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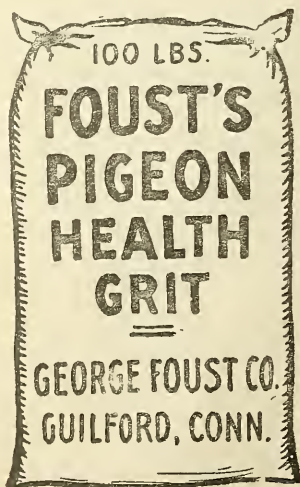
Pigeon Diseases
and
Feeding Management

By E. J. W. DIETZ

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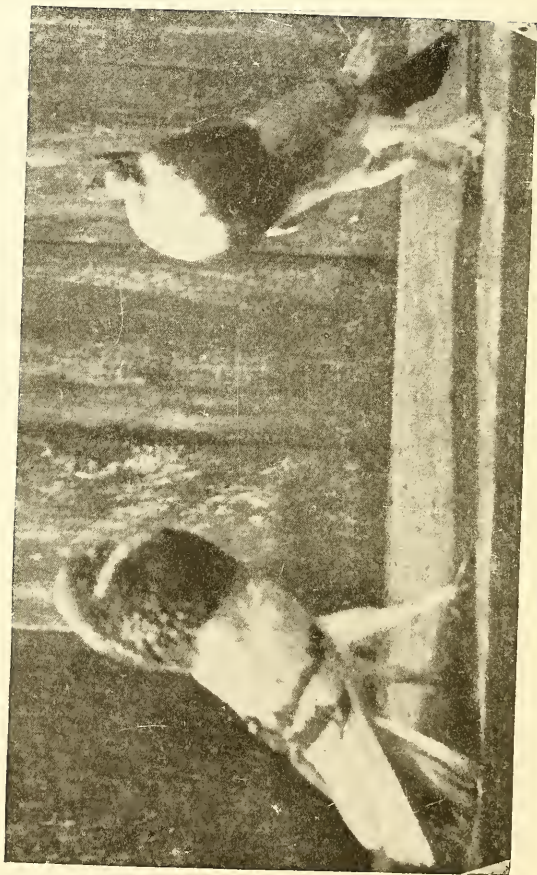
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A PAIR OF PIGMY POUTERS AT PLAY.
Illustrating a Pair of Pigeons In Full Health.

PIGEON DISEASES

WITH A CHAPTER
ON FEEDING

WRITTEN AND COMPILED BY

E. J. W. DIETZ

Editor, Pigeons & Pigeon Flying

CHICAGO
E. J. W. DIETZ, PUBLISHER
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PREFACE.

This treatise on pigeon diseases and feeding management is published in response to many inquiries which have reached the office of **Pigeons & Pigeon Flying** for information upon the various phases of this subject.

In the routine of answering these inquiries, it has been found that no one book heretofore has covered this subject, and much time has been consumed in searching through various pamphlets and, in some cases making inquiries among veterinarians and physicians seeking for remedies and treatments for specific diseases.

From this experience the author has been persuaded to compile this information and place it before the pigeon public in the present form in the hope that it will promote the cause of pigeon keeping by lessening the losses, as well as relieving many of our pets from unnecessary suffering.

On account of the multitude of sources from which this material has been gathered, it has been impossible to give full credit to the source of the information in every instance. In fact some of the physicians did not want to be quoted. But in cases where the information was obtained from other works, full credit has been given. Many of the remedies and treatments are original and all of such have been tested and tried in actual "fussing" with sick animals in the author's possession.

This little work is offered to the pigeon fraternity in the hope that it will be a real benefit and, if any reader finds it lacking, it is desired that he report his experience to the author, to the end that supplements may be added containing information covering every possible phase of this subject.

E. J. W. DIETZ.

Chicago, Ills.,
May 1, 1919.

INTRODUCTORY.

The Naturalist divides all living forms into Phyla, beginning with the Protozoa and going on up in the order of their complexibility until they reach the Vertebrata, which includes the classes: Mammals, Fishes, and Aves or Birds.

The Aves include all animals which have a body covering of feathers and thus include pigeons. The Aves are divided into Families according to the various chief characteristics, and the Pigeon belongs to the Dove family, which differs from all other birds in two respects: (1) They are the only birds that have a milk secreted in their crops at hatching time and which milk becomes the first food of their offspring; and (2) They are the only birds that hold their bills in the water when they drink. The duck, the goose, the swan and numerous shore birds will often put their heads into the water, but that is not to drink, but rather to search for food, when such water-fowl drink they simply put their bills in the water and then raise them in the air to swallow.

The study of Aves or Birds is called Ornithology and we are indebted to this science for much valuable information about wild bird life. The Ornithologist's investigations of the Rock Dove, the wild bird from which all tame pigeons is supposed to have been domesticated, is really the foundation of our rules for care and management of pigeons.

Mr. Chas. Darwin, the famous Naturalist, devoted considerable attention to pigeons and, it is said, had at different times in his possession every known kind. He claimed that all tame pigeons belonged to a common ancestor, and that this was proven by the fact that all pigeons interbred, and all fancy pigeons when mixed up in breeding, will revert very quickly to the color and type of the Rock Dove (*Columba livia*).

According to the "History of British Birds," the Rock Dove inhabits the islands to the north of Scotland and the birds make their nests in the recesses of the rocky crags along the sea shore. Boys in the neighborhood have taken young from the nest and partially domesticated them. These birds are similar in feather coloring to the Blue-barred Homer, and in size, shape and actions, to our Common pigeon.

Pigeons, when allowed unlimited freedom, seldom are troubled with disease or ailments; but, when under domestication, they are confined to limited quarters—houses or aviaries—they are likely to have certain troubles overtake them, unless plans are made and methods adopted which will provide the proper management.

As sick pigeons cannot thrive or reproduce, the secret of success in pigeon keeping is to know how to guard against disease; and, as some diseases are easily cured, it is important that pigeon keepers study how to determine such troubles and how to prevent them. Especially is this true with fancy stock, most of which is somewhat in-bred through the process of line-breeding. At least such varieties seem more susceptible than the more numerous breeds which are not so closely in-bred, and as some of these specimens are valuable as breeders, it is very important that they have the best of care and be kept in the best of health.

This knowledge is easily acquired, but it will be necessary to observe many details in order to obtain the best success.

It is recommended that time be taken to read this book through carefully in order that a general view of the whole subject be obtained; and then you can study the separate items with a better understanding.

In order to know when a pigeon is sick, they must be studied when in perfect health. It is somewhat difficult to describe a healthy pigeon. But it may be said, however, that a pigeon in health has a bright eye, is sprightly in action and its plumage is close-

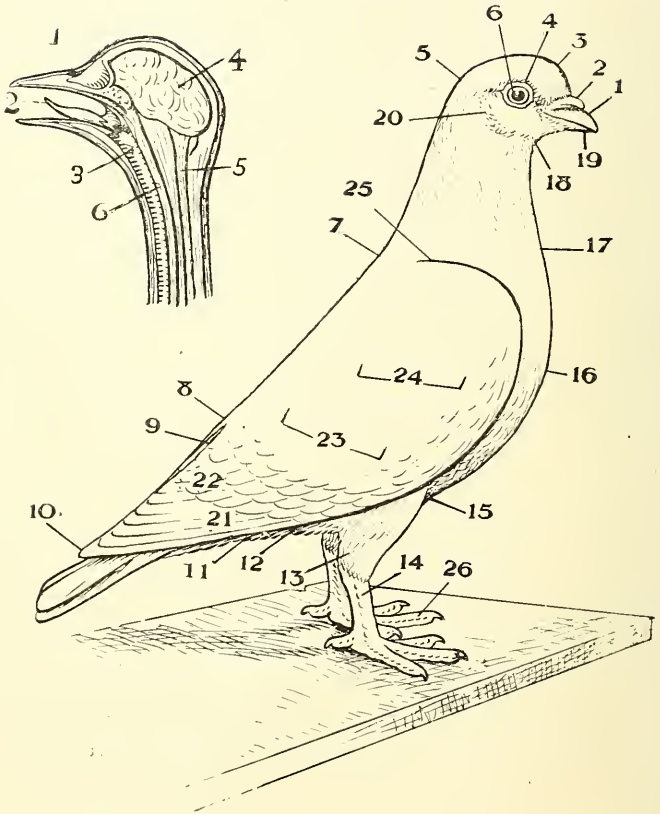
fitting and will glisten in the sunlight, especially the neck feathers. The brightness of the red of its feet is also a good sign although a pigeon's foot will always seem brighter after it has been in the water. The feet also aid in determining the health of a pigeon by feeling them—they should not feel hot to the human hand.

Undoubtedly the best way to learn how to tell when a pigeon is in the best of health, is to visit some old-time breeder and have him point out some of the signs of health. If this is impossible you can find out some of the best signs by watching your birds upon a spring day in April or May, when they are mating and cooing around each other. Birds which conduct themselves actively during the mating and breeding season, may be said to be in good health.

The Plan of the Book.

The plan of this book is to first give the common names of the various parts and organs of a pigeon and then explain their functions; after which the diseases will be treated in the order of the functions of the organs of the bird.

To many fanciers, the treatment of diseases is an interesting study and great satisfaction is derived in witnessing the recovery of some useful bird, hence we hope all who keep pigeons will be interested in this work.



Upper Figure: 1, Upper Mandible; 2, Tongue; 3, Trachea; 4, Brain; 5, Spinal Chord.

Large Figure: 1, Upper Mandible; 2, Nostril; 3, Fore-head; 4, Eye-Cere; 5, Hind-head (occiput); 6, Iris; 7, Upper Back (dorsum); 8, Lower Back; 9, Rump; 10, Wing-tips; 11, Vent; 12, Abdomen; 13, Thigh; 14, Tarsus; 15, Rear of Breast Bone; 16, Breast; 17, Crop; 18, Gullet; 19, Lower Mandible; 20, Ear; 21, Flights or Primaries; 22, Secondaries; 23, Greater Wing Coverts, 24, Lesser Wing Coverts; 25, Shoulder; 26, Toes.

CHAPTER I.

Pigeon Physiology, or the Organs Named.

Assuming that the reader has learned how a healthy pigeon looks and acts, the next step is to seek to learn something about their anatomy and for this purpose it would be well if he could prepare a healthy specimen for the table. In removing the organs try to take them out without tearing, and spread them out upon a table so you can see how each looks in a healthy bird. The chart (Fig. 1) gives the names of the various organs.

