplasmosis. Cryptococcosis and histoplasmosis are the two most significant ones involving pest birds. The organisms become serious infectious air pollutants. A non-respiratory mycosis involving pigeons is systemic candidiasis.

Environmental mycotic diseases are not transmitted from humans to humans. Perhaps that is why they do not make the headlines. The fungi causing the diseases are acquired by inhaling the fruiting bodies or spores along with particles of dust. The fungi live saprophytically in feces and soil. These diseases are more common than they used to be, and there is good reason. Perhaps one can blame it on progress.

When you see the huge earth moving equipment in action every time a new shopping center, building or road is built, it means that dirt is being moved. If the soil was contaminated with such fungi as *Histoplasma capsulatum*, the spores will be set free as air pollutants. It doesn't take much wind to move those spores great distances, and they may land in your central air conditioning and be disseminated through the air ducts.

The potential for infections (in this case histoplasmosis) to spread downwind is clearly illustrated by an outbreak that occurred when dry soil under a roosting area was bulldozed. *People up to one mile away contracted histoplasmosis and the bulldozer operator died after a 7-week illness.*

At present, there is no vaccine for prevention of mycotic infections, but there are means of getting rid of feral (wild) pigeons, starlings and English sparrows.

CONTAMINATION OF FOOD AND FEED is a serious problem. The three pest birds may not appear to consume much food, but they surely do contaminate lots of food which they do not eat. Those birds are not particular where they defecate. Pest birds frequently pass huge numbers of viable organisms in their excreta. These feces often contain many filthy organisms which may adversely affect one's health.



There are more than sixty transmissible diseases associated with the three pest birds, many transmittable through their droppings.

Where there are pest birds, there are always droppings. Their fecal matter is a serious contaminant. They contaminate tremendous quantities of expensive livestock feed and food intended for humans. This naturally reduces the availability of our food and increases the cost.

Food contamination can be foot-borne or air-borne. Molted feathers, ectoparasites, debris from bird nests and dead birds are all contaminants or adulterants.

The American consumer (and that includes you and me) wants food that is safe to eat. This means food which is clean and free from contamination. We have the Federal Food and Drug Administration (FDA) that sums up the requirement of food protection in Sec. 402 (a)(4) as its basic authority for regulating the food industry. This translates that if a food product has been manufactured, processed, packaged, or stored in a facility where conditions are present that could result in the food becoming contaminated, it may be deemed to be in violation. *Birds in a food processing plant can be considered as evidence for citation. This concept has been upheld in court.*



The FDA's attitude towards pigeons is the same as it is towards rats! One rat, one mouse, or one bird is one too many.

It is not necessary for FDA to prove contamination, as such. The FDA can take action if food is held under unsanitary conditions, and that includes birds. ***Their attitude towards birds is the same as to rats. One rat, one mouse, or one bird is one too many.*** In today's food industry, no one will put up with visible contamination of any kind.

We are interested in protecting our food from possible contamination. This means that we need to prevent the problem. We must ask ourselves whether we are going to allow pest birds to contaminate our food or are we going to control the pest birds?

DEPREDAATION OF CROPS is significant. Hungry birds can literally wipe out a farmer's crop if allowed to feed unmolested for a few days or a few weeks. Control can make the difference between total ruination and reasonable success.

DISTURBING NOISE is of great significance. The exasperating and provoking chatter is often extremely annoying and may be a contributing factor to insomnia.

SAFETY HAZARD from pest birds may be of great magnitude. Birds that are gregarious and form large flocks can become hazardous to aviation. Starlings have been incriminated in the crash of aircraft.

Accumulations of bird droppings on sidewalks, steps, and fire escapes may render them hazardous. There are numerous instances where the sidewalk actually became slippery underfoot. Some of those droppings get carried on to the living room floor where the children play.

NATIVE BIRDS HAVE BEEN DISPLACED. Colorful native birds frequently leave an area as the aggressive pest birds compete for food and

nesting sites. The nests of pest birds frequently serve as hosts for such insects, or such fungi as *Cryptococcus neoformans*.

Health problems may be related to pest birds, but the disturbing noise, property damage, environmental pollution, destruction of aesthetic quality of buildings, other property also are of a serious nature.



Pigeons can quickly take over a building.



Buildings and inhabitants are at risk when dried feces can infiltrate a building through the air handling equipment.



All it takes is one pigeon to be a problem.



Metal and paint are susceptible to corrosion from bird droppings.



Spikes don't stop pigeons from finding a home and settling in.

Chapter Two

Pest Bird Problems

PIGEON PROBLEMS

Pigeons are not harmless birds. Besides the health hazard, high pigeon populations present an economic problem. They have been described as “rats with feathers”. The description is most appropriate because free flying feral pigeons transmit over 40 diseases and are a serious health hazard to humans and domestic animals.

Pigeons have been described as “rats with feathers”

Pigeons are known as vagrant pigeons, common pigeons, feral pigeons, domestic pigeons, city pigeons, wild pigeons, rock doves, vagrant domestic poultry or *Columba livia*. All are basically homing pigeons and usually return to their birth place. *Pigeons are pole sitters and people-watchers. They are often found in close proximity to people. Their nests mar window sills, clog drain pipes, render fire escapes hazardous and interfere with awnings.*

Well-kept carrier, racing or fancy pigeons in sanitary loft are not a health menace. The breeder of fancy pigeons keeps his birds confined, and those who fly tumblers, homers, topplers, etc. have well kept lofts, so these birds are not a public health risk. These pigeons are often protected by law.

Pigeons do a lot more than contaminate the environment with their untidy habits. *They are persistent public health problem in many areas, especially where a large concentration of birds is closely associated with people.* One of the reasons there are so many pigeons is that most people are not familiar with the hazards of pigeon associated diseases.

Some cities and housing developments have restrictions against harboring pigeons, yet their parks and streets are infested with wild or feral pigeons which are a definite health menace. Many people feed those nuisance pigeons without realizing that every third one is a carrier of chlamydiosis. They are not aware of the many diseases that are disseminated by feral pigeons.

Pigeons play a part in the transmission of over 40 diseases including aspergillosis, candidiasis, chlamydiosis, (ornithosis, psittacosis)

coccidiosis, cryptococcosis, encephalitis, erysipeloid, histoplasmosis, Newcastle disease, salmonellosis, toxo lasmosis, tuberculosis, yersiniosis (pseudotuberculosis, helminths and ectoparasites. In one survey, 30 of 32 pigeon roosts were infested with *Cryptococcus neoformans*, the cause of cryptococcosis. The yeast is carried in the intestinal tract and is deposited with their feces.

Pigeons play a part in the transmission of over 40 diseases

The first natural infection of pigeons with Chlamydiosis (ornithosis) was observed in 1939 and there was evidence of human infection in 1942. Pigeons in streets and parks constitute a hazard to people who come in contact with the dust from pigeon droppings. The dust from pigeon roosting or nesting areas incriminates pigeons as a carrier of chlamydiosis, without the necessity of a person coming in direct contact with the pigeons. It is interesting to note that in Oslo, Norway, 11.5% of the patients hospitalized for virus pneumonia showed positive for chlamydiosis. It also was noted that 3.5% of the blood donors showed the positive response.

The relationship of pigeons to Candidiasis should be reemphasized. It has been known for over 100 years that *Candidae* can invade the internal organs. It is becoming a major obstacle in the care of debilitated persons. *Candida* accounted for 50% of all systemic fungal infections seen in 1,185 unselected autopsies.

In a Kansas City study, it was observed that children living in buildings on which pigeons roosted or nested had a histoplasmosis infection rate three times that of children living in quarters without pigeons. Pigeons have been associated with histoplasmosis in many cases involving old buildings. Documented cases include Mandin, N.D., Cincinnati, Ohio, Ft. Leavenworth, Kan., Pittsburgh, N.Y. and Warrentown, N.C. In some cases men had been working on air-conditioning in attics where pigeons had been roosting.

A theory that toxoplasmosis is associated with pigeons is not new. When 10 of 80 (12.5%) pigeons trapped on the nation's capitol in Washington, D.C. revealed positive evidence of *Toxoplasma* infection, it was an indication that pigeons do a lot more than discolor the statues and buildings.

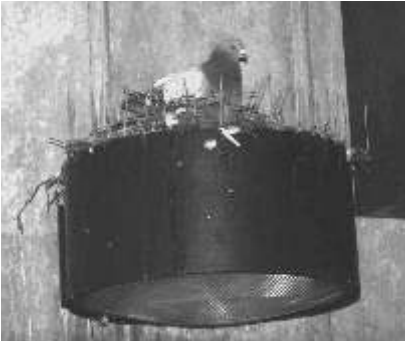
In addition to the diseases listed, pigeons are associated with such diseases as pigeon breeder's lung. It is also known as bird breeder's lung.



Unfortunately, this is all too common a scene on buildings without proper bird control.



Even elaborate, historic buildings can be protected from the defacing that accompanies pest birds. Here, Bell Environmental Bird Specialists install bird control on the United States Post Office building in New York City.



As you can see, spikes didn't stop this pigeon from making a nest. Improper bird control is as good as none. Do your homework or consult with a professional before attempting any bird control.



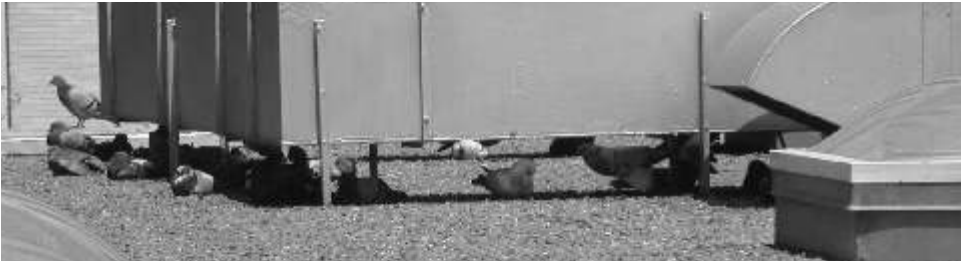
It's actually unsafe to enter this building without an umbrella!



This plastic owl didn't keep any pigeons away. They soon become accustomed to them and move right back to their favorite perch.



One of the biggest problems in bird control will come from people who think that birds can do no wrong. Many bird lovers feed and enjoy the birds. In many cases it doesn't make any difference to them what kind of a bird it is.



We can't stress enough the importance of proper bird control around air handling equipment. It is suspected that "Sick Building Syndrome" and Legionnaires' disease could be caused by dried feces and birds nesting near air handling equipment.

Below are two installations with netting to protect the inhabitants.





When some rain combines with bird droppings this step will be a law suit waiting to happen!



Is nothing sacred?



"Time" for some bird control!



Waiting for their next target!



The next person to work on this electrical panel should wear rubber gloves and a approved face mask.



Roosting areas are often easy to locate because of the tell tale droppings.

There are about 70 cases a year in the Netherlands. The acute form occurs 4 to 6 hours after inhalation of pigeon droppings. It begins with chills, followed by fever, shortness of breath and a non-productive cough. It lasts 4 to 6 days.

The question was raised in 1977 as to whether Legionnaires' disease could be traced to a large flock of pigeons which was roosting on the hotel in Philadelphia when the 29 people died. This was never proven. The fact that Cryptococcus neoformans is associated with pigeon droppings has been known since 1955.

In many instances, the infectious agents are carried in the droppings, which drop and become mixed with dust. Humans or animals may become infected when they inhale the pollutant. Pigeons may have feces on their feet when they jump onto feeders and all the feed they touch may become infected. When they jump out, feed that has stuck to their feet is left among feces on the floor.

Pigeons and bird mites were brought to attention as a health factor in 1974 when an infestation of mites occurred in Duke University Medical Center in Durham, North Carolina. A pigeon nest was found in a vent located in the hospital ceiling directly over the patient's bed. The patient, his wife and two daughters, who were regular visitors, were all affected by pruritis. Three previous occupants of the room had also complained of pruritis. The problem was caused by *Dermanyssus gallinae*, one of six mites incriminated as a cause of fowl-mite dermatitis.

Pigeons contribute to the pollution problem. They have long been the bane of America's mayors and councilmen. They have been considered pests by many people primarily because *they deface buildings, deposit droppings on unwary pedestrians, contaminate sidewalks, equipment, and stored products, and produce objectionable odors.* They often trample through their copious excrement on window ledges and air intake vents. *It dusts off to contaminate food products with Salmonella typhimurium and causes salmonellosis, a bacterial food poisoning of people.* A very frequent cause of food poisoning in humans is *Salmonella typhimurium*. It is found in about 2% of pigeon feces. Their nests mar window sills, clog drain pipes, render fire escapes hazardous and interfere with awnings.