See if you can locate and name each organ and try to remember its color, size and shape. This will be useful in seeking to make a post-mortem examination to determine the cause of some fatal disease. However, in making a post-mortem, the bird should not be drawn as when prepared for cooking, but should be cut with a pair of scissors through the small ribs on each side, and the entire breast removed from the back, leaving the intestines in their proper place. They should then be examined for enlargement or discoloration. If nothing out of the ordinary is found, you should next proceed to cut off the head and examine the mouth and throat. If there is no foreign looking substance or bad smelling condition there, you should then proceed to cut open the entire digestive canal, beginning at the throat.

This should be done carefully and as you pass from one organ to another, note if there is any stoppage or appearance of internal laceration. A hand magnifying glass will be useful here to reveal conditions invisible to the naked eye. By thus proceeding through

the whole digestive tract you should locate the trouble; but, if not, then it must have likely been in the lungs or reproductive organs, as will appear by a later explanation.

Your first attempt at this work may be a complete failure, but such is the method of the veterinarian and the pigeon breeder can learn how, too, if he tries.

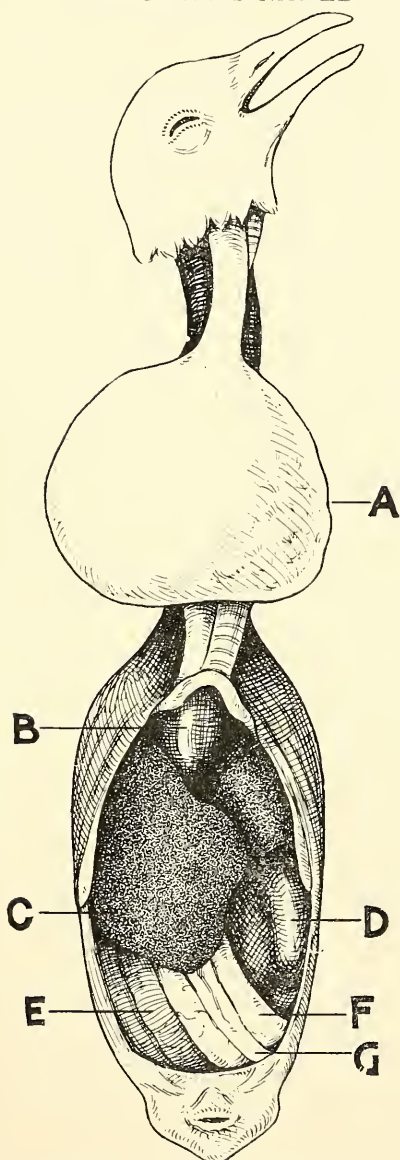
It will not be necessary to study the osteology or bones of a pigeon for their names will not help us in caring for the birds. But it will be necessary to study all the symptoms of disease before you can properly tell just what is the matter with our bird. In fact, as a pigeon cannot talk, it is easier to say what is the trouble if you know how the bird has been fed and cared for, than it is to try and guess the trouble from physical appearances.

As a general rule in both young and old birds the most common disease is some form of throat trouble. Therefore if the bird fails to eat, open the bill and see if there is any yellow, cheesy matter or spots in the throat. If so, this is canker which will be described later.

Examine the bird also to see if the feathers under the eye are moist or whether there is moisture running from the nostril: this is the sign of a cold or catarrh.

The pigeon droppings should be watched as they are really the best sign of health or sickness. Green, watery fetid droppings show that something is wrong and the feed should be examined to see if it is free from mustiness or mould; the surroundings and drinking water should be studied to see if they are sweet and pure, and the interior of the house and the birds themselves should be examined to see if they are free from lice.

Strive to study and learn the normal, thrifty, healthy state of your birds and then you will know when they are sick.



Explanation: A, Crop; B, Heart; C, Liver; D, Gizzard; E, Small Intestines; F, Doudenum; G, Pancreas.

The Respiration System.

(From Government Report.)

The respiratory organs of birds differ considerably from those of our four-footed animals. The plan of structure of these organs follows more closely the analogous organs of reptiles than it does those of mammals. This should not excite surprise as it is now admitted that birds are descended from some animal of the reptilian group. The lungs are confined, as they are in the tortoise to the back part of the body cavity, and are firmly attached to the ribs and the spaces between these bones. Large membranous sacs, communicating with the lungs, and serving as reservoirs of air, extend to the posterior portion of the abdomen and even into the bones. The lungs are not suspended freely and divided into lobes as we see them in other farm animals, but they are attached to the back part of the chest and are accurately molded to the inequalities of the ribs and the spaces between the ribs.

Notwithstanding these resemblances to the sluggish cold-blooded animals the birds' breathing apparatus is of the highest order of excellence, and wonderfully effective. The lungs are comparatively small and have little elasticity, but there is a compensation for these features in the free communication with the spacious air sacs which contain an abundant supply of air.

The upper opening of the trachea or windpipe is on the floor of the mouth just behind the tongue. The larynx at the beginning of the windpipe which is such a perfect structure in the higher mammals, is in birds only slightly developed. The edges of the larynx appear to close together so perfectly that no epiglottis or lid is necessary. There are no vocal cords in the larynx as in mammals, and therefore this organ cannot produce voice, and it only raises or lowers a note by bringing together or separating the stiff margins

of the opening. The true organ of voice in birds is the lower larynx or syrinx, which is found in no other class of animals and is situated where the trachea divides to form bronchi.

The two primary bronchi, formed by the division of the trachea, penetrates the lungs, branching as they go and end in the air sacs which have already been mentioned. The primary branches of the bronchial tubes give off secondary branches, and these secondary branches in turn send off tertiary branches. These finer branches open upon a dense network of minute, almost naked, blood vessels, through the delicate walls of which the oxygen passes to the blood and the carbonic acid and other vapors escape.

There are in all nine air sacs, four on each side, and one (the interclavicular) which has been formed by the union of another pair. These are named the cervical, the interclavicular, the anterior thoracic, the posterior thoracic, and the abdominal sacs. With many birds the air sacs extend into the humerus or large bone of the wing, with some, into the breast-bone, the thigh bone, and even other bones of the body. The air sacs act principally as reservoirs of air, feeding the lungs between the periods of inspiration and ensuring an abundant air supply at all times. There is possibly some oxygenation of the blood through their walls, and they serve in addition to reduce the weight of the body when in flight.

Nearly all the moisture which escapes from the bird's body passes off through the respiratory organs. With mammals, a large proportion of the liquid taken into the body is evaporated from the surface of the skin, and this process serves as an efficient regulation of the body temperature. A considerable amount of liquid is also excreted by the kidneys of such animals. In birds the secretion of the kidneys contains but a small quantity of water, and the skin has no sweat glands, so that but an insignificant amount of mois-

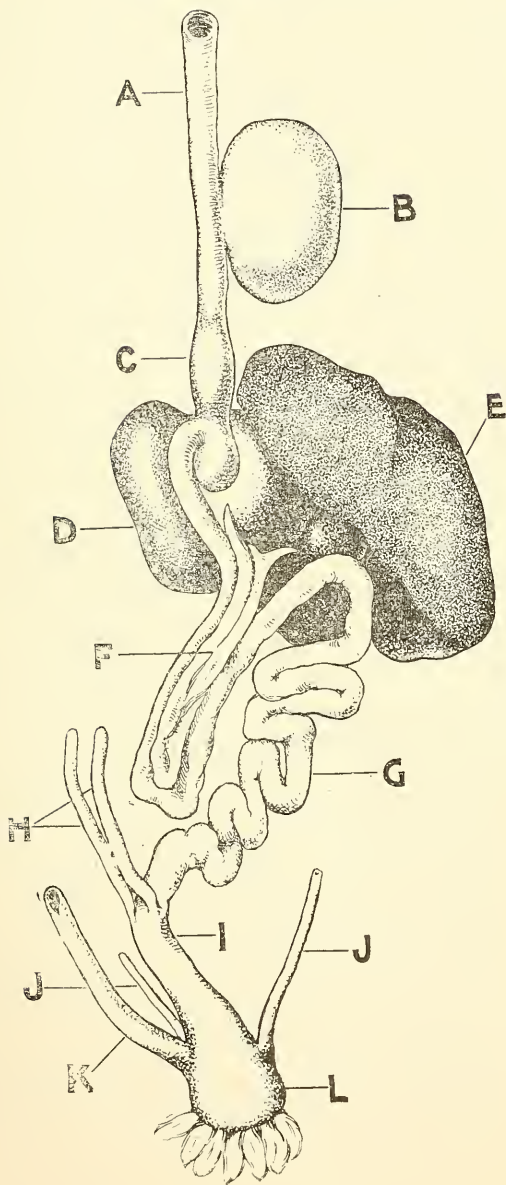
ture is evaporated from the external surface of the body. The lungs and air sacs of birds must, therefore, perform not only the duties which devolve upon the respiratory organs of mammals, but also largely those of the kidneys and skin as well.

On the whole, the respiratory apparatus is very perfect and more active than that of any mammal. The quantity of carbonic acid exhaled is very large, the breathing is rapid, and the oxidation of the blood is necessarily thorough to maintain the high temperature of the bird's body. With all of this, birds are capable of great and prolonged muscular exertion; the "wind" of the Homing Pigeon, for instance, being something remarkable.

The intimate connection which exists between bronchi and air sacs readily permits of the extension of a disease process from one to the other, and parasites or parasitic disease may be common to both. Injured birds may even breathe through a broken humerus which has pierced the skin, when their wind-pipe are obstructed with blood and impemeble to air. In this case the air is drawn into the lungs through the interclavicular air sacs instead of penetrating apparatus of birds of the trachea and bronchi. The respiratory apparatus of birds differs, therefore, to a remarkable extent from that of other animals, in structure, in function, and in the development and extension of the disease to which it is subject.

The Digestive System.

The digestive system of the pigeon differs considerable from that of man, or mammals which have teeth to masticate the food. Instead of teeth they have a crop into which the grain and vegetable food passes in the exact condition in which they find it, and where it is moistened with the water which the pigeon drinks. This crop also acts as a storage place for food, so that a pigeon with a full crop of hard



THE DIGESTIVE CANAL.

A, Gullet or Oesophagus; B, Crop; C, Proventriculus; D, Gizzard; E, Liver; F, Pancreas; G, Small Intestine; H, Caeca; I, Large Intestine; J, Ureters; K, Oviduct; L, Cloaca.

grain can go for a long period without feeding and apparently no particular harm will come from it. This crop is really an extended oesophagus or gullet, and has special glands that, at hatching time, secrete a milk like fluid, with which the pigeons feed their young.

After the grain has become thoroughly moistened and softened, it passes slowly into the real stomach where it is first acted upon by the gastric juices, or digestive fluid secreted from the many tiny glands covering the lining of that organ. This stomach is relatively small in the pigeon and the food quickly passes to the gizzard, the organ with thick walls and in which the grains are completely macerated by being squeezed between the small pieces of sand and grit the pigeon has picked up and which this organ always seems to have within it whenever opened. As pigeons are large consumers of grit it must be that they dissolve it within the gizzard and, no doubt the solutions from this grit are used in the aiding of feather growth.

"The ferment secreted by the stomach," says Dr. Barker, "acts almost exclusively upon the nitrogenous or proteid constituents of the food which, insoluble in their original condition, are reduced thereby to soluble substances known as peptones, capable of being absorbed from the gastro-intestinal tract into the blood vessels, and so on into the general system.

"From the outlet of the gizzard the food passes into the first portion of the bowel, known, on account of the narrowness of its lumen, as the small intestine. Here it comes, almost simultaneously, under the influence of three distinct digestive juices, namely, the bile from the liver, the pancreatic juice from a gland known as the pancreas, and the intestinal juice poured out by a multitude of microscopic glands contained in the bowel itself. The action of the bile is a manifold one, and is somewhat as follows: Firstly, it promotes the digestion of fatty matters

by splitting them up into an emulsion consisting of tiny globules in suspension, which are capable of passing through the walls of the intestine and in this was being absorbed into the system. Secondly, the bile is said to assist in the separation of the nutritious from the non-nutritious portions of the food. Again it has a stimulating action upon the muscular coats of the small intestine, preventing constipation; and, lastly, it has an antiseptic action which assists in the prevention of putrefaction changes in the intestinal contents.

“This complex action of the bile really explains some of the ill effects which follow upon a faulty condition of the liver, and when one considers that the secretion of this fluid is only one amongst a number of duties performed by that organ, its importance in the animal economy is additionally emphasized.

“The pancreatic juice, which, as before mentioned, the food also meets with on its arrival in the small intestine, has at least a three-fold action, for it assists in the emulsification and absorption of fat, it converts starchy matter (insoluble as such) into soluble sugar capable of absorption in the blood, and it continues the action of the gastric juice upon the proteid constituents of the food, converting them into soluble peptones, and again probably into yet simpler bodies.

“It is interesting to note that in pigeons, it is here for the first time that the food meets with a digestive fluid designed to act upon its starchy constituents.

“In the case of the human being, the saliva, poured out by glands in the mouth, and mingled with the food during the process of mastication or chewing, possesses the property of converting insoluble starch into soluble sugar fitted for passage into the blood, and this action of the saliva upon the starch portion of the food is continued for a time after the food has reached the stomach until such time, in fact, as the food contents of the stomach, alkaline in the

first instance, become acid in reaction from admixture with gastric juice poured out by that organ.

“In this connection it is perhaps worthy to mention that with the single exception of the gastric juice, all food ferments or digestants are alkaline in reaction, and require an alkaline medium for the performance of their duties. * * *

“The contents of the stomach (of the pigeon) when they in turn leave the organ of the small intestine (as mentioned before) are then acid in reaction, and not until the alkaline juices from the liver, the pancreas, and the intestinal glands, have neutralized the acid reaction of the semi-digested materials received from the stomach, can they commence their solvent duties upon those portions of the food that remain to be digested. It follows, therefore, that inability to digest the nitrogenous constituents of the food in the stomach may be due on the one hand to deficiency of the actual ferment pepsin, or it may on the other hand be due to deficiency of free hydrochloric acid, notwithstanding the presence in normal quantity of digestive ferment from the peptic glands.

“Again, over acidity of the stomach contents may cut short at too early a period the digestion of starch by the salivary secretion, leading to one form of what is known as amylaceous or starch dyspepsia, and those over acid contents of the stomach, passing on into the intestine, may delay or suspend digestion in that portion of the bowel by overfacing (covering over) the alkaline ferments met with therein, notwithstanding the fact that these ferments may be adequate in amount and perfectly efficient from action under normal conditions.”

It will be noticed that action of these digestive juices are very complex and they have been here explained somewhat fully to show the importance of care in pigeon management and there is but to add that from this latter large intestine the fecæ, or in-

digested portion of the food, is voided from the body of the bird.

Other Systems.

In addition to the breathing system and a digestive system, pigeons have a urinary system which removes the soluble waste from the body, and void it as a white substance with the excreta. The organs of this division are the kidneys, which are elongated in form and situated immediately below the lungs, and extending along the sides of the spine as far as the termination of the rectum. There is no bladder and the cloaca forms a common receptacle for both the urine and faeces.

The Reproductive System.

The reproductive system consists of an ovary in the female and testicle in the male. The ovary in the pigeon is located under the center of the backbone and consists of minute globular ovum which, when they attain the proper maturity break the sack in which they are contained and pass into the oviduct, which latter is divided into three almost equal sections.

In the first section the ova is surrounded with what is commonly known as the "white" of the egg; the second section surrounds this with a fibrous film which acts as a protection, and the third section secretes the material which makes the hard outer shell.

As the "white" is being secreted there is also formed a thin fibrous covering, around the ova which acts as a balancing cord for the egg and it keeps the germ uppermost regardless of the position of the egg. This is called the chalazee.

The Circulatory System.

Of course, as the pigeon has blood there must be

some method to provide for its circulation and here we find a similar system to the human. There is a heart with arteries and veins.

The Nervous System.

Pigeons also have a nervous system which has its seat in the brain as in the human family, but this organ is not nearly as complex and as well developed, although it will be seen later, it is subject to similar diseases.

General Remarks About Diseases.

Generally speaking pigeon keepers know that it does not pay to keep a sick pigeon, as it is likely to contaminate the flock. But most fanciers dislike to see their pets suffer and it is but natural that some attempt be made to relieve the trouble, hence all keepers are looking for some information upon the subject of Pigeon Diseases and their treatment.

In treating sick pigeons there are three things to do:

1. Find the cause.
2. Administer a remedy.
3. Then give stimulating food to revive the bird.

It might also be said that there are four general causes for all pigeon troubles:

1. The taking into the system some foreign substance or bacterial growth.
2. The failure of some organ of the bird to perform its proper function through constitutional weakness.
3. External parasites.
4. Accidents.



A Tumbler Pigeon, Showing How a Bird Looks When in Good Health.

CHAPTER II.

Hygienic Requirements.

As it has been pointed out that pigeons enjoying full liberty seldom are sick, it naturally follows that most of the diseases of birds under confined conditions must be due to their surroundings, therefore, we will first endeavor to explain some of the Hygienic rules the breaking of any one of which will undoubtedly result in pigeon troubles. In fact it is almost safe to say, if all hygienic rules were constantly observed there would be few pigeon troubles. The word Hygiene is derived from the Greek work Hygeia which was the name of the goddess of health, hence hygiene means the rules governing health.

Cleanliness the First Rule.

It is almost self-evident to all that no animal can thrive in its own filth. In visiting pigeon plants we have often found places that were obnoxious to human nostrils, but in which pigeons seemed to thrive. This might be for a short while, but should dampness enter such an obnoxious place, it is safe to predict that there would be many pigeons die. While dry pigeon manure does not give much odor and may not cause much trouble, yet your chances for success are far better if there is a thorough cleaning up and all filth removed so that the pigeon loft is unoffensive to the most fastidious person.

Exhalations Breed Disease.

It must be remembered that the exhalation of a pigeon is much more voluminous in proportion to the size of the bird, than in the human and in all such exhalation there is some solid matter which settles upon the walls of the buildings. In fact on the wall of

most houses there is to be found a fine whittish dust which comes off upon being rubbed with the hand. In time this forms a mould and breeds a bacteria which upon being inhaled again by the pigeons or swallowed through the medium of the drinking water is liable to cause the cholera which is the most dreaded of pigeon diseases.

General Suggestions.

The best general suggestion is to see that your pigeon house is kept clean and free from offensive odors. It should be white-washed at least twice a year and such white-wash should be well made from fresh unslaked lime and to which it is well to add some soluble carbolic acid or cresol disinfectant sufficient to make a 2% solution. If your pen has an earth floor, the upper two inches of such earth should be removed every month or two and fresh earth should be added. Over this you should sprinkle some air-slaked lime, enough to make the ground look white.

Specific Directions.

Specific directions for specific cases will be given under the specific diseases where they apply.

CHAPTER III.

Feeds and Feeding.

As proper feeds and proper feeding management has much to do with the health of pigeons, and as improper feeding and management will certainly cause sickness, it is fitting to take space here to say something about this subject.

When it is remembered that there are numerous kinds of pigeons and that the various kinds are kept under varying conditions of freedom, work and climatic conditions, it is obvious that no description of this subject can cover every detail that will confront a pigeon keeper during several years' experience. All that it is hoped to do is to give a general idea of the subject and a few rules that will guide the reader to the way of better results, which must really be acquired by observation, study and experiment.

Up to the present time there has been no full explanation of the subject of pigeon feeding and among the various pigeon men with whom we have talked, a great variety of opinions have been found, all of which, however, lie between these two extremes. On the one hand there is the man who is a successful exhibitor of Magpies, who buys two brands of mixed poultry feeds as put out by two of the largest milling concerns which he mixes together and obtains good results; and on the other hand we have the information given in the February number of Pigeons and Pigeon Flying from an English Runt breeder, which is as follows:

“As to feeding Runts, the best way to keep Runts big, heavy, strong, and healthy, is to have old maple peas before them at all times, also fresh drinking water and grit. Give them some wheat, whole small

maize or rice—the last two sparingly. I never give my birds any but the above grain. I give them in their drinking water a pinch of citrate of iron and quinine crystals about twice a week—enough to give the water a light amber color. I also give them two tablespoonsful of extract of quassia in their bath once a week. I sprinkle some turps in their nest boxes when they first go to nest, and I also sprinkle a little around their nests once a week. I often give them a piece of banana to pick at, especially if any are ailing.”

As both of these men are highly successful, it is difficult to say which is best. However, there are some rules and some knowledge concerning this subject which, if the reader will take time to study it, will help in selecting new feeds should those which you have been using suddenly take a sharp up-turn in price, or should you suddenly be unable to get them.

The history of pigeons tells us that the wild rock dove, from which our domesticated pigeon has been produced, made its home on the rocks of the salty sea and was seldom seen far inland; although it is said, that they were accustomed to fly sometimes as far as 200 miles to obtain food, as was evidenced by certain seeds found in the crops of birds that had been killed. From this “seaside home” it will be seen why pigeons are such great lovers of salt and all who have kept them know that they live almost exclusively upon a seed diet. While the writer has seen domesticated pigeons pick and peck at the bare ground, he has never seen one pick up a worm or grub, the same as chickens do and their digestive organs indicate that they are almost exclusively a seed-eating bird. Although they will eat grass, water cress, or lettuce leaves. Since the foregoing was written, a squab breeder tells us that his Homers will pick up and eat fish-worms.