Ectoparasites are also contaminants. A survey in the Boston area involving 122 pigeons revealed 13 species of ectoparasites. This included 4 species of lice, 8 species of mites and louse fly.

***Pigeons are the avian public enemy No. 1
in the structural pest control industry.***

If there is a place to roost or build a nest in a hard to get to place, the pigeon will find it. The abundance of shelter in most cities assures them ample places to roost and breed. Pigeons are flocking birds which have favorite congregating places. As evidenced by the accumulation of droppings.

Large flocks of pigeons can represent a hazard to aircraft. This has been observed when the larger flesh eating birds fly in to capture the pigeons. These large birds frequently cause damage to the aircraft.

Pigeon control may become complicated because pigeons are mobile. One may see them feeding on the premises, but they may be roosting and nesting in other areas. In like manner, they may be loafing or resting on a building, but they may be feeding in other areas. See the full chapter on Bird Control for more information.

STARLING PROBLEMS

The most unpopular bird in America is the starling (*Sturnus vulgaris*). Starlings have a bad reputation and would win first place if there was an unpopularity contest. They are often a nuisance, a hazard, or a cause of economic loss. They live, feed and nest just about everywhere one would wish them not to.

It is true that most of our songbirds are harmless and generally very beneficial. There is one outstanding exception, the starling. The starling has been called a “flying carp” because it competes with desirable native birds for nesting sights and food. It battles its way to victory, both killing and destroying. It destroys nests, topples out the young and breaks the eggs so it can take over.

***The starling has been called a “flying carp” because it competes
with desirable native birds for nesting sights and food.***

Starlings have adapted themselves to living close to man where there is plenty of food and a good environment. Our parks and large trees provide winter roosting places. Starlings frequently take over bird feeders and chase away cardinals and other desirable species.

They cause serious sanitation problems as their usual shower of filthy droppings produce an obnoxious stench, especially in damp places. It is

often very nauseating. The constant stench is terrible. Some people have reported a dozen or more starlings on each windowsill. In some cases, the sidewalks and pavements look like they were whitewashed. These starling droppings just don't enhance the appearance of any object, and the filth is decidedly objectionable to persons living near roosting areas. In some areas those droppings are three inches deep.

All starling roosts are potential health hazards.

The introduction of European starlings into North America is generally accredited to a Eugene Schifflen who released 80 pair in Central park in New York City on March 16,1890. He wanted to introduce all the birds referred to by Shakespeare. Unfortunately, Shakespeare had mentioned starlings. The ill-guided Schifflen certainly played a costly joke on our country.

Starlings don't stop with eating expensive feed, and contaminating it. They also spread diseases. In fact, more than 20 diseases of humans and domestic animals are associated with starlings. Some are carried on their feet, others through their alimentary canal. It has been proven that starlings can transmit TGE (transmissible gastroenteritis) in their feces.

When it comes to human diseases, citizens of a community are incorrect in assuming that starlings roosting across the street or several blocks away are not their problem. The spores of histoplasmosis are air-borne and can be inhaled. This is a very serious disease of humans. It is associated with established roosts of starlings and certain other birds.

Another important way in which starlings endanger the lives of people involves aircraft. Starlings made the headlines in 1960 when they were responsible for the death of 62 people as an airliner crashed into the bay of Boston's Logan Airport after 3 of its engines became clogged with starlings. Seven people died because of starlings on February 26, 1973 when a Lear jet struck a flock of starlings on take-off at the Dekalb-Peachtree Airport, Chamblee, Ga. The aircraft and all persons aboard were lost.

ENGLISH SPARROW PROBLEMS

Those innocent-looking English sparrows can be a nuisance out of all proportion to their size. The problem may seem to develop overnight.

An English sparrow is not really a true sparrow, but one of the Old World finches. There are over 40 species of true sparrows that belong to the

family Fringillidae. Most of them are beneficial and beautiful. The native sparrows are protected species. It is important, therefore, to distinguish them from the English sparrow which is also known as house sparrow, domestic sparrow, spatsies, and house finch. The scientific name is *Passer domesticus*. For practical purposes, it will be referred to as sparrow in this discussion.

Their overall length is about 5-3/4 inches from the end of their beak to the tip of their tail. You have never seen them walk. They always hop. The male has distinct markings on the head and wings, clear white cheeks and a prominent black "bib" during the spring and throughout the mating season. This black throat is not apparent right after the new feathers appear, but develops as the grayish tips of the throat feathers wear off over a period of several months. All birds molt their feathers at the end of the breeding season. It is, therefore, called the post-nuptial molt. The new plumage is the breeding plumage for the following year.

The female and the young are dull gray above, light below and generally lack distinctive markings. They do not have that black throat.

The English sparrow is an immigrant. It was imported from Europe in 1852 and at least 16 times between 1852 and 1881. The objective was to control the larvae of the linden moth. It was soon learned, however, that it did not eat the larvae. English sparrows are probably the most common bird in the United States. With the exception of a few hawks, they do not have many natural enemies.

Sparrows constitute over 70 percent of the adult birds in some areas. Perhaps it is familiar to so many people because it is usually seen around human habitation. One characteristic of the bird is that it operates within a rather limited area. Sparrows are closely associated with people, where their nesting and feeding habits create many problems. They are gregarious birds. They roost, nest, and feed in large flocks.

Sparrows are opportunists and build nests in any conceivable place where the bird can anchor a nest. The anchored nests may be as large as a basketball or a hornet's nest. They are frequently built in protected areas such as the inside of warehouses, airplane hangers, grain elevators, machine sheds, garages, barns and other buildings. They will even build under eaves, in vines, in transformers, in drain spouts and many similar areas. Sparrows will find construction flaws in new buildings. They will find the gaps between the gutters and the roof.

Sparrows have even built nests in constantly moving objects. This occurred in oil well pumps in Kansas. Sparrow nests frequently plug gutters and cause roofs to leak. Their unsightly nests often interfere with door openings or become fire hazards. Sparrows have a bad habit of building nests in the air intake and cowlings of small aircraft. One thing for sure, they are aggressive and persistent. They will build nests in TV antennae and roof ventilators on homes, then as the fledglings leave the nests, mites, for example, may enter the home where their excretions and bodies are potent allergens. The mites often inhabit mattresses and furniture to become the principal allergenic compound of household dust.

How much harm do the sparrows do? *Sparrows are associated with the transmission of over 25 diseases of humans and domestic animals. Nine viruses have been isolated from sparrows.*

Sparrow control can be achieved by habitat manipulation, exclusion and population reduction.

Chapter Three

Know Your Problem Before Starting Bird Control



Don't even think about effective bird control until you watch the birds. You need to be a better bird watcher to become a better bird controller. One should know the habits of the species to be controlled and take advantage of their natural habits. The habits of each type of pest bird vary greatly. Every species is different, so consideration must be given to the particular type of bird and the problem it presents.

It cannot be over-emphasized that one should know the habits of the birds. Some fundamental knowledge of bird behavior is essential if one is to have an effective bird control program. There are a number of natural or hereditary reactions which are called instincts. A bird will build the same general type of nest even if you move it three states away. This is part of a behavioral pattern.

Birds are like people and have a tendency to do the same thing every day. In a way of comparison, you and I are creatures of habit also. Isn't it true that you normally sit on the same chair in the same location at your breakfast table every morning? You probably relax in the same easy chair every evening while watching your favorite TV program. Pest birds also tend to perch in the same spot every night. Pigeons tend to loaf or sun themselves in the same area every day.

Becoming familiar with the habits of the problem birds will be a valuable asset in controlling them. By analyzing their flight pattern, noting how they enter, and observing where they roost, one can determine the preferred

place to position the control mechanisms. Are they roosting under the canopy over the loading docks? The droppings on the floor will be a helpful guide. Are they sitting on the roof before flying in? Many times a bird will sit on top of a building first and then go to the window ledge.

***Becoming familiar with the habits of the problem birds
will be a valuable asset in controlling them.***

Basically, birds are interested in two things: propagating the species and survival. These are their primary goals. Birds must eat to survive. This means they are going to look for food. They are initially attracted by the presence of food, especially that which is easy to find. Bird population is often closely associated with the readily available food and this easy-to-acquire food is usually what starts the problem.

Birds are also going to need a place to deposit their eggs and raise their young. During those phases they are going to fly, feed, sing, fight, loaf, rest, build nests and care for the exterior of their bodies. They will also try to escape from their predators. All of this develops into a behavioral pattern. In the process, the birds definitely become creatures of habit. By understanding these habits one can develop a more effective control program.

Birds seek out protected, comfortable roosting places. They tend to roost in the same spot every day. The natural landing or roosting spots include roof ridges, gutter edges, window sills, ornamental copings, cornices, tops of signs, under canopies, under bridges and in buildings. Favorite roosting spots can often be determined by observing where the fecal droppings have accumulated. Obviously, if there are many droppings on the floor, there are birds roosting overhead, and they have been there for sometime.



It is necessary to spend as much time as possible analyzing the habits of the birds that constitute the problem, and why they are in a particular area. Patience is important. It is necessary to know what pest species is involved and if non-target species are in the area.

It is possible to determine the favorite spots where the flocks spend their time feeding or roosting. Frequently, a small number of undisturbed, comfortable roosting birds becomes the magnet for attracting large numbers. *Knowledge of their habits will aid in determining the proper placement of the control products for maximum and rapid results.* It is what one learns after he knows all about birds that really counts.

Pigeons have a tendency to loaf in the same general area each day where they sun themselves. In many cases the pest birds sit on the roof or gutter before entering a building. With the exception of the female starling, most birds alight first before going to their nest.



Unightly stains, slippery when wet surfaces and bad odors can make otherwise desirable usable spaces totally unusable!

Bird Management Considerations

Persons involved in the control of pest birds have some clear-cut immediate responsibilities. *The first* is to become fully informed on the habits of the birds and the problems created by the pest birds. This will enable them to help other people have a greater appreciation of the adverse affects and the diseases carried by the pest birds, along with the need for control.

The second is to understand the legal implications. *The third* is to practice good public relations.

The fourth will involve action in the application of measures for the control of pest birds, so as to help in the maintenance of a healthier environment.

LEGAL IMPLICATIONS may hinder bird control. Pest birds are legally considered the property of the people, but the people are unwilling to accept the responsibility of the damage caused by the pest birds.

Most species of birds are wards of the federal government under the migratory bird act of 1916 and its subsequent revisions. Fortunately, starlings, feral pigeons and English sparrows are not protected by federal law.

It is important not to endanger protected species. The legal aspect of bird management will evolve sooner or later, so it is a good idea to check the situation before beginning any bird control work. One needs to be acquainted with and guided by federal, state and local regulations.

***Starlings, feral pigeons and English sparrows
are not protected by federal law.***

In addition to federal laws, each state has laws protecting wildlife. These are not uniform. Some states have more restrictions than the federal government. For example, several states include pigeons as a protected species, but there is usually a provision for the State Department of Health or any local board of health to order and provide for the destruction or removal of feral pigeons.

In some states all three of the pest species receive protection in one form or another, mostly by restrictions or limiting the methods or materials that can be used to capture or otherwise remove birds. *A state may require a license.* The techniques or manner for control must conform with their law.

In many cases there are local ordinances. Some of these prevent the control of any birds, or the ordinance may apply to certain areas as in a park.

Many cities have been declared bird sanctuaries. In these cases, all birds are protected.

If a permit is needed, it must be acquired before the privileges afforded by the provision are enacted. Even if a permit is not required, it is advisable to notify the local and state authorities and wildlife officials of your problems and proposed method of control. The Board of Health understands the problem of disease disseminating birds. These folks have probably had complaints about birds on previous occasions. They may offer helpful suggestions where specific problems exist.

Killing a protected bird could land you in jail.

We must remember an increasing number of laws for protecting wildlife are being passed practically every year. *Killing a protected bird could land you in jail.*

Effective Bird Management Includes Public Relations.

The biggest problem in bird control is people who think that birds can do no wrong. Many bird lovers feed and enjoy watching the birds. In many cases it doesn't make any difference to them what kind of a bird it is.

An important consideration in developing and carrying out an effective control program for pest birds is that of public information. *An extensive bird control program cannot be successful without an effective public relations program. People must understand that the objective is to protect their health, not to harm birds.* Serious misunderstandings can develop if the nature and extent of the problem, the need for control, and the methods to be used are not properly understood. Patience is important in dealing with the public, when convincing them that a real hazard exists, not only from the excrement, but from the disease they transmit, along with the parasites they carry and harbor in their dung encrusted nests.

A carefully planned program should enable the authorities and communication media to be able to explain the significance in preventing soiled sidewalks, environmental pollution and health hazards. An informed media can be most helpful.

PICK UP THOSE DEAD BIRDS. There is probably more static from dead birds than from anything else. It is important to minimize public contact with deceased birds.

People should be advised not to pick up dead birds with their bare hands. First, the ectoparasites leaving the dead birds may transfer to people. Second, if a toxic compound is used it is remotely conceivable that a person could handle enough birds to get some of the toxic compound on his skin. Third, a person might blame a totally unrelated or psychological illness on the toxicant.

There are no automatic single answers. There just isn't any one single automatic sure-cure for controlling all pest birds under all conditions. Definite answers are not available. In the meantime, we must attempt to manage pest birds with methods that work, that are plausible and that are

economical. One should be familiar with all the methods of pest bird management. It is frequently necessary to use more than one procedure.

The success from any program can best be evaluated by the absence of pest birds. *Bird control is a complex undertaking and requires substantial effort.* Success or lack of success is ultimately related to the techniques employed by the individual.

***Bird control is a complex undertaking
and requires substantial effort.***

One thing is sure. Some of the often repeated theories and ideas about bird control may sound good, but they do not control the pest birds. *It is important to learn what not to do by avoiding the hopeless methods that have frequently been advocated.*

There are three prime factors in bird control. The first is timing. The control measures should be started at the first indication of a problem. This is not easy, since many times the pest birds have become established before anyone thinks about controlling them. This means that more intense effort is necessary.

The second factor is persistence. One should be more persistent than the birds. Control measures should be applied as long as the pest birds are present.

Third, no single method solves all the problems for all the species.

We must keep in mind that if the total number of birds is very large, even an effective control may be inadequate. If one has 90% control, and there were a million birds, one still has 100,000 birds. If there is 99% control one still has 10,000 birds to transmit diseases.

Basically, there are three types of bird management methods. The first is habitat manipulation. The second is bird stoppage which includes exclusion and frightening or anti-roosting devices to move the birds to another area. The third involves population reduction to decrease the population. These are discussed in succeeding chapters.

Chapter Four

Bird Control

Bird Control has become a complicated task. What works one place may actually encourage birds in another location. Making matters even worse has been the recent outlawing of previously affective chemicals.

Wherever you attempt bird control you'll also have to deal with the bird lovers who actually believe that all birds have an inherited right to roost anywhere they want and nothing should be done to discourage or disrupt them. To these die-hards, we can only hope that someone passes along a copy of this book so that they will finally understand how unhealthy and even fatal contact with certain birds and their droppings can be.

In this chapter we can't tell you exactly what to do for your specific application because every building and area is different. We've tried to give you some background information about different types of bird control that works and, hopefully, will help you stay away from ones that don't. We also suggest you re-read Chapter Three which covers studying habits and using those guidelines to help understand your specific problems before selecting a bird control method.

We can't tell you exactly what to do for your specific application because every building and area is different.

In NYC recently there was a news article about a bird control company being hired to clear a park of problem pigeons. He brought a hawk to the park and, yes, it did clear out the pigeons as long as the hawk was present. We visited that same park 10 days after the hawks were pulled out and the pigeons were back. Point being that if you choose the wrong type of Bird Control you can waste your money. ***Do your research and hire a reputable bird specialist if your problem is severe.***

Here is the place to consider the four basic requirements for effective control of pest birds. (1) It must pose little or no serious hazard to humans and non-target animals or birds. (2) It must be designed to affect only the pest birds which are to be controlled. (3) It must not present a serious secondary hazard to animals or birds. (4) It should act rapidly with a minimum amount of pain to the target pest bird.

One last point before we go on is that because of the bird lovers, it's very important for public relations reasons to make any form of bird control



Lifts and heavy equipment are often required to gain access to the pest birds nesting and roosting spots.



Bell Environmental Bird Specialist installing netting in a garage area where there was extensive vehicle and product damage from pest birds.

The building owners wanted to save the appearance of their historic building but needed to eliminate the pest birds. Bell Environmental Bird Specialists devised a way to bird proof the building without changing the appearance.



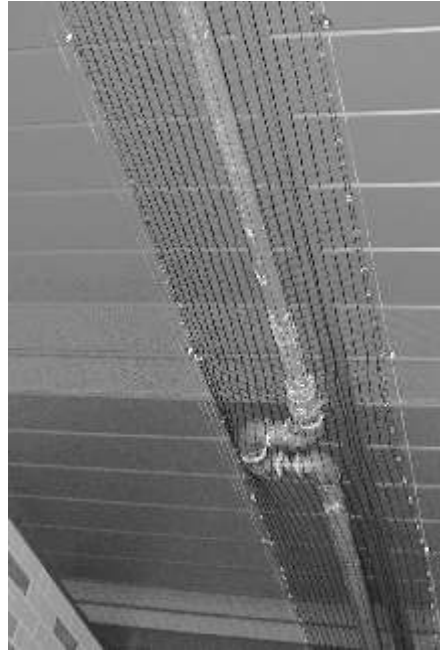
Almost invisible, properly installed bird control should be effective but not seen.



Improperly installed or maintained bird control becomes totally ineffective.



Solar-powered and with battery backup, Bell Environmental's Bird Strip can be installed even where power is not accessible.



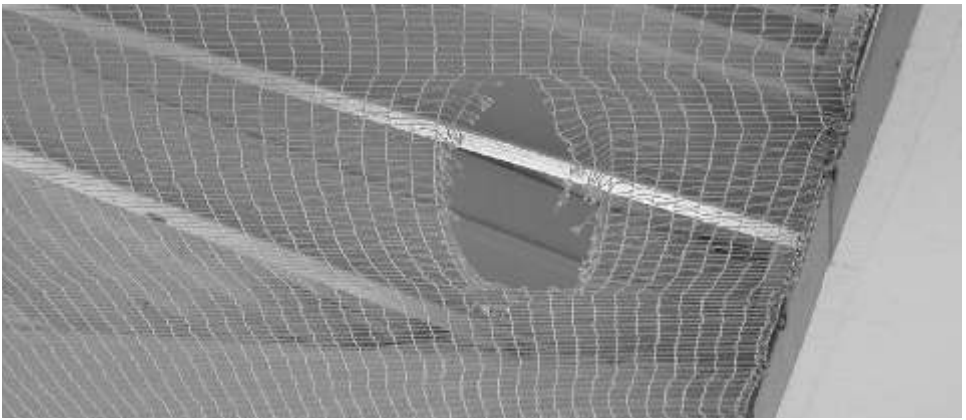
Even a single pipe can be a problem without bird control.



Even a small ledge can be "Bird-Proofed" with the proper equipment.

Sometimes multiple strips are required on wide areas.





Improper bird control is as good as No Bird Control



disappear into the surrounding environment or almost invisible on a building.

BIRD CONTROL BY HABITAT MANIPULATION

The survival of birds depends on an established daily routine, so anything you do to upset that daily routine may cause them to leave. Pest birds are present because something attracts them. It may be an abundant quantity of food. It could be a supply of water. It might be a convenient place to roost. It might be the attractive nesting sight.

Although this is usually not the preferred method for managing pest birds, habitat manipulation is occasionally used to supplement other methods. Removal of food, water, or other habitat requirements are important when this can be done in a practical manner.

Under certain situations the birds can be discouraged from roosting in trees, shrubs or vines by careful thinning or pruning. This often destroys the beauty of the plants. Thinning of trees in line with suggested forestry practices has occasionally been tried. It does not usually work. An elaborate tree-thinning project in Maryland involved the removal of over 50 percent of the pine trees. By late fall long lines of birds were again winging their way back into the less ideal but still hospitable pine grove. The population was estimated at 50,000 in September, but it was in six figures in November, with apprehension rising as fast as the flock was increasing.

Removal of the normal food supply may be difficult and in cities not practical or under your control. Water is essential for survival. It might be a matter of drainage or removal of unused containers to eliminate the source of water.

BIRD MANAGEMENT BY BIRD STOPPAGE OR MOVING

Some people are violently opposed to any type of bird control. They feel that birds can do no harm. It is, therefore, desirable in all cases to attempt to manage the offending birds by non-chemical means. Most previously used toxicants have been outlawed, so be sure to check the local and state ordinances before using or letting a control service use anything toxic.

One type of bird stoppage involves construction features or modification of existing features so the pest birds cannot roost or nest. It could be referred to as "building out". Many new buildings are designed without flat window sills, projections and holes in order to prevent roosting. Many newer buildings are being built for people, not birds.

On existing buildings, it is possible to prevent the birds from roosting by altering the roosting site. Ledges, projections, cavities and signs all offer attractive roosting areas. Ledges can be covered with slanting boards, aluminum, sheet metal, or mortar placed at a 45° angle. There are also new low voltage strip wiring that can be used on ledges and other projections where the architectural design could be ruined any construction. It is important that any modifications are firmly attached to prevent any chance of injury to pedestrians on the sidewalk. Cavities can be screened or filled.

PHYSICAL EXCLUSION IS OFTEN HELPFUL. If buildings are involved, the birds may be entering through an open or broken window. Broken windows and unscreened open windows are welcome mats for the pest birds. Maybe there is a knot-hole. Openings to lofts, towers, vents, steeples, under eaves, behind signs and similar areas can often be screened with a rustproof 3/4 inch mesh or blocked. Automatic doors or some other form of modification may be the answer.

Mechanical exclusion is primarily used for situations where pigeons, starlings or English sparrows are roosting or nesting. It is generally a permanent type solution.

The use of meshed wire or other screening material to prevent access into buildings or roosting should be the first consideration in bird control. Netting has even been used to cover the entire front of some buildings in an attempt to exclude the birds.

The philosophy of dispersing birds to some other area involves visual items, repellents, and sound.

VISUALS are supposed to frighten the pest birds. *They are not effective.* They come in a wide array of designs as replicas of hawks and owls, whirling devices, colored flags, balloons, revolving lights, scarecrows, suspended pans, etc. They all have one thing in common. They are harmless to the birds, do not have any adverse affect on the environment but *pest birds soon become accustomed to them.* Artificial owls and hawks have been sold to supposedly scare the pest birds, but are of little value.

Whirling devices don't frighten birds because they are moving. You might have seen the television program where the sparrow had a nest in the oil well drill, while the drill was in motion. *Colored flags, streamers, and balloons serve a better purpose if they were given to the children to play with. They do not keep the birds away.*

Revolving lights have often been installed in warehouses. Sometimes they flash or change colors, but there are many situations where birds have actually built nests on them. Possibly they helped to keep the eggs warm. Anyway they are of little permanent value.

Scarecrows are old favorites. They work while one is putting them up and that's about all.

Suspended pie pans and similar reflecting items may work for an hour or so, but that's about all.

ANTI-ROOSTING DEVICES OR REPELLENTS may be mechanical, electrical or chemical. Mechanical repellents are primarily used where pigeons, starlings and English sparrows attempt to roost on buildings and ledges, ornamentals, signs, ridges and roof gutters. They may be effective for controlling bird populations on particular parts of a building.

MECHANICAL REPELLENTS are usually the ledge "porcupine wires" which consist of strips of flexible, rustproof base bars with spines or needles. They are installed along building ledges and window sills. *Falling leaves and other debris often clog these devices, enabling the birds to build nests on them. Pigeons have been known to build nests on the units by first building up a protective layer of sticks and straw.*

ELECTRICAL REPELLENTS involve two permanently installed grounded wires that give the pest bird a non-lethal shock of about 3/10,000 of a second duration. They are like electric fences for livestock, giving intermittent shocks when the birds contact the wires. The wires carry high voltage, but low amperage, so are not dangerous to humans. There is no fire hazard. They do require some maintenance and check-ups because they can short out if sticks or straw are dropped by the birds. This type of deterrent has proven very successful when applied properly!

CHEMICAL REPELLENTS

STICKY CHEMICAL REPELLENTS are messy. These may be referred to as glue or jellies. They are non-toxic mastic type materials that are supposed to discourage roosting and hopefully encourage birds to go elsewhere to roost. They come as drop-in cartridges, aerosols, paste and sprayable. These sticky, basically non-drying or slow drying compounds are used in the natural resting places as window sills, ridge line of roofs, gutter edges, ornamental coping, ornate stonework cornices and ledges.