The Composition of the Body.

As we have seen, the composition of a pigeon's body is a complex group of organisms, and, it is clear, that these include numerous chemical substances. In fact there are twelve chemical compounds found in a pigeon's body, but about 95% of the whole is composed of four: nitrogen, carbon, hydrogen and oxygen.

Of course, it is assumed, you understand that in the process of living the animal consumes food similarly as a boiler requires coal to make steam.

In analyzing food substances the chemist is able to separate them into the following divisions:

1. Proteids—Or flesh forming elements.
2. Fats—Or heat forming elements.
3. Carbohydrates—Or the starches and sugars which are assimilated in the process of digestion as explained in a previous chapter.
4. Crude fibre—Or undigestible matter, but which really is necessary, and aids in distending the organs so they can perform their functions properly.
5. Water—Which helps to moisten the food and make it digestible, as has been explained.
6. Ash—Or the elements found in the bones and horny part of pigeons.

The fats, starches and sugars are really all carbohydrates as they are a combination of carbon, hydrogen and oxygen in differing proportions, and in animal feeding it is customary to multiply the fat percentage by 2.6 and add it to the carbohydrates and then compare the total with the protein. The percentage of this relation gives us what is called a nutritive or "balanced" ration. For pigeons this has not been definitely determined, but from the examination of several successful feeding compounds it varies from 1:3 in the breeding season to 1:5½ in the winter months.

The following table of the usual pigeon food cereals

used in America is from the Department of Agriculture Bulletin and while these cereals will vary from season to season, and locality to locality, these percentages may be taken as the basis for figuring our pigeon's needs.

Feed.....	Protein... Per cent..	Fats Per cent..	Crude Fibre Per cent..	Carbo- hydrates Per cent..	Water Per cent..	Ash Per cent..	Nutritive ratio
Canadian Peas	22.4	3	6.4	52.6	13.4	2.4	1:2.9
Soy Beans	36.5	18	3.9	27.7	3.7	5.4	1:2
Peanuts, Spanish	27.9	39.6	7	15.6	7.5	2.4	1:4
Corn	10.3	5.0	2.2	70.4	10.6	1.5	1:8.1
Wheat	11.8	2.1	1.8	72.	10.5	1.8	1:6.8
Egyptian Wheat or Shallou	11.25	3.78	2.47	72	9.52	.89	1:7.4
Barley	12.4	1.8	2.7	60.8	10.9	2.4	1:6.2
Rye	10.6	1.7	1.7	72.5	11.6	1.9	1:7.3
Milo Maize	10.21	2.95	2.34	72.24	11.28	4.51	1:7.9
Kafir Corn	10.84	3	2.46	70.88	11.22	1.65	1:7.4
Feterita	12.95	2.89	2.04	63.66	10.83	1.64	1:6
German Millet	12.7	3.3	9.5	58	13.5	3	1:6.2
Texas Millet	10.9	3.5	8.1	62.6	10.9	2.8	1:7.2
Buckwheat	10	2.2	8.7	64.5	12.6	2	1:8
Rice	7.4	.4	.2	87.6	12.4	.4	1:12
Sunflower Seed	16.3	21.2	29.9	21.4	8.6	2.6	1:6
Sorghum Seed	9.1	3.6	2.6	69.8	12.8	2.1	1:8.9
Oats	11.8	5	9.5	59.7	11	3	1:6.9
Horse Bean	26.6	1	7.2	50.1	11.3	3.8	1:2
Lentils	29	1.5	..	44	14	2.3	1:1.6
Hemp Seed	21.0	30.6	18.0	16.9	9.0	4.5	1:4
Hairy Vetch	25.0	2.0	6.8	49.0	14.0	3.2	1:2
Canard Seed	13.8	5.4	8.2	50.7	15.1	6.8	1:4
Rape Seed	19.4	38.5	7.8	16.4	14.0	3.9	1:5
Flax	22.6	33.7	7.1	23.2	9.2	4.3	1:5

It must be remembered also that the amount of food required will vary with the season and activity of the bird. A Flying Homer which has hard, vigorous training and a good fly every day, will consume more food than a small Owl that never gets outside its house. Also a large Runt will consume more food than a Tumbler or Owl, and the squab breeder which is feeding young will consume more

than the same pigeon in winter that is not breeding or rearing young. In fact, it has been noted that when pigeons are feeding young they will eat nearly 50% peas when fed a mixture and allowed to choose to suit themselves.

It has been calculated that a pigeon that is daily active will consume from 12 per cent to 15 per cent protein matter daily. As more heat is required in winter to keep the pigeon warm, they can be fed more corn, which it will be seen by referring to the table, is high in fat percentage.

By examining the table in the light of these remarks, it will be noticed that the Englishman who fed his runts on peas and beans came very near to furnishing a balanced ration, and by adding a little corn (maize) in the winter months to give additional fat units, he was complying fully with the requirements of these birds.

While the race horse man will tell you that he gets good results with the best grade of oats and good timothy hay for his horses, and this would indicate that such a diet was all that was necessary—but by inquiring more closely you will find that this is used only during the training season and occasionally he will give some bran; and, further, he likes to put such animals on good blue grass to recuperate. Hence he also gives a change of diet.

On the other hand, the dairy farmer producing the best grade of milk in handling his pure bred cows will be found to feed a ration containing many grains, and he will also be found to like a variety of hay and other fodder. In fact, one of the best dairyman in this country told me that he found his cows always gave a slight increase in milk production immediately after the introduction of a new ingredient in his mixture of feeding stuffs. For this reason he bought as many kinds of mill products as possible.

These two examples might be used to represent the racing pigeon man and the squab breeder, and it

is suggested that the reader consider these suggestions from that viewpoint.

This explains the wonderful development and increase in the sales of mixed pigeon feeds, and it is quite evident that such a variety will enable the birds to make some variation by selection from day today. Although the feeder must remember that pigeons have not much mentality and like children will fill themselves up on "candy" if they get a chance. From our view-point, corn is candy to the pigeon, for under most circumstances it will eat the corn before all other cereals.

Perhaps a few remarks about the various foods may help some reader to understand this subject better.

Peas: By these are meant the hard Canadian field peas. There is also available green peas and sometimes there is obtainable a New Zealand "maple" pea. The latter is the kind most favored by the English feeders. It will be noticed that the pea comes the nearest to the balanced ration, or relatively 1:3, of any of the cereals. But it will be found that they are the least liked by pigeons and will not be eaten by them until the corn is all gone from the feed hopper.

There are two reasons for this. One is that pigeons are like the child that likes to have butter and molasses upon his bread—corn is the same as these dainties—and peas being round are difficult for the pigeon to pick up from the floor. Thus they require more exertion and give the bird more exercise. Because they have these faults (?) they are the best to leave before the birds all the time. It has been observed also that small pigeons dislike large peas and especially irregular shaped ones.

Corn: This is our cheapest food and is very desirable for winter feeding. It has been found that hard-working animals can consume large quantities of it without injury and hard working people

thrive upon it even in hot climates. Those who use it most, favor its being fed whole, although it is rather large for some of the smaller varieties. However, when it is cracked, it sometimes has a mould form on the cracked surfaces, and this mould is very injurious to pigeons, causing many of them to die from bowl trouble. Pop corn or flint corn is preferable to the common yellow maize.

Wheat: This is our most widely distributed cereal and the one most sought after by the human family. Pigeons like it and it serves to balance the corn diet. In fact we know of some feeders who use it almost exclusively during the summer months with good results. It is more cooling than peas or corn.

Barley: This cereal is very similar to wheat and almost identical to oats. It differs from wheat in having more ash content and is the same as oats in this respect. Now this ash matter is largely phosphate and mineral matter that is especially desirable for growing stock, hence barley should be more generally used by pigeon men.

Oats: The same as barley, although it has a heavier hull and is less liked by pigeons on that account. Some oats are all hull, and as such are not much good.

Peanuts: These are generally the smaller ones that are too small for human purposes and they are much esteemed by squab breeders. They are very fattening.

Beans: All varieties of beans should be good food for pigeons as they are high in protein content. Because they are rounding in form and difficult for the pigeon to pick up many pigeons will not eat them and the average feeder thinks they are no good. But the larger varieties of pigeons will eat them and they should be in every pigeon's diet.

Rye: This cereal is not much desired by pigeon men, and the main reason undoubtedly is that it develops a mould also which is very harmful to pigeons.

If bright and clean and polished, it could be fed without any harm. But pigeon men had better avoid it, if other cereals are obtainable.

Rice: This cereal is gaining in favor as a human food, but it will be noticed from the table that it is low in protein and thus lacking in the principle element necessary for pigeons. Rice has this quality, however, it is very easily digested and causes practically no irritation in the digestive canal. For this reason it would be a desirable cereal to feed pigeons recovering from "going light" or similar intestinal trouble. For pigeons the "paddy" rice, or rice with the hull on would be better than the clean polished rice such as is used on the table of the human family.

Kafir, Feterita and Milo Maize: These are all very similar to corn, or maize, and differ only by having less fat content. On this account they are very much esteemed by pigeon men and being small make desirable pigeon feed.

Canary Seed, Hemp, Rape, Linseed and Sunflower Seed: These all carry large percentages of oil and are much liked by pigeons for this reason. They are also used by pigeon men to put brilliancy upon the plumage of show birds. They are also used by fanciers who wish to show off their birds, for they act as an extra stimulant and will coax pigeons away from almost all other foods. Hemp seed, however, should not be used regularly in very large quantities as it contains a stimulating element which if fed in large quantities will be injurious.

Squab Feeding.

Squab breeders whose birds breed throughout the year require a very substantial ration as, it is said, the young squab contains nearly 6 oz. of protoplasm, which is almost pure protein.

Inquiry among some successful squab breeders reveals a variety of opinions as to the proper feeding mixture, and they have had to vary their mixtures

during the last few years on account of the high price of grain.

One of the successful squab raisers advises that, if prices were right and the grains obtainable, he would feed a mixture of the following:

Canadian Field Peas	25	lbs.
Hemp Seed	12½	lbs.
Millet	12½	lbs.
Whole Corn (small size).....	25	lbs.
Wheat	15	lbs.
Buckwheat	12½	lbs.

To this add some small peanuts and sunflower seed.

By examining some of the commercial feed mixtures upon the market, it will be found that the best of them for pigeons contain all of these grains, although they may not be found in the exact proportion as here mentioned. But such combinations can be obtained generally at less money than the separate grains can be obtained now and the pigeon man by understanding the requirements of his birds can buy such special seeds and grains as his wisdom dictates and add them at his pleasure, and vary them with the season's changes.