The material has a limited life span. Most of the time it is not very permanent. Some products become brittle in cold weather. They often run

in hot weather, so one may end up with a disfiguration of the building and may require sandblasting to remove the residue. A major problem seems to be that it coats over with air-borne dust in dusty areas and quickly loses its effectiveness. One state reported that the only situations where the sticky repellents have been used to repel pigeons ended up by providing a suitable adhesive surface on which the pigeons built their nests.

SOUND OR SCARING DEVICES are not suitable for city use but frequently effective for crop protection. Local ordinances may prevent the use of many sound devices. Sound devices include electric alarms, recorded distress calls, automatic exploders or gas cannons, pyrotechnics and firearms.

ELECTRONIC ALARMS are not suitable for city use but can be effective for large warehouses in isolated areas. The alarm produces loud screeching, intermittent, amplified sounds. The alarm is a noisy unit which assaults the ears, so limits its use to areas where sound can be tolerated.

RECORDED DISTRESS CALLS are moderately effective against gregarious species such as starlings and black birds. This recorded distress call has been effectively used to move starlings, but there may be more complaints about the ear-piercing shrieks from people than from the birds.

AUTOMATIC EXPLODERS OR GAS CANNONS are designed to produce loud explosions at regular intervals. They are not injurious to the birds, but the loud report may be objectionable in residential areas. They are automatically eliminated in areas which have ordinances against loud noises.

PYROTECHNICS essentially include fireworks, exploding shells, and such versions as aerial bombs, noise bombs, whistle bombs, salutes, skyrockets, scam rockets, Roman candles and similar devices. They are automatically eliminated in areas which have ordinances against loud noises.

BIRD CONTROL BY POPULATION REDUCTION

Population reduction of pest birds is the only practical way to make room for desirable birds. Population reduction may sound misleading, but dead bad birds don't spread disease or pollute the environment. The best time to reduce bird production is before the young start to hatch in the spring. It helps if one can make the birds stop building nests or make them abandon

their eggs. English sparrows and feral pigeons can be reduced somewhat by destroying eggs at two-week intervals in the spring and summer, but that takes lots of time and effort.

In the past the primary methods for reducing population of pest birds included toxic perches, chemically-treated baits, trapping, firearms and stressing or wetting agents. Because of new legislation and congested environments, these are no longer viable means for pest control.

TOXIC PERCHES have a contact toxicant in a strategically placed wick-type perch which acts as a reservoir for the chemical, but have been outlawed in many areas.

CHEMICALLY-TREATED BAITS are often effective when properly used but have been outlawed in most areas. Toxic baits can be hazardous to the applicator, to other individuals in the area, and to non-target species.



TRAPPING is not a panacea for control of pest birds. It is expensive, requires constant care, and persistence. Bird trapping permits are required in some states.

STRESSING OR WETTING AGENTS reduce the surface tension of the oil in the birds' feathers, thus allowing water to remove the oil. They lose their protective insulation, and are subject to chill factors in low temperature. The material is used only under the supervision of the U. S. Fish and Wildlife Service.

Chapter Five

Removal and Cleanup of Bird Droppings

Bird droppings are hazardous waste

We can't stress this enough – Bird droppings are hazardous waste and all cleanup and removal activities should be done with that in mind.



The most serious health risks arise from disease organisms that grow in the nutrient-rich accumulations of bird droppings, feathers and debris. In addition, insects that live on birds or their droppings may become a problem when the infested birds leave roosts or nests.

Cleanup can cause the diseases to go airborne. Cleanup operations stir up fecal dust so *all cleanup personal must be properly protected. All windows must be sealed, HVAC systems wrapped to protect against infiltration and all precautions taken to protect anything downwind of the cleanup site.* Individuals who work in, or clean up, areas contaminated with bird droppings may become exposed when the material is disturbed or dust is created.

If the health reasons are not enough to motivate you to clean up your building, consider that the *bird droppings are extremely corrosive to metal, paint and asphalt roofs.* Dead birds and nesting material can block roof drains, water can pond on the roof and add excessive structural load.

At one site in New York, an asphalt roof had to be replaced after less than one-half of its life expectancy because of bird dropping damage. The roofers were aware of the health problems associated with bird droppings and when arriving at the site refused to work on the roof until it was professionally cleaned. Bell Environmental was contracted to perform the cleanup, but the buildings owner opted not to do the bird control. Unfortunately, the roofers were delayed and when they did finally arrive to complete the job the birds had returned and enough droppings had accumulated that they still wouldn't work at the site. The entire cleanup had to be redone and this time proper bird control was put in place to keep the building bird free.

Another sad story associated with pigeon dropping was recently reported. A 37-year-old mother of five contracted "pigeon lung" from feral pigeons nesting outside her apartment.

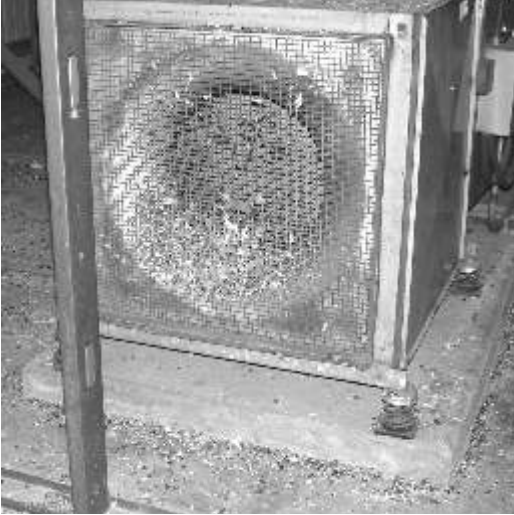
Her family doctor said: "The fire escape at the back would get pigeon debris on it and was cleaned regularly by the mother and one child at a time. That, we think, is why the mother had the most severe symptoms and died. The father, who did no cleaning, was unaffected." The children are being treated for the illness.

The mother had the most severe symptoms and died.

The potential for infections (in this case histoplasmosis) to spread downwind is clearly illustrated by an outbreak that occurred when dry soil under a roosting area was bulldozed. People up to one mile away contracted histoplasmosis and the bulldozer operator died after a 7-week illness.

Because the symptoms associated with many diseases caused by contact with droppings mimic other diseases we believe the medical community often misdiagnose. In one case this was fatal, (in this case cryptococcosis). A 46-year-old man developed a chronic neurologic syndrome after dismantling a steeple that was contaminated with bird droppings. He was treated for tuberculous meningitis and the symptoms went into remission. One year later he was hospitalized with chronic inflammation of the brain and diagnosed as having cryptococcal meningitis. By that late stage, treatment was unsuccessful and the man died.

Sick Building Syndrome



It has been suspected that “Sick Building Syndrome” can be fully or partially caused by buildup of bird droppings, especially in or near HVAC systems.

A detailed assessment of the indoor air environment of a facility in Texas was completed in response to occupants’ concerns about repeated eye infections, burning eyes, respiratory distress, and headaches.

The initial walk-through inspection revealed several problems but one notable one was that HVAC filters were covered with accumulated dust and debris, and the roof was covered with dead birds and bird droppings.

Measurements of the indoor air revealed several disease-causing organisms, *Chlamydia psittaci*, *Cryptococcus neoformans*, and *Histoplasma capsulatum*, which is often present in bird droppings, and all can cause pulmonary infections.

Proper Cleanup Procedures

All this death and disease could have been prevented by proper cleanup of bird droppings and then setting up an effective bird control system.

According to the Hazardous Material Management Web Site, the most probable exposures to disease may be from maintenance activity, which requires cleanup of an excessive build-up of bird droppings on building surfaces or around HVAC equipment.

***The most probable exposures to disease
may be from maintenance activity***

Respirators with HEPA cartridges should be worn, as well as disposable coveralls. To reduce airborne spore levels, the bird droppings should be wetted.



All bird dropping should be handled as hazardous waste and disposed of in accordance with proper disposal methods established by local and state authorities.

All cleanup personnel should be healthy, properly trained and outfitted with a high efficiency (HEPA) dust respirator that can filter particles as small as 0.3 microns, disposable gloves and overalls.

It is also very important to inform workers about potential disease and the precautions which are required. *All workers who may become exposed should undergo proper training before starting any cleanup.*

Department of Health - Cleanup Procedures

The following are the recommended cleanup procedures and have been compiled from the NJ Department of Health and Senior Services web site and an official government Occupational Safety and Health Service of the Department of Labor web site. If large quantities of bird droppings are present, contact an environmental engineering consultant or a Bell Environmental Bird specialist for advice.

Whether you are attempting your own cleanup or contracting out to professionals make sure they adhere to the following standards before letting anyone do cleanup on your building. ***The legal liabilities of allowing unsafe cleanup are just now becoming in the forefront of legal actions and settlements are high.***

- 1.** Employer's should select workers whose immune status is high. If in question require that all personal go through a medical screening before proceeding. During cleanup only authorized cleanup personnel should be present.

2. Avoid using chemicals. Chemical sterilization of droppings before removal has not proven to be effective against all organisms (and may present another health hazard from chemical exposures).
3. Dampen deposits of bird droppings with a gentle spray of water until sufficiently wet to prevent dust from becoming airborne. This may take several hours or more of repeated spraying to penetrate the mass of droppings completely.

Note: Do NOT use Strong jets or large quantities of water. This may cause dust to become airborne and any runoff will contaminate other areas, eventually drying and become airborne.

4. Seal off windows, doors and ventilation inlets to inhabited areas and shut down these systems.
5. Wear a high efficiency (HEPA) dust respirator that can filter particles as small as 0.3 microns, disposable gloves and overalls. When finished and while still wearing the respirator, remove protective clothing and place it in a plastic bag. Treat the disposable gloves and overalls and respirator filters as contaminated waste and add them to the droppings for disposal.

Note: During removal of an accumulation of bird droppings from an enclosed area such as an attic, dust control measures should be used, but wearing a NIOSH-approved respirator is also recommended to reduce further the risk of fungal spore exposure.

6. Double bag the droppings and disposables in heavy 3 mil plastic bags. The outside of the garbage bags should be rinsed off before they are placed in a disposal container. Contact local health authorities to find out about proper dispose methods established by local and state authorities for the removal, transportation and disposal of contaminated material.
7. Non-disposable work clothing and respirators should be removed, placed in a plastic bag and sealed. These items must be disinfected in the bag before final cleaning and reuse.
8. Shower after scrubbing boots.
9. Perform proper bird control or modify the structure to prevent birds from reestablishing the roost.

Chapter Six

Diseases Associated With Pigeons, Starlings, And English Sparrows.

This section lists some of the diseases that are associated with pest birds. This list should not be construed as all inclusive, but just our attempt to make you familiar with most of the diseases that have been linked to pest birds. The medical community is discovering new associations all the time, so for the latest up-to-date information consult a medical expert.

The information in this list has been condensed so as not to put you to sleep. If you're attempting to use this information for research purposes it is recommended you search out the original, unedited version of the book. We located our original copy through Amazon.com. They have an affiliation with numerous book stores who help locate out-of-print books often in perfect condition.

One of our foremost desires is good health, while hunger, pain, disease and death are our greatest fears. Good health and protection from disease is also important to domestic animals if we are to have an adequate supply of wholesome food at reasonable prices.

People should think more seriously about the protection of their health by the control of problem birds. The possible infection of humans and animals by diseases and parasites transmitted by these pest birds is a true health hazard. Pest birds often create conditions for growth of organisms that cause diseases. Dermatitis (skin infections) caused by ectoparasites may result in reddening, severe itching and pain. However, these are not as detrimental as some of the bacterial, mycotic, protozoal, rickettsial, viral or helminth infections which may result in a great variety of disease and intestinal pain, prostration, hospitalization or death.

People should think more seriously about the protection of their health by the control of problem birds

A review of the literature ***reveals more than sixty transmissible diseases associated with the three pest birds.*** Certain diseases are of much greater significance than others. Those of minor significance are included so that all aspects of the problem are covered. In cases where there is no common name for a disease, the name of the causative organism is indicated. Since

the mere name of a disease may not be too meaningful, a brief commentary is made concerning the complications or situations.

*More than sixty transmissible diseases
are associated with the three pest birds.*

RELATIVE OCCURRENCE AND IMPORTANCE

MOST IMPORTANT: acariasis, candidiasis, chlamydiosis, cryptococcosis, Eastern equine encephalitis, Erysipeloid, Histoplasmosis, Newcastle, Paratyphoid, Pasteurellosis, Pullorum, St. Louis encephalitis, Salmonellosis, Taeniasis, Toxoplasmosis, transmissible gastroenteritis, Trichomoniasis, Tuberculosis, Vibriosis, Western equine encephalitis, Yersiniosis.

MODERATELY IMPORTANT: American trypanosomiasis, aspergilliosis, Blastomycosis, Capillariasis, Coccidiosis, Dispharynxiasis, Eyeworm, Fowl typhoid, Gapeworm, Infectious coryza, Listeriosis, Pox, Q fever, Spirochetosis, Streptococcosis, Tetramariasis, Ulcerative enteritis.

LESS IMPORTANT: Those in the following charts not indicated previously.

DISEASES ASSOCIATED WITH THREE PEST BIRDS

BACTERIAL DISEASES

Erysipeloid	Salmonellosis
Fowl Cholera (Pasteurellosis)	Spirochetosis
Fowl Typhoid	Streptococcosis
Infectious Coryza	Tuberculosis
Listeriosis	Ulcerative Enteritis
Paratyphoid	Vibriosis
Pasteurellosis	Yersiniosis
Pullorum Disease	

MYCOTIC DISEASES

Aspergillosis
Blastomycosis
Candidiasis

Cryptococcosis
Histoplasmosis
Sarcosporidiosis

PROTOZOAL DISEASES

American Trypanosomiasis
Coccidiosis
Haemoproteus

Leucocytozoonosis
Toxoplasmosis
Trichomoniasis

RICKETTSIAL and CHLAMYDIAL

Chlamydiosis
Piroplasmosis

Q fever

VIRAL DISEASES

Encephalitis
Eastern Equine Encephalitis
Fort Morgan Encephalitis
St. Louis Encephalitis
Venezuelan Encephalitis
West Nile Encephalitis

Western Equine Encephalitis
Meningitis
Newcastle Disease
Pox
Transmissible Gastroenteritis

PARASITIC CESTODES

Davainea proglottina
Railletina tetragona

Taeniasis

PARASITIC NEMATODES

Capillariasis (3 spp.)
Dispharyxiasis
Eyeworm

Gapeworm
Tetramariasis (2 spp.)

PARASITIC TREMATODES

Schistosomiasis	Echinostoma revolutum
Brachylaemus commutatus	Haplorchis pumilio
Brachylaemus fuscatus	Hypoderaeum conoideum
Collyriculum faba	Plagiorchis murus
Cotylurus cornutus	Postharmostomum gallinium
Cryptocoyle convacum	Riberiola ondatrae
Echinoparyphium paraulum	Tamerlania bragai
Echinoparyphium recurvatim	

DERMATOSIS

Acariasis

Comments: The above information is based on review of literature in the Indiana University Medical Library, Purdue University Veterinary Library and material supplied by cooperating interested individuals.

BACTERIAL DISEASES

ERYSIPELOID, STARLINGS, PIGEONS AND ENGLISH

SPARROWS: (Erysipelas, Erysipelois, Erysipelotrix, St. Anthony's disease, St. Anthony's fire, Diamond skin disease)

Affects humans, cattle, swine, horses, sheep, goats, chickens, turkeys, ducks and dogs. The disease is known as erysipeloid or erysipeloid rosenback when affecting humans. It is called erysipelas when affecting animals or poultry.

When affecting humans, it usually appears as an eruption of the skin, being slightly swollen, bright red or dark violet colored to almost black and blue. It generally starts in a wound or small break in the skin and is accompanied with a sensation of burning, throbbing pain and intense itching. The infection often starts on the face, but may affect any part of the body. There may be headaches, chills, pain in the joints and

prostration, fever and vomiting. It is sometimes fatal, especially to young children or old and infirm people.

Starlings have been found to have natural occurring infections. During one survey, 5 of 97 starlings (approx. 5%) were found to be affected. Pigeons will pass the infection to its squabs. The infections have been found in both adults and squabs.

LISTERIOSIS, PIGEONS AND ENGLISH SPARROWS:

Listeriosis affects humans, chickens, ducks, geese, cattle, horses, swine, sheep, goats, cats and dogs. It is a grampositive bacterial disease caused by *Listeria monocytogenes*. The disease causes changes in the cells of the nervous system. Humans occasionally have an inflammation of the inner eye lid (conjunctivitis), endocarditis and skin infections. It can also cause meningitis in newborns, abortions, premature delivery, stillbirth and death within a few days. The disease has been isolated from pigeons and English sparrows. It is suspected that the disease is transmitted by the oral-fecal route.

PARATYPHOID, PIGEONS, STARLINGS AND ENGLISH SPARROWS:

Paratyphoid includes diseases caused by many types of salmonella. Paratyphoids can infect practically all animal species including humans, cattle, swine, sheep, goats, horses, dogs, cats, and poultry, especially turkeys.

Pigeons, starlings and English sparrows are extensively involved. Pigeons were first authentically identified with paratyphoid in southern New Jersey in 1895 by Moore of the United States Department of Agriculture. Pigeons which survive paratyphoid outbreaks often become chronic carriers, excreting the organisms in their feces.

PASTEURELLOSIS, PIGEONS AND STARLINGS: (Chicken cholera, avian pasteurellosis, hemorrhagic septicemia, shipping fever)

Pasteurellosis affects humans, cattle, swine, horses, rabbits, dogs, cats, chickens, turkeys, and other avian species. The acute infectious disease is caused by a highly contagious gram-negative bacteria *Pasteurella multocida*.

The disease in humans may be divided into four groups of syndromes: (1) Infection of the upper respiratory tract as nasal discharge, or inflammation of the inner surface of the eyelid (conjunctivitis); (2)

Infection of the lower respiratory tract as bronchitis, or pneumonia; (3) Infection of internal organs as appendicitis or inflammation of the urinary bladder; (4) Abscessed wound infections caused by bites or scratches from cats or dogs, for example.

Pigeons are subject to the disease and can spread it through their droppings or nasal discharges. The organism can live as long as a month in pigeon manure or 3 months in a dead pigeon.

PULLORUM, PIGEONS, AND ENGLISH SPARROWS:

Pullorum has been reported in humans. It is a bacterial disease caused by *Salmonella pullorum*. It usually affects younger chicks and poults that have been chilled or devitalized. Pigeons are occasionally subject to pullorum. If they recover, they are permanent carriers of the disease.

SALMONELLOSIS, PIGEONS, STARLINGS AND ENGLISH SPARROWS: (Food poisoning, gastroenteritis, paratyphoid, typhoid)

Salmonellosis is more than food poisoning: Salmonellosis affects humans and all domestic animals. The cause is a closely related group of salmonella bacteria (*Enterobacteriaceae*) with over 1700 serotypes which are members of the genus *Salmonella*.

Salmonellosis in humans may manifest itself in one or more of four main types (1) Temporary carriage without infection, (2) Gastroenteritis (food poisoning), (3) Enteric fever septicemia (blood poisoning), (4) Persistent infection. Temporary carriage occurs in over 2 million people in the United States each year. There may be mild symptoms of short durations which do not require the attention of a physician.

Wild birds, including pigeons, starlings and English sparrows, are among the most frequent carriers of the motile salmonella and are a ready source of the infection for humans, domestic animals, poultry and pets.

Pigeons are important factors in the spread of salmonellae, since the bacteria are left where ever the pigeons defecate. Pigeons trample back and forth through their copious excretions on window ledges and air intake vents. This dusts off to contaminate food or homes as the dust enters through air conditioners and ventilators.

SPIROCHETOSIS, PIGEONS, STARLINGS AND ENGLISH SPARROWS: (Avian spirochetosis, fowl spirochetosis)

This bacterial disease is caused by *Borrelia anserina*. It affects chickens, ducks and pigeons. Pigeons, starlings and English sparrows are hosts of the vectors.

STREPTOCOCCOSIS, PIGEONS:

This disease affects cattle, swine, sheep, horses, chickens, turkeys, geese, ducks, and rabbits. It is caused by a gram-positive bacterium *Streptococcus zooepidemicus*. Feral pigeons are susceptible to these bacteria and aid in transmission.

TUBERCULOSIS, STARLINGS, PIGEONS AND ENGLISH SPARROWS: (Avian tuberculosis)

Tuberculosis is a bacterial disease. These comments are in reference to the avian strain *Mycobacterium avium*. Avian tuberculosis may affect humans, chickens, turkeys, swine, cattle, horses, sheep, dogs and cats. Tuberculosis in humans may cause victims to tire easily with a slow loss of weight. Infection in humans is often referred to as *Mycobacteriosis*. It is usually caused by *M. tuberculosis*.

Pigeons have been implicated as a source of tuberculosis. Tuberculosis was reported in pigeons as early as 1884. Starlings are also involved.

Great numbers of the organisms were excreted in the feces. The disease is transmitted by direct contact, through the oral route and by inhalation of fine particles of infected dust in air currents.

ULCERATIVE ENTERITIS, PIGEONS: (Quail Disease)

Ulcerative enteritis is of economic importance to chicken and turkey farmers. It is a bacterial disease caused by *Clostridium colinum*. The organism has been isolated from pigeons.

VIBRIOSIS, ENGLISH SPARROWS:

Vibriosis affects humans and is of economic importance in cattle and sheep. It is a gram-negative bacterial disease caused by *Vibrio fetus*. Vibriosis can cause great discomfort in humans. The predominant symptoms include a severe and prolonged fever, headache, vomiting, chills, diarrhea, loss of weight and overall stiffness. It may cause abortion or premature birth. It may also cause inflammation of the lining of the heart (endocarditis), inflammation of veins (pericarditis), inflammation

of the vein where a clot of blood remains attached (thrombophlebitis), pneumonia and arthritic swelling of the knees or elbows. It has been found in the gallbladder. This is evidence that it can be shed in the feces. English sparrows have been incriminated as fecal shedders of *Vibrio fetus*.

YERSINIOSIS, PIGEONS AND ENGLISH SPARROWS: (Formerly called pseudotuberculosis)

Yersiniosis affects humans, cattle; sheep, goats, horses, turkeys, chickens, ducks, dogs and cats. It is a plague-like disease caused by gram-positive bacteria. When affecting humans, this intestinal disease is clinically indistinguishable from appendicitis. Both diseases cause fever, nausea, headache, hard and painful stomachs. Because of the similarity, there were 32 school children hospitalized in Oneida County, New York for suspected appendicitis in September, 1976. Fourteen children were reported to have had unnecessary appendectomies. *Y. enterocolitica* serotype eight was isolated from the ill children.

Pigeons are known to void large numbers of viable organisms in their feces, thus contaminating feed. The disease was isolated from pigeons and reported by a German scientist, H. Dolfen, in 1916. Transmission by pigeons may be either through the feces, eggs, or ticks of pigeons.

MYCOTIC OR FUNGAL DISEASES

ASPERGILLOSIS, PIGEONS: (Pigeon feeder's disease, Brooder pneumonia, Gaps)

Aspergillosis is a fungal disease caused by *Aspergillus fumigatus* which affects humans, cattle, chickens, turkeys, and ducks. In humans it is primarily a disease of the lungs and the broken skin. The fungus produces toxins which poison the victim's blood, nerves and body cells. Pigeons are associated with this disease because they assist the spread of aspergillosis spores in airborne dust.

BLASTOMYCOSIS, PIGEONS, AND STARLINGS: (Gilchrist's disease, North American blastomycosis).

Blastomycosis is a chronic, systemic fungal disease that affects humans, horses, dogs and cats. The disease primarily affects the lungs. The main route of infection is by inhalation of spores. The disease is infectious but is not contagious. Major symptoms in humans include loss of weight, fever, cough, bloody sputum and chest pains. One epidemic of human

blastomycosis involved seven people under sixteen within a four mile area.

CANDIDIASIS, PIGEONS: (Candiosis, Crop Mycosis, Moniliasis, sour crop, thrush, oral thrush).

Candidiasis affects humans, cattle, swine, sheep, horses, chickens, turkeys, dogs and cats. The disease may be acute or chronic. All organs of the body can support the disease. When affecting people it primarily affects the skin, fingernails, the mouth, the respiratory system, the intestines and the urogenital tract, especially the vagina. The discomfort of the itching, pain and discharge caused by the growth of this fungus is significant enough to warrant the elimination of pigeons. Pigeons help seed the environment as they spread the disease organism. Once infected, an individual is much more susceptible to reinfection. Pigeons are one of three wild birds most frequently infected with *Candida*.