Pigeon Grit.

As explained in a previous chapter, pigeons and all grain eating birds require small stones or grit to grind their food in the gizzard; and in the development of the art of keeping pigeons, it has been found that they require certain mineral substances such as lime, iron, salt, etc., for their general health and well-being. On this account certain enterprising concerns have placed upon the market a special grit mixture particularly designed for pigeons. It is the common practice to keep such grit before the birds at all times, and it is astonishing the quantity they will consume. There is but one caution to be offered concerning this. Some of these mixtures seem to have a variable amount of salt in them, and all mixtures containing salt will usually have enough for

the purpose that no other salt is necessary for the birds. But it is good practice in keeping pigeons to have a lump of rock salt in a box on the floor where the birds can help themselves.

About the Drinking Water.

Everyone knows how insipid water soon becomes when exposed to the air or sunshine, and for this reason alone pigeons should have fresh water more than once a day. The ideal system would be some kind of running water, as water in motion purifies itself. In cities or where an abundant supply is obtainable, this would be possible, and successful pigeon raising will largely depend upon this. On the other hand, if you allow the water to become stale, or leave it exposed so that the dust of the house is allowed to settle upon it, you can look for bowel trouble and similar diseases. Some pigeon men use regularly the ordinary "roup remedy" compound or permanganate of potash in the drinking water. Just enough to turn the water pink. No apparent harm comes from the practice. But if running water is available this doping of the drinking water would not be necessary or advisable as we do not believe in the continual "doctoring" of the birds.

The Art of Feeding.

In the foregoing I have tried to show some of the scientific principles underlying the compounding of the foods for pigeons, and it will now be in place to make a few suggestions upon the art of feeding these foods.

The true guide for the feeder is the general appearance of his birds. If they are lively, active and productive, you can assume that they are in good health. The first sign of disease is usually manifested in the excreta, which should be reasonably firm, of a dark grayish color and tipped with whitish substance, the urea. If they are greenish, brownish,

frothy, loose, or bloody, something is wrong with your feeding or management.

It is by studying these things and knowing the properties of foods that a pigeon man becomes an expert in this science and learns the real art of pigeon-keeping.

Hand Feeding Young Pigeons.

It sometimes happens that one young pigeon in a nest will grow much faster and more vigorously than the other, and in such cases the weaker bird will not obtain sufficient food and dies of starvation. This can be overcome and avoided by the simple plan of hand-feeding the weaker bird. This is done as follows: If it is very young, you can give it some very soft bread and milk. By crumbling up the bread into the milk and adding just a sprinkle of salt, you can give it to the young pigeon by dropping it down its throat with a medicine dropper. The dropper filled with this liquid should be forced down the pigeon's throat. Old fanciers generally take a mouthful of the soft feed and then, sticking the bill of the young pigeon between the lips, blow some of the food into its mouth.

As the young birds get older, you can feed them on small Canadian field peas. They should be soaked in fresh water over night and put into the bird's mouth, one at a time. Be sure that the bird has swallowed one grain before you try to put the second one down its throat. Water can be given with the medicine dropper. The crop of the young pigeon should be slightly distended when fed, but should not be crowded full. They will require feeding three or four times a day when very young and twice a day when older. You can tell by how vigorously they cry for feed, whether you are giving them enough or not. If the young bird is slightly hungry, it will learn to feed more quickly.

One old-timer, when writing upon this subject in *Pigeons & Pigeon Flying*, said: "Care should be

taken that the birds do not take cramp. I have found the best preventative is to keep them upon a kind of gridiron made of small crossed pieces of wood, so placed in a box to allow the air to circulate under the birds."

In feeding young pigeons, care must be exercised to avoid straining them in any way, as a slight twist of the beak of the young bird is apt to twist it permanently.

If something has happened to the parent birds so they cannot care for the young, you will have to keep the young in a warm place. It is very difficult to induce a new pair to take and hover young other than those which they hatch. Old birds, particularly, seem to know their young by sense of smell and, even when we have put young under them after dark, they have been thrown out of the nest or killed during the night.



A MALTESE HEN
Pigeon Showing Characteristic Pose.

CHAPTER IV.

Diseases of Pigeons and Treatment.

In the foregoing chapters I have tried to show the characteristics and functions of the organs and parts of a pigeon, and indicate that a pigeon in good healthy and thrifty condition is a lively and active bird. Hence, whenever a pigeon is sick from some disarrangement of its digestion due to improper food or feeding, or because of some other external cause, it will become dumpish or listless in its actions, will show loss of appetite, and huddle itself up in a corner. It will be our purpose now to try and explain the interpretation of diseases that may be the result of mismanagement or other external causes.

The diseases of pigeons are best classified according to the organ or system of organs affected, and thus we will consider them. This gives us the following classification:

A. Diseases of the respiratory system, which includes colds, catarrh, bronchial troubles, and lung diseases.

B. Diseases of the digestive system, including the crop, stomach, intestines, and the liver.

C. Diseases of the urinary system, or kidney troubles.

D. Diseases of reproduction, including infertile eggs, soft shelled or hard shelled eggs, and egg-bound.

E. Diseases of the nervous system, apoplexy or vertigo.

F. Diseases of constitutional weakness, such as cancer, and going light.

G. Diseases of external nature, such as lice, and external parasites.

Diseases of the Respiratory System.

As pigeons in their wild state migrate more or less as the seasons change, going south to a warmer climate in winter, and returning north in summer to reproduce; and as they have an extraordinary lung capacity, for an animal of their size, as has been shown, it is to be expected that as they undergo domestication and remain in one place from one season to another, that they will be troubled considerably with air passage or lung diseases.

Catarrh.—A pigeon will take a cold just as a baby might, with the result that it will have inflammation of the mucous membrane lining the nose, the parynx or larynx. The symptoms are a discharge from the nostrils and more or less difficulty of breathing due to the obstruction of the nostrils, which have become filled with matter, and choking the nostrils and throat. Simple catarrh is not accompanied by a rising temperature or fever.

Bronchitis or Roup.—Bronchitis is an inflammation of the tubes leading from the lungs to the exterior. This is a more deep seated trouble than simple catarrh. There is a discharge from both the nose and the throat, and there is a "rattle" in the breathing process, caused by the bronchi being filled with foreign secretions which the bird has been unable to discharge.

Diphtheria.—Pigeons are also subjected to a "dry" bronchial trouble which is commonly called diphtheric roup. This is caused similar to bronchitis, but there seems to be dryness instead of the foreign discharge or secretion.

Treatment.

As these troubles have been brought on by weather

changes, the bird should be placed in a warmer or more protected room. There are two things to do: (1) To apply local ointment, oil or salve to disinfect and dry up the passage, and (2) to furnish stimulating and easily digested food to build up the system so as to ward off future attacks. In fact the catarrh is almost sure to be caused by the lack of exercise of the lung passages such as a pigeon would get if allowed to take its regular morning fly every day of the year. And this is proven by the fact that racing pigeons which are in training the year round are hardly ever bothered by such troubles.

To prevent or treat cararrh the commonest way is to put some roup remedy or permanganate of potash in the drinking water. Just enough to turn the water a light rose red. This is not an absolute preventative, but will surely prevent the spread of the disease by your pigeons using a common drinking fountain. The permanganate serves as a germicide and will be sufficient for all mild cases.

For more severe cases you will have to use local treatment, and for this a good plan is to put a drop of kerosene down each nostril by using a medicine dropper and holding the head back until the oil enters the nose. This is a pretty severe treatment. A milder form would be to use 1 per cent menthol in albaline oil or in sweet oil. Apply this the same as the kerosene. It will take several applications to make a cure. In addition to this treatment the pigeon should be fed on nourishing feed. Dry bread soaked in milk is the most nourishing. If there is a loss of appetite you should give it some form of condition powder, of which there are many available. These preparations can usually be purchased as cheaply from supply houses as you can buy the drugs from the druggist to mix yourself. But for the benefit of those who might like to try the latter way we give a formula which should be beneficial:

Carbonate of iron	2 drachms
Gentian root.....	4 drachms
Cayenne pepper	1 drachm
Flower of sulphur	2 drachms
Hypo of sodium	1 drachm
Salicylate of sodium.....	1 drachm

This should be thoroughly pulverized, mixed together and given in two grain doses per day. It can be mixed with a little honey or molasses and moulded into pellets. The purpose of this compound is to aid digestion and build up an appetite.

Treatment for Bronchitis.—As this trouble is lower down in the system it will require more care. The treatment should be similar to catarrh and in addition to this may be given every evening a couple of tincture of aconite pills, procurable at a druggist.

If there is constipation it would be beneficial to give a dose consisting of five drops of turpentine in half a spoonful of castor oil. This is recommended by Dr. Salmon for poultry and should be equally beneficial for pigeons.

Roup or Contagious Catarrh, "Canker."

If you have not used a germicide in the drinking water it is pretty certain that some of the flock will be taken with "roup or canker." This disease manifests itself by a bad smelling, cheesy formation appearing in the mouth, nostrils, or eyes of the pigeon. In my estimation it is the result of a poison taken up by the pigeon by drinking from the same vessel as a bird with catarrh or bronchitis. As this is undoubtedly a disease of the blood there is not much hope of saving the bird, or, at least, bringing it back to a sound breeding condition. Hence, unless the specimen is a very valuable one, it would be cheaper and better to destroy it.

Treatment.—To treat roup you can only try to

remove the "cheesy" formation. The best way to do this is to dampen the blunt end of a match or tooth-pick and dip it into some powdered sulphate of copper. Touch the parts affected with this and allow the bird to rest for an hour or two. The copper will burn the surface of the matter, and after a couple of hours you can entirely remove it with a toothpick. Of course all such matter should be thrown in the stove and burned, especially if you have other fowls or pigeons around, or they may contract the disease also.

After the removal of this external formation you can then give the pellets as recommended under the head of catarrh.

Inflammation of the Lungs.