CRYPTOCOCCOSIS, PIGEONS: (European blastomycosis, Torula, Torulosis, Yeast meningitis)

Cryptococcosis affects humans, cattle, swine, horses, dogs and cats. Cryptococcosis in humans usually begins as a primary infection of the lungs. When the involvement becomes apparent the symptoms may include cough, chest pain, weight loss, fever or dizziness. The disease may be in the lungs, mucous membranes, bones, and joints, with no organ or tissue of the body exempt. It very frequently involves the brain covering as cryptococcal meningitis. The central nervous system involvement usually follows the pulmonary disease. Pigeon excreta is the most common source of *C. neoformans*. The yeast was isolated from six of thirteen (45%) samples of pigeon nests and droppings in Morgantown, W. Va. When pigeon coops in Pittsburgh, Pa. were studied in 1966, it was found that 68% were infected with *C. neoformans*. Most of the cryptococcal infections occur from inhalation of the fungus along with the dust from areas enriched with pigeon manure. The entrance may also be through the gastrointestinal tract.

HISTOPLASMOSIS, STARLINGS AND PIGEONS: (Histo)

Histoplasmosis affects humans, horses, cattle, swine, dogs and cats. It is an important systemic fungal disease caused by *Histoplasma capsulatum*. It is interesting to note that the disease was suggested for consideration as a biological warfare agent at one time because of its air-borne route. Histoplasmosis is an environmental disease acquired from inhalation of the air-borne spores in the dust. The organism is an air pollutant.

Histoplasmosis is probably the second most significant fungus disease. The disease is endemic to eastern and central United States. There is a wide variation of the disease. It is basically a pulmonary or respiratory disease, but may also extend to the liver, lymph nodes and spleen. It may disseminate to the blood and bone marrow and be fatal. The victim frequently has chills and fever to 105°F, night sweats, chest pains and is fatigued. A non-productive cough is fairly common. Children are more susceptible to this mold than any other mycotic infection. It has been suggested that primary histoplasmosis may be a common cause of unexplained fever in young children in endemic areas. When untreated, about half of the disseminated cases in infants and young children may prove fatal.

There were 27 cases of histoplasmosis reported to the Indiana Board of Health in 1976. In Springfield, Missouri, three bulldozer operators became ill while working where a roost had existed at least five years. In Mason City, Iowa a starling roost was involved in two epidemics. The roost had been established at least seven years. The ground had a thick cover of droppings. The first epidemic was in 1962 with 28 documented cases, of which 16 had worked at the site of the roost. Two people died. A 58-year-old power-shovel operator developed chills and fever 12 days after he started working on the project. He died after an illness of 7 weeks. A 34-year-old lady died shortly thereafter. A second epidemic occurred 12 years later when another attempt was made to clean the site. There were 270 cases reported. Eighty-seven cases of acute pulmonary histoplasmosis were studied in detail. Most of the employees of downtown stores in the area had a positive reaction.

Pigeons have been incriminated with outbreaks of histoplasmosis. The mold of *H. capsulatum* has been recovered from many sites enriched with the dung of pigeons. In Columbus, Wisconsin an epidemic involving 23 people was related to pigeon droppings contaminating the shrubbery around a church. The victims had helped dig the shrubbery. In Delaware, Ohio 384 students and faculty members became ill. This was the largest number of cases to be reported prior to 1979. It started on Earth Day, 1970, when the school children were cleaning up a school yard where pigeons and blackbirds had roosted. Clinical illness occurred in 384 (40%) of the students and faculty. They were ill enough to stay home from school. One adult was ill for six weeks. The entire school building was contaminated as spores had entered through the forced air ventilating system. In Kansas City it was observed in one study that children living in buildings on which pigeons roosted or nested, had an infection rate three

times that of children living in quarters without pigeons. In Hot Springs, Arkansas the courthouse tower was scraped. As the bird feces dropped over the edge of the roof, they fell past the air conditioners, so some of the dust was drawn into the offices. This resulted in 44 of 84 (50%) of the employees developing histoplasmosis.

The largest outbreak ever recorded in the United States occurred in Indianapolis, Indiana during the winter of 1978 - 79 with more than 400 confirmed cases which included 18 deaths

It has been suggested that the final solution of the histoplasmosis problem must involve the awareness by the general public and more extensive use of effective controls in reducing the population of problem birds.

PROTOZOAL DISEASES

AMERICAN TRYPANOSOMIASIS, PIGEONS: (Chagas disease, human trypanosomiasis)

This disease organism may be found in humans, pigs, dogs and cats. There is no cure, there is no effective treatment, there is no vaccine for the disease. Most of the people infected by this disease will die early of heart disease. The response to the disease infection can vary from swelling of the face, eye, or other parts of the body at the site of invasion, to a fatal outcome. Death may occur in two to four weeks. The disease is of great importance to humans, especially young children and infants. Pigeon kissing bugs have been found on pigeons.

COCCIDIOSIS, PIGEONS, ENGLISH SPARROWS AND STARLINGS:

Coccidiosis is a very serious disease in poultry, cattle and sheep. Pigeons have been incriminated.

HAEMOPROTEUS, PIGEONS:

This disease affects turkeys, ducks, geese and pigeons. The causative organism was originally found in the common pigeon.

LEUCOCYTOZOONOSIS, PIGEONS:

This disease affects ducks and geese. The organism has been isolated from common pigeons.

SARCOSPORIDIASIS, ENGLISH SPARROWS:

This protozoal disease is not considered as economically important in the United States. It may affect humans, cattle, swine, sheep, horses, chickens and ducks.

TOXOPLASMOSIS, PIGEONS, STARLINGS AND ENGLISH SPARROWS:

Toxoplasmosis may be one of the most widespread zoonotic diseases in the United States. In one group of seven surveys in the United States, 22% of the people tested showed positive reactions. It is common in humans and in many domestic animals including cattle, swine, horses, sheep, chickens, turkeys, dogs and cats. Toxoplasmosis is extremely common in humans, but most infections are not apparent. Toxoplasmosis has been shown to cause abortions in women. The organism seems to have an affinity for brain tissue. The disease may cause many problems, including mental retardation and death. A serious outbreak occurred in Atlanta, Georgia in October, 1977 among 29 people who were patrons of a riding stable. Pigeons frequently transmit toxoplasmosis through fecal contamination, respiratory droplets, eye secretions, contact with infected tissues or through ectoparasites.

TRICHOMONIASIS, PIGEONS AND ENGLISH SPARROWS: (Avian trichomoniasis, canker, roup)

Trichomoniasis affects humans, cattle, chickens, turkeys, ducks, quail, and canaries. Some species affect the genitalia tract of humans and cattle. Some strains invade the head sinuses, skull and skin of the neck. There may be a swelling of the throat. The cankers can be severe enough to block the esophagus and result in death from starvation or block the trachea and result in death from respiration failure. Death may occur as early as four days after invasion. Pigeons are considered the primary host of *T. gallinae*. It is extremely common in domestic pigeons. One hundred percent (50 of 50) feral pigeons collected in Chicago were infected.

RICKETTSIAL AND CHLAMYDIAL DISEASES

CHLAMYDIOSIS, PIGEONS, STARLINGS, AND ENGLISH SPARROWS: (Ornithosis, psittacosis, feline pneumonia, parrot fever, bedsonia, bedsonia infection)

Chlamydiosis affects humans, cattle, horses, swine, sheep, goats, chickens, turkeys, ducks, geese, dogs, cats and many wild birds and

mammals. Chlamydiosis is one of the well known avian associated diseases that affects humans. It is a systemic, contagious disease which occasionally is fatal. Chlamydiosis in humans is a generalized infectious disease that causes a pneumonia or flu-like respiratory infection with high fever ranging from 101° to 105°F, chills, loss of appetite, non-productive cough, severe headache and generalized aches and pains. Other symptoms may include vomiting, diarrhea, hepatitis, insomnia and restlessness. The pulse rate may be low. Thrombosis (bloodclot) and phlebitis (inflammation of a vein) are common complications. Chest X-rays often reveal a pneumonia which is much more extensive than the physician is led to believe while listening with a stethoscope. The disease has often been diagnosed as atypical pneumonia. The patient recovers slowly and relapses are quite common. Workers of the Rockefeller Institute of Medical Research isolated the organism from 25% of human pneumonia patients along the eastern coast of the United States. Because of their high infective rate, pigeons are strongly suspected for contamination of the environment of domestic avian species. Pigeons are the most common and consistent source of infection of all known hosts. Over half of the pigeon population is or has been infected. Pigeons have infected humans with chlamydiosis on many occasions.

PIROPLASMOSIS, PIGEONS: (Babesiosis)

This is a rickettsial disease of chickens, turkeys, ducks and geese.

Q FEVER, PIGEONS AND STARLINGS: (Query fever, nine mile fever)

Q fever attacks humans, cattle, sheep, goats and poultry. Q fever in humans is characterized by a sudden onset of pneumonitis. There is an absence of rash. Symptoms may include chills, fever, weakness, severe sweating, a mild cold, scanty expectoration and chest pain. There may be severe headaches and sore eyes. Recovery is generally slow with weakness and fatigue persisting for several months. The disease caused major epidemics during World War II in Army troops in southern and eastern Europe. Pigeons are involved as carriers. Ticks and mites taken from pigeon nests were found to be infected.

VIRAL DISEASES

ENCEPHALITIS, PIGEONS, STARLINGS AND ENGLISH SPARROWS:

Encephalitis is an inflammation of the brain. It is a general name for a series of primarily viral diseases causing damage to the central nervous system, including the brain and other nerve tissues. It usually causes drowsiness and a slowing down of both mental and physical facilities.

The three principal bird-related arthropod-borne viruses that cause encephalitis include Eastern equine encephalomyelitis (EEE), Western equine encephalomyelitis (WEE) and St. Louis encephalitis (SLE). These are described separately, but are briefly compared here.

SLE is considered to be more serious to humans than WEE and EEE, but SLE is more important because of the large number of cases. SLE is a more serious disease of older people, based on mortality, while EEE affects mainly young people. The EEE and WEE produce clinical diseases in humans and horses. SLE does not produce symptoms in horses. EEE produces symptoms in birds and has caused problems in raising pheasants.

Pigeons, starlings and English sparrows are amplifying hosts in the bird-related viruses.

EASTERN EQUINE ENCEPHALOMYELITIS, PIGEONS, STARLINGS, AND ENGLISH SPARROWS: (EEE, sleeping sickness)

Eastern equine encephalomyelitis affects humans, horses, turkeys, ducks and pheasants. EEE is the most deadly of the North American arbovirus diseases. It occurs primarily along the eastern seaboard and appears most often in children, with a great percentage of cases ending fatally. The mortality rate may be around 60%. Symptoms may include headache, fever, neck stiffness, vomiting, nausea, drowsiness and disorientation. It has been known to cause mental retardation, convulsions and paralysis in survivors. The first human case occurred in Massachusetts in 1938. EEE was responsible for eight deaths in Massachusetts in 1956 and for 22 deaths in New Jersey in 1959. A second epidemic occurred in Massachusetts and Rhode Island in 1973. Pigeons are considered a reservoir and amplifying host for the virus. It was also isolated from pigeons in a field study conducted at Hockamock Swamp, Massachusetts.

Starlings have been reported to have shown the presence of circulating antibodies against EEE and there is evidence that they must be important hosts for the dissemination of the arthropod-borne viruses.

FORT MORGAN ENCEPHALITIS, ENGLISH SPARROWS:

This disease was first documented in 1974. It is similar to Western equine encephalitis. The virus has been isolated from English sparrows.

ST. LOUIS ENCEPHALITIS, ENGLISH SPARROWS AND PIGEONS: (SLE)

St. Louis encephalitis affects humans, but does not produce clinical symptoms in horses. SLE was the first Group B virus isolated in the United States. It is the most prevalent arbovirus on the basis of the large number of cases. SLE affects the nervous system. There is an inflammation of the brain and spinal cord. The effects range from complete recovery to disorganization, paralysis, coma and death. The most frequent symptoms are headache, fever, some loss of motor ability, vision or hearing. SLE affects all age groups, but is most severe and with high mortality rates in those over 60 years. The mortality rate is usually 5 to 10%, but in some cases up to 33%.

SLE was given its name after being isolated from the brain of a human in St. Louis in 1933, at which time there were 1,100 cases with 200 deaths in the city. More documented cases (1,995) occurred in 1975 than in any previous year. The large number of cases included 640 in Illinois (20 fatalities), 392 in Ohio (11 fatalities), 323 in Indiana (4 fatalities), 210 in Mississippi (23 fatalities). These figures do not always agree with statistics issued by the states.

When an infected mosquito feeds on a bird, the virus is transmitted and a viremia develops in the bird's blood which may last a few days. For these few days the bird can infect any other *Culex* mosquito that feeds on it. Eventually, enough mosquitoes are present and the disease can be transmitted to humans. Thus birds are the active amplifying hosts. The three birds labeled as main reservoirs of SLE are English sparrows, pigeons and house finches.

Pigeons have been determined to be one of the amplifying hosts of SLE and thus spreaders of the disease. It was isolated from a pigeon from downtown Houston during the 1972 epidemic. In 1975, isolations were made from 127 of 326 (38.9%) of the pigeons tested in Ohio. It was isolated from pigeons in Florida in the sixties.

VENEZUELAN EQUINE ENCEPHALITIS, ENGLISH SPARROWS.

This Group A arbovirus affects humans and horses. Symptoms in humans are influenza-like and may include fever and severe headache. Eighty-four people in the coastal counties of Texas yielded the virus in 1971.

WEST NILE ENCEPHALITIS, PIGEONS:

This virus is widespread in the Middle East and Africa and has become a serious problem in the United States. It is a Group B arbovirus. The virus is maintained in birds by mosquitoes. The disease in humans ranges from mild to fatal infections. It may produce fever, headache, sore throat, rash and flushed face. The virus has been isolated from pigeons.

WESTERN EQUINE ENCEPHALOMYELITIS, PIGEONS AND ENGLISH SPARROWS: (Western equine encephalitis, WEE, Western encephalitis, WE, sleeping sickness)

WEE affects humans, horses, ponies, mules, donkeys, chickens and turkeys. It is a Group A arbovirus that involves a bird-mosquito cycle. The disease is much more prevalent and dangerous than most people think. It has long been a prevalent disease in the western United States, but it also occurs in eastern U.S. The virus is transmitted through the saliva during the bite of an infected mosquito. The virus was first isolated from the brain of a fatal human case in California in 1934. The largest human epidemic occurred in the western United States in 1941 with over 3,000 cases. The second largest outbreak was in 1965 with 172 cases. Typical symptoms in humans include sudden headaches, fever, nausea, stiff neck, drowsiness and disorientation. The fatality rate has been between 5 and 15%. In humans, young people are most highly affected. Children under one year of age really never recover from an infection of this virus. They often become total vegetables and are confined to an institution. About 27% of the WEE cases in California were children under one year. One hundred and thirty cases were reported in 1975. Pigeons are one of the amplifying hosts of WEE.

MENINGITIS, PIGEONS: (Meningo encephalitis)

The disease affects humans, cattle, sheep, swine, poultry, dogs and cats. This virus disease causes an inflammation of the brain and its covering. Meninges are the membranes covering the brain. The disease often causes convulsions, dizziness and nervous movements. Pigeons are susceptible to Newcastle and are the third largest common carrier. It has

been detected in their feces. It has also been found in Northern fowl mite on pigeons.

POX, PIGEONS, STARLINGS AND ENGLISH SPARROWS: (Avian pox, avian diphtheria, chicken pox, bird pox, sorehead, bird diphtheria, canker, contagious epithelioma, fowl pox)

Pigeons are very susceptible to pox and can serve as a source for the mosquitoes that transfer it as vectors. English sparrows are also affected and can serve as carriers. Starlings have been reported to have a carrier of pox.

TRANSMISSIBLE GASTROENTERITIS (TGE), STARLINGS AND ENGLISH SPARROWS:

Transmissible gastroenteritis (TGE) is an extremely contagious viral intestinal disease of young pigs.

PARASITIC WORMS (Helminths)

CESTODES (Tapeworms)

Davinea proglottina and pigeons: Affects chickens and pigeons.

Raillietina tetragona and pigeons: Affects chickens and guineas.

TAENIASIS, PIGEONS, STARLINGS AND ENGLISH SPARROWS:
(Beef measles, beef tapeworm, large tapeworm, Cysticercosis)

Large tapeworm in humans, beef tapeworm and beef measles have one thing in common; they are caused by a cestode *Taenia saginata*. This is a common tapeworm in humans. It may reach a length of 6 to 25 feet, but specimens up to 50 feet have been recorded. Starlings, pigeons and English sparrows have been incriminated as potential vectors in the transmission of beef measles to cattle.

NEMATODES

CAPILLARIASIS, PIGEONS AND STARLINGS: (Capillarids, capillaria worm, hairworm, threadworm, intestinal threadworm)

Capillariasis is a parasitic disease caused by a group of roundworms belonging to the genus *Capillaria*. The adult worms normally inhabit the digestive tract of birds, animals, and in some cases, humans. The disease is transmitted through contaminated food or water. The worm eggs are infective for seven months when left in pigeon droppings.

DISPHARYNXIASIS, PIGEONS, STARLINGS AND ENGLISH SPARROWS: (Spiral stomach worm, stomach wall worm)

Affects chickens, turkeys and many farm birds. Pigeons are involved in this disease which has brought death to many pigeons in the southern United States. Starlings and English Sparrows also are subject to this disease.

EYEWORMS, PIGEONS: (Manson's eyeworm)

Eyeworms affect chickens. Pigeons are affected with the parasite. Certain cockroaches serve as intermediate hosts.

GAPEWORMS, STARLINGS: (Syngamiasis)

It affects turkey poults, baby chicks and pheasants. It parasitizes the trachea and often causes the birds to suffocate and die.

TETRAMERIASIS, PIGEONS, STARLINGS AND ENGLISH SPARROWS: (Globular roundworm, globular stomachworm)

These worms affect chickens, turkeys and ducks. Pigeons have been found to be carriers of the organism which was isolated from six of nine pigeons examined in Kansas and three of three in Oklahoma.

T R E M A T O D E S (FLUKES)

SCHISTOSOMIASIS, STARLINGS, PIGEONS AND ENGLISH SPARROWS: (Bilharziaris, human schistosomiasis)

Schistosomiasis affects humans and is of economic importance in its effect on cattle, swine, horses, sheep, goats, dogs and cats. Schistosomiasis is one of the most prevalent diseases throughout the world, probably ranking second or third. Bird or avian schistomes larvae, however, may cause severe cercarial dermatitis or swimmer's itch. Pigeons, starlings and English sparrows are associated with flukes in the watery areas where they exist.

Echinoparyphium paraulum and pigeons: Affects humans, ducks and pigeons.

Echinoparyphium recurvatum and pigeons: Affects humans, turkeys, chickens and ducks. It has been found in pigeons.

Echinostoma revolutum and pigeons: Affects humans, chickens, turkeys, ducks and geese. The disease in humans is called echinostomiasis. It has been isolated from pigeons.

Haplorchis pumilio and pigeons: Affects humans, chickens, dogs and cats. Human infections occur from eating improperly cooked fish. It has been found in pigeons.

Hypoderaeum conoideum and pigeons: Affects humans, chickens, ducks and geese. It occurs in pigeons.

Plagiorchis murus and pigeons: Affects humans, sheep and dogs. Human infections occur in the intestine. It is usually acquired by ingesting contaminated water. It has been found in pigeons.

Postharmostomum gallinium and pigeons: Affects chickens and turkeys. It lives in the cecum. It has been isolated from pigeons.

Riberioia ondatrae and pigeons: Affects chickens, geese and pigeons.

Tamerlania bragai and pigeons: Affects chickens. It has been found in pigeons.

DERMATOSIS or Dermatitis

ACARIASIS, PIGEONS, STARLINGS AND ENGLISH SPARROWS:

Acariasis is a disease caused by an infestation of mites. Acariasis affects humans and domestic animals. Human acariasis usually involves the skin. It normally occurs when there is a reduction in normal hosts, as when fledgling birds leave their nests. The unfed mites seek new hosts. They are often disseminated into the home by air conditioners. Elimination of bird nests around the home and control of rodents are important in preventing their annoyance.

When the skin is inflamed it is referred to as dermatitis or dermatosis (disease of the skin). The term pruritic or pruritic dermatitis refers to itching dermatitis. Their hosts include pigeons, starlings and English sparrows, (also rats and mice).

Chapter Seven

INSECTS, MITES AND TICKS ASSOCIATED WITH PIGEONS, STARLINGS AND ENGLISH SPARROWS.

There are more than 50 insects and related organisms associated with the three pest birds. The first category includes approximately two-thirds which may affect the health or well-being of humans and domestic animals. The second category includes nuisance or incidental pests.

AIR SAC MITE (Cytolichus nudus)

This small oval, creamy-colored mite has been found in turkeys, chickens, pheasants, various cage or pet birds and pigeons. They apparently do little harm if not abundant. However, with large numbers, they may be associated with emaciation, anemia, a droopy appearance, coughing, and lack of endurance.

BED BUG (Cimex lectularius)

Bed bugs affect humans, chickens, turkeys, dogs, cats and other animal pets. Bed bugs are flat bodied, elongate oval in shape, yellowish brown to dark brown in color about 1/8 inch long, flat, wide and wingless. Bed bugs draw blood and lower the vitality of the host causing it to become weak and anemic. They may consume up to five times their own weight in blood. The presence of bed bugs may lead to nervous and digestive disorders in sensitive people. Bed bugs have been found on pigeons, starlings and English sparrows and also in their nests.

BLACK CARPET BEETLE (Attagenus megatoma)

The black carpet beetle is about 0.2 inch long (5MM) and dark brown to black in color. It is regarded as the most dangerous pest to fabrics in storage. The larvae have been found in the sinuses and nasal passages of humans. Black carpet beetles have been found in the nests of pigeons, starlings and English sparrows.

CADELLE BEETLE (Tenebroides mauritanicus)

The cadelle is also called the bread beetle because of its widespread occurrence in bakeries. The shiny black to brown adult beetle is about 1/3 inch long. Cadelle beetles have been found in pigeon nests.

CARPET BEETLE (*Anthrenus pimpinellae*)

This is a pest of carpets, woolens, furs and silks. The larvae have been found in the nests of pigeons, starlings and English sparrows.

CARPET BEETLE (*Attagenus pellio*)

The small, dark reddish brown beetle has whitish markings. The adult is about .25 inch long. It also is a pest of carpets, woolens, furs and silks. The larvae have been found in bird nests including pigeons, starlings and English sparrows.

CASEMAKING CLOTHES MOTH (CASEBEARING CLOTHES MOTH) (*Tinea pellionella*)

This dimly spotted, dark buff moth is about 1/5 inch long. The natural food is unprocessed materials such as pollen, feathers, hair, wool, upholstered furniture and leather. Casemaking clothes moths have been found in pigeon, starling and English sparrow nests.

CHICKEN MITE (RED MITE, POULTRY MITE, ROOST MITE)
(*Dermanyssus gallinae*)

These mites are cosmopolitan in distribution and a serious pest of chickens, turkeys, canaries and other cage birds, but may also feed on humans. Adults, who frequently live in bird nests, may survive for five months without food. When the mites are unable to obtain the blood of birds, they may attack humans, causing itching and dermatitis. It is known as fowl mite dermatitis. A disease known as acariasis is also an infestation caused by mites. The mites have been found naturally infested with virus of Eastern, Western and St. Louis encephalitis, consequently, they may act as a vector for these diseases. The mite has been found on pigeons, starlings and English sparrows, and in their nests. It is often found in sparrow nests because of their habit of lining nests with chicken feathers.

CHIGGERS, (CHIGGER MITES) (*Eutrombicula alfreddugesi*)

This mite is almost invisible to the naked eye. It is a serious pest of humans and poultry. It also may attack practically all species of domestic animals. The adults feed on insect eggs and small arthropods. The immature or first-stage larvae cause the problem with humans. They do not burrow beneath the skin, but insert their mouth parts in a skin pore or hair follicle, sucking the tissue juices from humans and a large variety of vertebrate hosts. In the case of humans, the larvae attach themselves on

the part of the body constricted by clothing. They seldom remain attached over 48 hours.

The skin may become inflamed and great welts may develop. Intense irritation occurs as the chigger injects tissue dissolving saliva and toxin which causes intense itching. The swollen, red, itching lesions may cause people to become feverish, extremely nervous, and seriously disturbed. Chiggers have been found on pigeons and English sparrows.

CLOTHES MOTH (*Tinea fuscipunctella*)

The larvae of this moth feed on animal matter. They have been known to destroy pigskin book bindings and injuring bedding. The larvae have been found feeding on feces and feathers in pigeon nests.

CRYPTOPHAGID BEETLES (*Cryptophagus badius*, *C dentatus*, *C hirtulus*, *C saginatus*)

The cryptophagid beetles are occasionally pests in homes. They are often referred to as fungus insects or plaster beetles, since they may occur in freshly plastered homes. They can exist only in damp locations where they feed on molds. They occur on cheese, jam, fibres, carpeting, damp plaster, wet straw or vegetable fibres that support molds and mildews. Cryptophagid beetles have been found in pigeon nests.