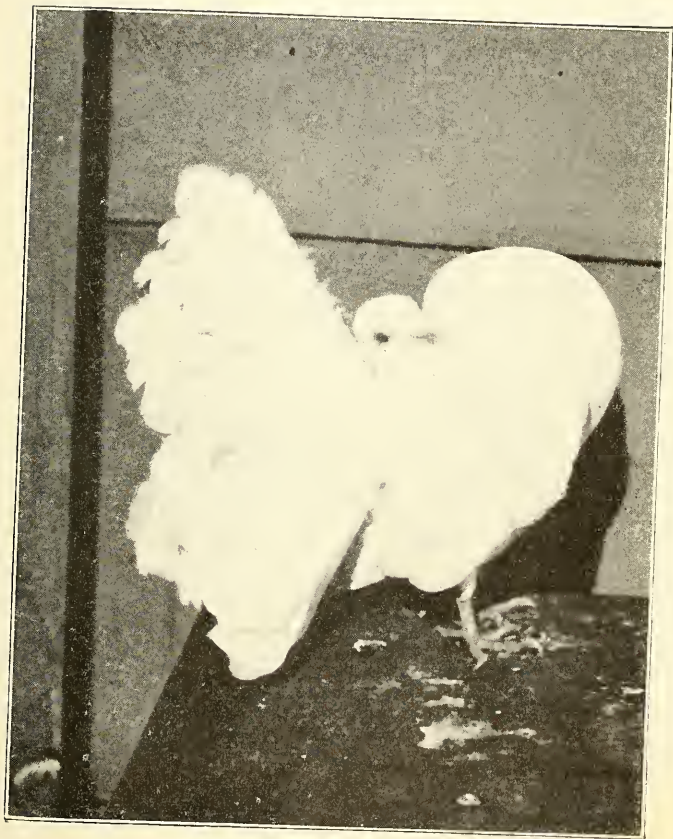
Pigeons also contract inflammation of the lungs caused by unusual exposure to cold and damp weather, especially is this liable to happen to birds confined in small quarters which do not have a chance to take proper exercise.

There is not much that can be done for pigeons in this condition as it causes their death very rapidly, and explains why you sometimes find dead birds in your loft on cold winter mornings. They died of lung congestion which they took during the night.

Emphysema.

This is a disease resulting from an injury to an air receptacle which are located in various parts of the body, more especially on the sides of the neck, or on the wings. A puffing of the skin takes place. This might be caused also by a gun shot wound.

Treatment.—About all you can do is to prick the swelling tissue with a darning needle which has been dipped in a carbolized solution. Repeat if the swelling does not disappear.



A FANTAIL IN HEALTH,

CHAPTER V.

Diseases of the Digestive System.

Sour Crop.—Pigeons are seldom crop bound like poultry, as they do not often get a good chance to eat grass which stops the exit of the crop, but they often do have sour crop. This is caused by eating mouldy grain or sour food.

Treatment.—The best treatment is to remove the cause; that is, feed whole, sound, and polished grain. Do not allow grain to lay on the damp floor from one feeding time to another. There is not much else you can do for this trouble, and if you skip one meal and then give the bird only sound grain there is not much to be feared. If the bird has had access to broken charcoal or a "grit" containing the same, it will doctor itself. However, should you wish to give a pill mix equal parts of powdered charcoal and mustard and make a pill about the size of a pea and give night and morning.

Enteritis or Diarrhea.

The medical name for this trouble is gastro-intestine catarrh or gastro enteritis, and in it the stomach and the intestines are both affected. It is, no doubt, caused by similar changes in climatic conditions to those which cause catarrh of the nostrils, and may be brought on by overfeeding in the fall by the birds' nature causing it to take up more food than it can properly assimilate in its endeavor to procure the necessary heat units to keep its body warm.

The symptoms are a loss of appetite, roughness of plumage and indisposition to move. There is no doubt that all pigeons which are fed by hand only once or twice a day will exhibit some of these symp-

toms after each feeding. When birds eat plentifully the walls of the crop become more than ordinarily distended and they become partially paralyzed and empty slowly. When the bird has true enteritis there will be frequent expulsions of soft whitish, yellowish, or greenish excrement, which is irritating to the cloaca and to the neighboring parts. The droppings gradually become more liquid until severe diarrhea sets in. In the latter stages the cloaca becomes inflamed and the feathers surrounding it become matted with excreta.

Treatment.—See that the drinking water is pure, and it would be beneficial to put a little oatmeal or skim milk in it. Give the bird a teaspoonful of olive oil as a laxative to carry off any irritating matters. and follow with $\frac{1}{2}$ grain of bicarbonate of soda and 1 grain of subnitrate of bismuth in a little water, three times a day.

Of course, if the digestive trouble is due to sour food, it should yield to the same treatment as recommended for sour crop.

Constipation.

Is usually caused by dry, astringent food, or it may be caused by irritation of the mucous membrane. Pigeons troubled with constipation exhibit similar symptoms to gastritis with the additional symptom that they walk with difficulty.

Treatment.—Place some epsom salts in the drinking water, a tablespoonful to a gallon of water, and permit the bird to take more exercise.

A skillful feeder will seldom be troubled with any digestive troubles.

Going Light (Asthenia).

This is a trouble often found in pigeons, especially in the very young and the very old specimens. It is no doubt due to some constitutional weakness which

causes the bird to be very susceptible to digestive trouble, and this results in a chronic condition. Of course, when it appears in young birds it may be overcome by careful treatment and feeding; but there is always the probability that such birds will again take the disease and that they will transmit it to their progeny. Hence it is doubtful if it pays to try to doctor such specimens, and as their excreta is liable to spread the disease they should be destroyed and the place where they were thoroughly disinfected.

Some recent investigations conducted by Dr. A. W. Thomas and printed at length in *Pigeons & Pigeon Flying*, May, 1917, traced this disease to a parasite which attached itself to the large intestine, and that it not only robbed the bird of the nutritive value of its food, causing it to lose weight, although well fed, but it further irritated the bird by causing inflammation within the bowel itself, thereby aggravating the weakened condition.

Other authors claim it is largely due to young birds taking into their systems impurities by eating food soiled with excreta. This is possible, and by such means the larvae of these internal parasites as described by Dr. Thomas would be given an opportunity to be hatched out within the intestinal tract of such bird and, in turn, develop and cause trouble.

Treatment.—First, the specimen should be removed to a sanitary place and be allowed water to drink, but no food, until the crop is emptied. If the bird is very weak, it will have to be fed by hand and such food should be easily digested. Perhaps the best is stale bread soaked in fresh milk. Don't give too much. After, as the bird improves, soaked peas and rice can be given.


Dr. Tresidder, an English authority, recommends a pill composed as follows, be given three times a day:

Alom, grain $\frac{1}{8}$.

Resin of phodyphillin, grain $\frac{1}{8}$.

Extract of belladonna, grain $\frac{1}{8}$.

Capsicum, grain $\frac{1}{80}$.

 Strychnine, grain $\frac{1}{80}$.

As medicinal agents to remove the cause by purgation use castor oil in teaspoonful doses. After purgation use a stimulating tonic and the following has been recommended by Dr. Salmon: Powdered fennel, anise, coriander seed, cinchona, each 30 grains; powdered gentian and ginger, of each 1 drachm; powdered sulphate of iron, 15 grains. Mix thoroughly and make into 200 pills and give one pill twice a day.

.. Liver Trouble.

Pigeons which have not been able to get a proper amount of exercise are subject to liver trouble, which is indicated by the huddled up appearance of the bird, but more particularly by a frothing of the moisture in the droppings. In the advanced stages one wing will often drop and the bird appear to walk lop-sided.

Treatment.—See that the food makes a properly balanced ration. The following tonic pill is said to be very beneficial in such cases: Take pulverized capisicii, 1 drachm; pepsin, $\frac{1}{2}$ drachm; pyro, phos. iron, 1 drachm; quinine, 15 grains; extract of gentian, sufficient for 60 pills. Give two every twelve hours.

Fatty Degeneration of the Liver.

Pigeons when over-fat are troubled with degeneration of the liver. This can best be determined by the layers of fat forming on the abdominal walls, which are a sure indication that the liver is also surrounded with fat. This is caused by feeding food consisting of too much fat forming material, such as corn or maize. The birds in this condition will be more or less listless and inactive.

Treatment.—Drop the corn diet and cause the birds to take more exercise, if possible. Put some epsom

salts in the drinking water. Green food, such as water cress or lettuce leaves, will be found to be beneficial.

Inflammation of the Bowels.

This trouble is undoubtedly caused by irregularities in feeding, such as feeding too much of improper food, or feeding too much at one meal and not enough at another. The disease usually shows itself by the crop filling with water, which is of a greenish color. The bird refuses to eat and is constantly drinking.

Treatment.—Give twice a day of a pill made of five grains of carbonate of bismuth, with a quarter of grain of opium.

Egg Bound.

Young hen pigeons which have been highly fed on fat forming foods during the winter months are often troubled when passing the first egg in the spring. Especially is this true when birds are kept in confined quarters. Birds in such condition will appear all out of sorts. It will go on the nest but will not remain there on account of the pain when such conditions appear, the egg can be felt in the oviduct and if it is not relieved inflammation may arise and trouble ensue.

Treatment.—The best thing to do is to inject a drop or two of salad oil into the vent, using a medicine dropper. And give the bird ten to twenty drops of linseed or salad oil every two hours until relieved. If this fails, it has been recommended that a flannel cloth soaked in hot water be applied to the vent. This latter will generally relieve all cases.

A writer upon this subject in a treatise upon the management of canary birds, says: Should the bird become egg bound, procure some hot water and then take the bird and lay it on its back on some soft place and with a piece of soft flannel bathe the abdomen of the bird with the warm water. The heat of the

water will remove the inflammation and pain and although the bird may flutter at first, it will shortly quiet down. After such application, moisten the vent with not more than two drops of sweet oil and then liberate the bird. Such treatment should be beneficial for pigeons. But care should be exercised so as not to break the egg within the bird.

Soft Shelled Eggs.

Soft shelled eggs are not as common among pigeons as among chickens, for the reason a pigeon does not lay as many eggs in a year as a fowl. But, occasionally a pigeon will lay a soft shelled egg. But this seldom happens when they have access to old lime or proper grit. It is caused, no doubt, by the bird being over-fat, which throws the egg production organs out of order.

Treatment.—Allow the birds to have access to a good commercial grit and give them more freedom and exercise.

Inflammation of the Oviduct.

This is caused by retention of a part of the egg which may have remained through a soft shelled egg being broken in the oviduct. Under such conditions a whitish, shiny liquid will be voided and the bird strains much when expelling it. Sometimes egg matter is also voided.

Treatment.—The treatment must be quick or death will soon follow. With a stripped feather oil the lower parts of the passage, and give ten drops of pure linseed oil every two hours until six such doses have been given, then give only every six hours.

CHAPTER VI.

Diseases of the Nervous System.

While pigeons are, no doubt, troubled with many nervous diseases there are only a few which manifest themselves to us.

Apoplexy.

Apoplexy is the result of a rupture of the blood vessels of the brain and pressure from the escaped blood; hence this disease as a rule terminates fatally. Such accidents are attributable to stimulating food, to over feeding or mechanical injuries; or it may be caused by the violent exertion of laying the egg (hens are sometimes found dead on the nest from this cause). In severe cases the bird will simply fall down in a fit and die. In mild cases the fit is less severe and the bird apparently recovers.

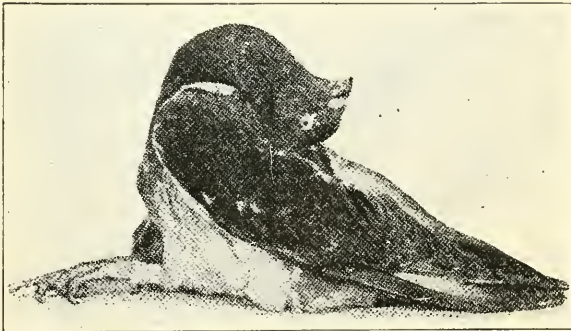
Treatment.—The treatment should be preventive. Feed a greater variety of food and allow more exercise. If the bird is seen to have the fit, and is laying sprawling and kicking on the ground, relief may be effected by holding a hump of ice against the head for two or three minutes and then cooping the bird in a dark, quiet place. Give it a half pint of drinking water in which one-fourth ounce of cream of tartar or baking soda has been added. Gradually reduce the strength of this drink and keep the bird quiet in a semi-dark place for a week.

Vertigo (Megrims).

Vertigo, or megrims, as it is commonly called, is by no means an uncommon disease. It is characterized by convulsive attacks with loss of consciousness which occur from time to time. The head is held in an unnatural position. When disturbed it will walk

backwards, or turn round and round. It seems to "see things" and loses its sense of direction. Mr. Vale in his book on Pigeon Diseases says that he has in his possession a portion of the skull of a pigeon that died of this disease, which was set up by bone pressure. A nail or some sharp pointed substance had, at some time previously, penetrated the skull, causing the growth of bone to form on its inner surface. It is supposed that many cases are due to tubercular disease in the cranial bones.

Treatment.—There is not much you can do for such cases and as the bird will hardly be fit for breeding purposes again it might as well be destroyed. About all you can do is to treat as in apoplexy and give a mild aperient drink to which may be added a little salt. Some recommend bromide of potash, 3 to 5 grains two times a day.



Pigeon in spasm due to an exclusive diet of polished rice.

CHAPTER VII.

Constitutional Diseases.

As I have explained about going light under the head of digestive diseases, it remains to treat only of cancer and rheumatic troubles under the head of constitutional diseases.

Cancer.

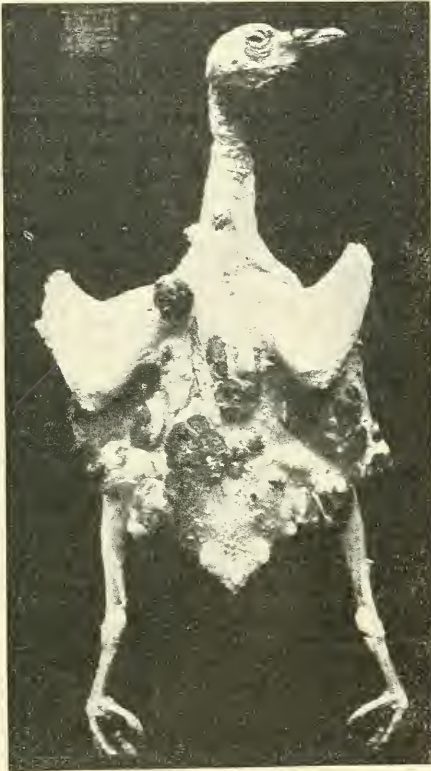
Cancer is somewhat similar to canker as described under roup, but is often found in birds when there is no sign of roup around the place. It is really a tubercular ulcer and may be found in various parts of the body. Of course when it comes on the bill, head, wing or feet it is most easily seen, but such sores, while they resemble cancer, are often the result of accidental bruises caused by fighting or quarreling. The accompanying illustration shows how almost the whole body may be covered with "canker" sores. The causes for such disease are two: a weak condition of the blood, and contagion.

Treatment.—Of course it is folly to try to breed from a bird having this disease, and it might as well be destroyed; especially if it is a severe case. In a mild case, however, a partial cure may be effected and a few more young obtained from such a bird. The treatment should be similar as described for roup. But should the sore be on some external part of the body it would be well to paint the spot for several days with tincture of iodine, using it full strength and applying with the tip of a feather or camel hair brush. This will bring the sore to "a head" and draw out the matter. After this foreign matter is squeezed out paint again with the tincture of iodine to disinfect the wound. A "canker lotion" recommended by Mr. Vale is: Perchloride of iron, one part; oil of

turpentine, one part; and glycerine, six parts. Shake well before applying.

Scrofula.

Scrofula is a similar disease to cancer but of a milder form, and should yield to the treatment and remedy as recommended for cancer.



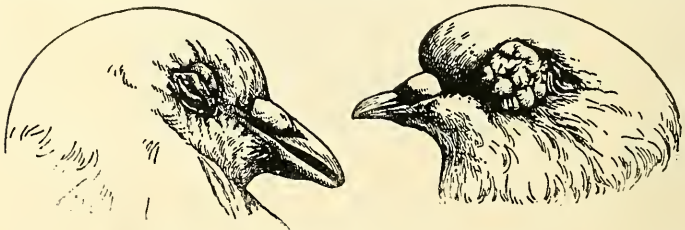
The above illustration shows a pigeon affected with cancer, which is said to be caused chiefly by in-breeding and also by the effects of domestication of animals. Cancer in pigeons makes its first appearance as a slowly growing lump consisting of solid flesh and should be distinguished from abscesses, which are always filled with "pus." It affects old birds more often than young and is not accompanied by any other form of sickness.

Smallpox (So-called) or Pigeon Pox.

This is a tubercular disease (fungoid) of a most virulent and contagious form and is similar to comb disease in fowls. It is found among birds that are closely confined or overcrowded, and compelled to breath the same air over and over again. It is said that the free use of indian corn or maize is apt to put the birds in a condition to be susceptible to this disease. It shows itself by small nodular swellings on some part of the face, usually on the wattle of the nose or the eye cere. By a process of ulceration the tissue around the swelling is soon destroyed and a yellowish sloughing discharge comes away. The disease rapidly extends and the head becomes much swollen or the sores cause the eyes to be closed, shut. These sores are also found in various parts of the body, and resemble the "warts" found on the hands of children. They soon show a central depression, an opening forms, or the summit is rubbed off accidentally, or by the bird's beak, after which there is a discharge of watery, or later of a thick, yellowish matter which soils the feathers and which, if abundant, may become foul and disagreeable.

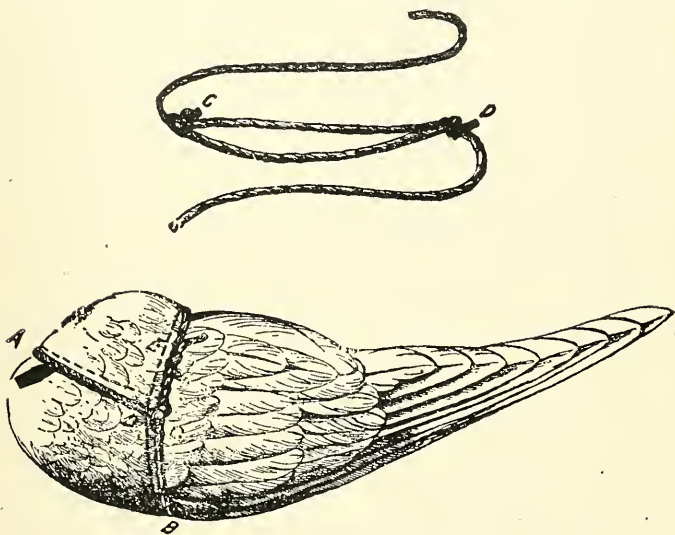
When the disease is local the general health of the bird does not seem to suffer and recovery may be rapid. But as the disease is contagious, the affected birds should be confined in quarters by themselves.

Treatment—The preventive treatment consists in excluding affected birds from the premises, in thoroughly cleaning the pigeon house by whitewashing or spraying them with solution containing three parts carbolic acid and



PIGEONS AFFECTED WITH PIGEON POX.

then opening them to dry out. Some people put a little sulfur in the food or applying an ointment of sulfur made by stirring a teaspoon of sulfur flour into an ounce of vaseline. Or by bathing the sores until they become soft with warm water and soap, and then applying a solution of a drachm of sulfate of copper (blue stone) in a one-half pint of water. This treatment should be



These illustrations show how to tie up a broken pigeon's wing.

accompanied by a general cleaning and disinfecting of the premises.

Gout.

This is the name given to a tubercular disease when it appears on the feet of pigeons and is treated similarly. The joints become swollen and warty looking lumps are formed.

Wing Disease.

The so-called wing disease is similar to gout or cancer. It obtains its name from being a local trouble and it set-

bles usually in one or more joints of the wing causing a lump and the wings to droop at the side of the bird. But drooping of the wings may also be due to rheumatism (which see). When there are tubercular sores it should be treated the same as for Pigeon-pox.

Dr. Cunningham recommends giving one grain of Salol, three times a day. The Salol can be mixed with bread and divided into pills.

Birds suffering from wing disease, or "lump on the wing" as it is usually called, are liable to droop the wing permanently; hence it is a good plan to support the wing in a sling while treating this disease. A sling can be made from some narrow tape or soft cord as indicated in the accompanying illustration. It will be necessary to draw it fairly tight in order to have it hold. To apply get a friend to hold the bird and take a piece of tape sufficiently long and pass it over the shoulder of the wing, and tie in a double knot so it will rest on the secondaries, as shown. Then raise the wing into its normal position and tie the two loose ends into another double knot.

Rheumatism.

Rheumatism in pigeons is usually indicated by inability to walk, although this must not be confounded with the weakness of some young hen pigeons when trying to lay their first egg. But when birds are troubled at other times than the laying period with leg weakness or inability to walk or to fly, it is a pretty safe sign that it has rheumatism. This disease may come on gradually or suddenly and is most likely to appear during damp and changeable weather.

Treatment,—Put the bird in a dry place and feed on easily digested food such as rice, and dry bread. Get some 5 grain tablets of Salciate of Soda and break into four parts. Put one of these down the pigeon's throat, every three or four hours, and you should note an improvement in the bird's actions in 24 hours. If the bird cannot walk place it on a pile of dry hay or straw so it can lie comfortably. If you can locate the part by noticing that it is hot and feverish you can cause relief

by rubbing the place with Oil of Wintergreen. Just put a drop or two on the spot and rub in.

Cholera.