DRUG STORE BEETLE (*Stegobium paniceum*)

The drug store beetle is about 1/10 inch long and uniform reddish brown color. It is a serious pest of the home, pharmacies and storehouse. The larvae are omnivorous. They feed on practically any plant or animal product that is edible to man, and many things that are non-edible. The beetle has been found in about any plant material found in pharmacies and has even infected poisonous materials like strychnine and belladonna. It has bored into breadboards, tin foil, sheet lead, books and manuscripts. It has been known to bore a straight line through a whole shelf of books. Drug store beetles have been found in pigeon nests.

EUROPEAN CHICKEN FLEA (*Ceratophyllus gallinae*)

This flea affects poultry by causing a weight loss and a reduction in egg production. In some cases, the loss of blood may result in death. It often leaves the poultry host to attack humans and animals coming in contact with poultry. It is not known to transmit human disease. This flea has been found on pigeons, starlings and English sparrows, and is often found in the nests of starlings and English sparrows.

EUROPEAN EARWIG (*Forficula auricularia*)

The European earwig is an unusual insect in that it actually broods over her eggs and then over the young for a few days, like an old hen with a brood of chicks. It is a dark reddish-brown beetle-like insect nearly an inch long, with a pair of sharp forceps at the tip of the abdomen. It hides during the day in the soil, kitchen drawers, laundry, clothing, etc. It feeds at night on about anything that is not too hard for its mandibles. This includes garden flowers, vegetables, ripe fruit, garbage and various insects. It is a notorious household pest in some areas due to its tendency to invade the home. The bite has never proven serious, but it is annoying and uncomfortable. European earwigs have been found in pigeon nests.

FOWL TICK (CHICKEN TICK, BLUE TICK, ADOBE TICK, TAMPAN) (*Argas persicus*)

The fowl tick is a reddish-brown, flattened, bean-shaped tick. The engorged female is about 1/3 inch long, while the male is about half that size. The tick is found primarily in warm and temperate climates. It is the most prevalent tick of birds, attacking chickens, turkeys, ducks, geese, canaries, pigeons and English sparrows. It rarely attacks humans or domestic mammals.

FURNITURE BEETLE OR DEATHWATCH BEETLE (*Anobium punctatum*)

This reddish brown to dark brown cylindrical beetle has a humped appearance. The full grown fat C-shaped white larva is about 6 MM long. It is found in floors, rafters and furniture, causing extensive damage to wood in buildings and wood products. It is a very serious problem in antique furniture. The frass appears as small oval pellets. The insect has been found in pigeon nests.

LARDER BEETLE (*Dermestes lardarius*)

The dark brown beetles are about 1/3 inch long with a yellow band across the middle of the body. There are three black dots on each wing. The adults are able to penetrate lead pipe and have threatened the safety of a building by drilling into the rafters and other timbers. The larvae are brown and very hairy. The infestation often originates in pigeon nests above the poultry house.

LITTLE HOUSE FLY (LESSER HOUSE FLY) (*Fannia canicularis*)

This specie has occasionally been involved in an infestation of fly maggots in humans where it is known as myiasis. Although the cases of urinary tract myiasis are rare, infection apparently occurs when flies deposit their eggs around the urethral meatus. This is usually associated with poor hygiene. Symptoms include frequent, painful urination with mucus, pus and larvae in the urine. The larvae normally breed in excrement and decaying organic matter. This fly has been found in pigeon nests.

MOSQUITOES (several species) are conspicuous blood sucking insects that have a pronounced effect on human health and well being. In addition to the discomfort and irritation caused by the bite itself, mosquitoes are vectors of encephalitis and pox. It was about one hundred years ago (1877) when mosquitoes were first incriminated as vectors of disease. The only natural method by which humans contract group A arbovirus infections is through bites of infected Culicine mosquitoes. Group A arboviruses include Eastern, Venezuelan and Western equine encephalomyelitis. St. Louis encephalitis was the first group B virus to be isolated in the United States. Some species of mosquitoes found on pigeons, starlings, or sparrows have been identified as vectors of pox, Eastern equine, St. Louis and Western equine encephalitis.

**NORTHERN FOWL MITE (NORTHERN FEATHER MITE)
(*Ornithonyssus sylvarium*)**

Northern fowl mites are vicious blood suckers. This small reddish or brown eight-legged mite is a serious problem of chickens and other domestic fowls. The mite may become a pest of humans by biting people and causing dermatitis as it bites or crawls over the skin. It can bite through tender human skin and thus cause pruritis. The mite has been found infested with chlamydiosis, Newcastle disease, St. Louis encephalitis and with Western equine encephalomyetitis. It has been found on pigeons, starlings and English sparrows.

PIGEON FLY (PIGEON LOUSE FLY, FLAT FLY) (*Pseudolynchia canariensis*)

The pigeon fly may bite people and suck blood. This fly is very damaging to squab pigeons. It reproduces primarily in pigeon nests.

PIGEON KISSING BUG (*Triatoma. rubrofasciata*)

The kissing bug receives its name from the fact that it prefers to attack the thinner or tender parts of the skin such as the eyelids or lips. It transmits a potentially fatal disease organism *Trypanosomas cruzi*. The bug has been found on pigeons.

PIGEON NEST BUG (EUROPEAN PIGEON BUG) (*Cimex columbarius*)

The pigeon nest bug is sometimes called a bedbug. It may bite people, but is not known to transmit any human disease. The injection of minute doses of saliva may cause sleepless nights. It can live as long as a year without food. The bugs have been found on pigeons and in their nests, and in homes which had pigeon nests on the roofs.

PIGEON TICK (*Argas reflexus*)

The pigeon tick may bite people, but is not known to transmit diseases to humans. It may transmit *Borreleia anserina* to poultry. It does not bite humans as readily as it bites pigeons. It may infest furniture and beds in the home. The ticks, which hide in cracks and feed at night, may live up to three years without food.

SCALYLEG MITE (*Knemidokoptes mutans*)

This small round mite affects chickens, turkeys, pheasants and pigeons.

SPIDER BEETLE (*Ptisus bicintus*)

This small cylindrical beetle looks like a small spider. It attacks grain and grain products. Spider beetles are found in pigeon nests.

STICKTIGHT FLEA (SOUTHERN CHICKEN FLEA) (*Echidnophaga gallinacea*)

This flea primarily is a pest of poultry in the south and southwest and, secondarily, a pest of dogs, cats, horses, cattle, swine, rabbits, pigeons and humans. After mating, the female burrows in and attaches its head into the skin making it impossible to brush it off. The males move about at night. This flea has been found on pigeons and English sparrows.

STRAW ITCH MITE (*Pyemotis tritici*)

Humans and animals are subject to attack by this microscopic mite. The severe dermatosis caused by these mites is referred to as barley itch, grain itch, grain mite dermatitis, hay itch, mattress itch, straw itch,

acarodermatitis urticariodes or papulovesicular dermatitis. The mite is not visible to the eye in the active stage which attacks humans. However, the females may be seen when distended with eggs. The mites do not burrow into the skin. They may inject an irritating material while in the process of sucking liquid substance from the skin. This may produce a hive-like eruption over much of the body. The lesions may vary from the size of a pin head to two or more inches in diameter. The pale pink to red blotches may itch severely for several days to a week. Outbreaks of dermatitis occur after contact with infested straw used for mattresses, livestock bedding, packaging materials or in the manufacturing of strawboard. Victims may suffer from fever, vomiting, headache or cold sweat. They also may find it difficult to sleep. The mite has been found on English Sparrows.

TROPICAL FOWL MITE (TROPICAL FEATHER MITE)

Ornithonyssus bursa)

This is a widely distributed ectoparasite of chickens in the warmer areas. The mite will bite people causing pruritis (itching). This is temporary since the mite cannot survive longer than ten days away from a bird host. Annoyance of humans is frequently associated with the death or departure of the normal host bird, leaving behind an infestation of mites in the nest without a convenient source of food.

The mite has been found on pigeons and English sparrows. In the case of English sparrows most of the life cycle takes place in the nest. Few mites are found on English sparrows flying about.

WEBBING CLOTHES MOTH (Tineola bisselliella)

This is the most destructive furniture pest in the United States. The larvae feed on bristles, hair, feathers, fur, wool, fish meal, casin, milk products, clothes, carpets, rugs, upholstered furniture and piano felts. Lint from rugs and hair from pets are sources of infection. The adult webbing clothes moth lives outdoors in bird nests and bee hives. The adult does not feed, so all the damage is caused by the larvae. The larvae are attracted to such stains as human sweat, milk, coffee, tomato juice and beef gravy. The webbing clothes moth breeds in the nest of pigeons, starlings and English sparrows.

WESTERN CHICKEN FLEA (*Ceratophyllus niger*)

This flea is found in the Western part of North America. It affects poultry and humans. It contacts the host only when it wishes to feed, which is at least once a day. The flea has been found on pigeons and English sparrows.

YELLOW MEALWORM (*Tenebrio molitor*)

This is the largest of the insects affecting cereal products. This is perhaps the most common beetle parasite of people in the United States. The eggs or larvae have been eaten in cereal products and breakfast foods. It may cause accidental parasitism in humans in which case it is known as intestinal canthariasis. Although it is not a common occurrence, it can be a persistent and disturbing illness. Medical records show the larva to have been found in tonsils during tonsillectomy. It also has been recovered from a patient's nose, the urinary bladder, the umbilicus and the bowel. Evidence that the disease exists is often first discovered when larvae are noticed in the stool. It also transmits a disease known as hymenolepiasis to people. Yellow mealworm has been found in pigeon nests.

NUISANCE OR INCIDENTAL PESTS

BARB MITE (WING FEATHER MITE) (*Falculifer rostratus*)

This is a small mite which is found between barbs of the pigeon's flight feathers.

BIRD LOUSE FLY (*Ornithomyia avicularia*)

This is a nuisance to fancy pigeons but also has been found on common pigeons.

BODY-FEATHER MITE (*Pterophagus strictus*) (**CONTOUR FEATHER MITES** (*Magninia cubitalis* (*M.ginglymerra*))

These mites do not bite humans. They affect fancy pigeons and have been found in nest of common pigeons.

CARNID FLY (*Cornus hemapterus*)

This fly has been found in pigeon nests.

DERMESTID BEETLE (*Dermestes murinus*)

This dermestid beetle feeds on skins, furs, woolens, museum specimens, stored grain and other food stuffs. One species of *Dermestes* has been found feeding on Egyptian Mummies. It has been found in pigeon nests.

HISTER BEETLES (*Gnathoncus punctulatus*, *Hister carbonarius*, *H. corvinus*)

Hister beetles are small, flattened insects. They are scavengers, so may become nuisances. They have been found in pigeon nests.

LARGE PIGEON BODY LOUSE (*Hoporstiella lata*)

This is an ectoparasite of fancy pigeons, but has also been found on common pigeons.

LATHRIDID BEETLE (*Cartodere filiformis*)

This insect may be a pest in the home. It feeds on such items as cheese, jams, carpeting and fibres. It has been found in pigeon nests.

LITTLE FEATHER LOUSE (*Colorceras damnicornus*) **NARROW BODY LOUSE** (**SMALL PIGEON BODY LOUSE** *Colpocephalum turbinatum*)

These ectoparasites affects fancy pigeons and have been found on common pigeons.

NASAL MITES (*Neonyssus columbae*) (*N melloi*, *Spelognathus striatus*)

These mites inhabit the nasal passage of fancy pigeons and are found in common pigeons.

NECK MITE (*Megninia columbae*)

This mite is found on the neck feathers of pigeons and occasionally on the body feathers. It is a pest of fancy pigeons and is also found on common pigeons.

PARASITIC WASP (*Cephalonomia nidicola*)

This parasitic wasp occasionally stings humans. It has been found in pigeon nests.

PIGEON FLEA (*Ceratophyllus columbae*)

The pigeon flea may bite people, but is not known to transmit disease to humans. It is found on pigeons.

PIGEON QUILL MITE (*Syringophilus columbae*)

This mite lives in the quills and can denude the pigeon, leaving only quill stumps. It does not bite people.

PIGEON VENT LOUSE (*Bonomiella columbae*)

This louse affects fancy pigeons and has been found on common pigeons.

ROVE BEETLES (*Several species*)

Rove beetles are scavengers, but are usually considered as nuisances around the home. Twenty species have been reported from pigeon nests.

SLENDER PIGEON LOUSE (*Columbicola columbae*) ***GOLDEN FEATHER LOUSE*** (*Campanulotes bidentatus*)

These affect fancy pigeons and also have been found on common pigeons.