This is a contagious disease caused by a bacteria and easily transmissible. It is mentioned in some of the oldest works of diseases of animals. It attacks all kinds of domesticated poultry and affects some species of wild birds. The infection generally starts by the bird drinking water contaminated with the excreta of sick birds; although it is possible for birds to be infected through sores on their skin or by inhalation of the germs in the form of dust suspended in the air.

The first sign of the disease is the yellowish appearance of the urates or that part of the excreta voided from the kidneys; this latter in the healthy pigeon is pure white, although it may be tinted yellow from other causes than cholera. While this coloration is not an infallible sign, such birds should be removed from the rest of the flock and watched carefully. The next indication of cholera will be diarrhea in which the excreta consist of a frothy mucus. In later stages the urates change to green and the bird becomes very weak as in "going light." Its crop will often be distended with food and apparently paralyzed.

Treatment.—According to Dr. Salmon there is not much hope of saving a bird which has become affected with true cholera. Many of the remedies said to be useful have never been tried on true cholera. The best method to pursue is one of disinfecting by whitewashing the whole house with wash containing 5% carbolic and whitewash the floor as well as the ceiling and walls. The ground of the fly should also be sprayed white or sprinkled with lime and spaded up thoroughly. Hence the best remedy against cholera is to thoroughly disinfect by whitewashing or painting at least twice a year. There is not much you can do to treat such a bird. The treatment would be the same as in going light.

CHAPTER VIII.

Parasites.

While there are over fifty-kinds of lice which infect poultry, there are only a few commonly found on pigeons and these may be divided into three groups.

A. Those which live upon the body and bite or gnaw the flesh.

B. Those which live upon the feathers or skin, some of which are seemingly unharmed, and

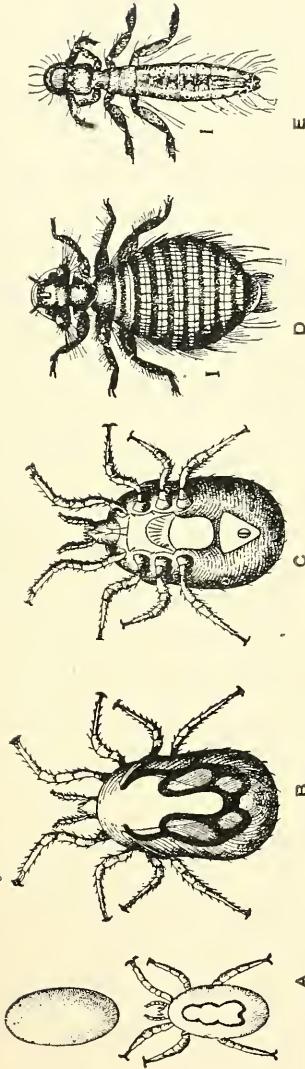
C. Those which live in the connective tissue, or intestinal canal.

Class A. Spizoa.

Those in class A are called spizoa and usually they suck blood or bite the flesh. These do not remain constantly upon the birds but leave them at certain periods and under certain conditions to hide about the nest and in the cracks of the walls of the building. While on the bird they puncture the skin and suck the blood for their nourishment. According to Dr. Salmon, "the coleopeterous larva gnaw the skin and even the superficial muscles of the neck and abdomen of young pigeons, producing serious wounds which often cause death.

"The bird flea is commonly found attacking pigeons and the dove cote bug, which resembles the ordinary bed-bug, and by some is thought to be identical with it, also torments pigeons. The tick also lives in pigeon houses and hides during the day in cracks and holes, coming out at night to attack the birds and showing preference for young pigeons, which often die of exhaustion due to loss of blood in from 10 to 15 days. The older birds tormented by these vermin are driven from their eggs and thus pigeon raising becomes very difficult."

"The red mite, or *dermanyssus gallinae*, is the most common and most perniciously active of all the parasites which attack birds. It is from 1-35 to 1-40 inch in length,



THE PRINCIPAL LICE THAT INFEST PIGEONS.

- A—Dermanyssus gallinae. Egg and young mite. Magnified 75 diameters.
- B—Dermanyssus gallinae. (Red mite.) Magnified 75 diameters. Upper surface.
- C—Dermanyssus gallinae. (Red mite.) Magnified 75 diameters. Under surface.
- D—Menopon latum.
- E—Lipeurus columbae.

yellowish, white, or dark red in color, according as it is fasting or is more or less filled with blood. This parasite hides by day in the crevices and corners of the buildings, nests, perches, floors, etc., where it may be found in great clusters, and at night the individuals composing these clusters scatter themselves over the birds, and by pricking the skin fill themselves with blood. They are injurious not only on account of the blood which is abstracted, but because of the itching, pain, and loss of rest which is a necessary consequence of their activity.

“Young pigeons, chickens, and cage birds are the greatest sufferers; their skin becomes pale and bloodless, they lose their usual vigor and alertness, become emaciated, and finally die from exhaustion. The red mite is not usually found upon the fowls when they are examined during the day, for its natural tendency is to confine its foraging to the night, but when it is allowed to multiply until very abundant, the birds are infested both day and night, and it becomes, apparently at least, a permanent parasite. According to Zurn, these mites sometimes enter the nasal cavities of young pigeons and chickens, and set up a catarrhal inflammation, and they have also been found in the external openings of the ear.

The red mite may get upon people and cause considerable itching and some irritation of the skin and it may, also, attack horses and other animals stabled near the pigeon house. It causes horses to rub and bite themselves, the hair over the affected places is lost, and there is an eruption similar to that which occurs in the common mange.

Class B, Epizoa.

The epizoa of our second group are all mites. The *Epidermoptes* cause a form of scabies characterized by the production of dry, grayish, yellow crusts of scales. The disease is seen on any part of the body, but only rarely about the head.

The *Sarcoptes laevis* produces the true scabies of pigeons. The skin is not much affected but the feathers break and are shed from the affected surfaces. This dis-

ease and the scabies of the legs will be treated with all necessary detail at the end of the general article on the epizoa.

Class C, The Mites.

"The third class, which live in the connective tissue and air surfaces, might, perhaps, be more properly placed among the entozoa. They are all mites, and some of them pass a portion of their existence upon the surface of the body. It is most convenient, therefore, to consider them in connection with the other mites. The *Cytodites nudus* lives in the air sacs and connective tissue of fowls and pheasants. They are found in the trachea, bronchi, lungs, and the various air sacs including those of the bones. They have also been reported as found in the thoracic and peritoneal cavities. Some authors state that they have observed them in yellow, miliary tubercles of the body cavities, lungs, liver, and kidneys. Large numbers of the *Cytodites* may exist in the air sacs without their presence being suspected during the life of the bird. When they are very numerous in the bronchi, they cause irritation of the mucous membrane, catarrh and coughing. Megnin states that they may cause death by congestion of the bronchial tubes. Gerlach and Zundel believe the *Cytodites* may cause enteritis and peritonitis. In small numbers these mites are not very injurious, but when birds are badly infested they become anaemic, lose flesh, stop laying eggs, show catarrhal symptoms, droop and die.

"The *Harpirhynchus nidulans* lives in tumors of the skin on pigeons and sparrows. When present in small numbers only it is nearly harmless, and, at most, causes slight local irritation and disturbance to the growth of feathers. If very numerous, there is impaired nutrition, loss of flesh, and frequently a fatal ending.

"The *Falciger rostratus* of the pigeon, which is really one of the feather mites, is able to introduce itself into the connective tissue beneath the skin, which it enters by way of the feather follicles, and there spends a portion of its life. Robertson examined a considerable num-

ber of both wild and tame pigeons and rarely found the connective tissue free from this parasite. He found it chiefly in the subcutaneous connective tissue around the large veins of the neck, and on the surface of the pericardium. No disturbance of the health has been observed to result from the presence of this parasite.

The lice of birds vary greatly in size, the largest varieties being one-sixth of an inch long, and the smallest not more than one-thirtieth of an inch in length. Lice are to be found everywhere because the birds of the air carry them from place to place and while you may be free from them today; tomorrow a bird may drop some in your coop and your troubles will begin all over again. But there are preparations with which the pigeon keeper can successfully fight these pests.

Treatment.—Perhaps the most beneficial thing to help pigeons rid themselves of lice is the clean water bath, and this, of itself, should rid the bird of any that might have remained on the body. But it will not destroy those which have left the body during the day to hide and lay its eggs in some crack and crevice of the building. To destroy these, you must occasionally whitewash the building. This should be done at least twice a year. And there should be a constant use of some good insect powder. Dalmation insect powder, obtainable at all drug stores is good but it is too expensive for general use. There are some good preparations on the market for this purpose but some of them contain such a large percentage of naphthalene flake that they cannot be used successfully around the pigeon nest. In fact, if you will read the printed directions on some of them it says "Do not use within 5 days of hatching time." So if lice are found in a nest at this period you are helpless. There is one powder, at least which can be used any time, and as it is advertised in the Pigeon papers we need not mention it here. It can be dusted over one-day-old squabs without harm and without causing the old birds to "stay off" the nest or hesitate about feeding them. And

as in the warm weather of July and August, we get a new crop of lice every few days from the eggs which are laid, it is necessary to use some such powder freely in the nest every seventh day.

Another treatment recommended by the Reverend J. Lucas in his work on the "Pleasures of a Pigeon Fancier," published about 30 years ago, is an ointment compounded of one-fourth pound of blue unction, and one oz. of lard. Place the two ingredients in a small pot near a fire until they melt and then let stand until cool. It is then ready for use. "Twice a year," says this author, "I inspect every bird on the premises and I never admit a new purchase into the loft without its first undergoing examination, which is generally needful."

"Apply the ointment sparingly. Holding the bird in the left hand, place a piece about the size of a pea on the tip of the forefinger of the right hand; put it on the bird on the affected part, the heat of the bird's body will melt it and spread as much as possible. A place where insects love to congregate is under the lower beak. Here they lay their eggs and dwell at ease, for the bird cannot molest them. The eggs are attached to the root of the feathers. They are small, round and whitish—sometimes half a dozen will adhere to one feather. Gradually they multiply and spread around the head and in a day or two the nits will be shrivelled to nothing."

Another has found that it is wise to rub some of such ointment in a circle around the vent of the bird on the supposition that the lice will go to the vent to get moisture. We have never tried this on pigeons, but it works well on poultry. This product is a poison and too much should not be used at one time.

CHAPTER IX.

Miscellaneous.

Egg Eating.

We have never heard of pigeons eating their eggs, in fact, they do not seem to touch them when found on the floor broken.

Salt Cat.

As some of my readers no doubt, will have heard or be told to give the sick pigeons "Salt-Cat," I will give a formula for this compound as given by Mr. Woodhouse, one of England's most famous breeders of Short Faced Tumblers, but who is now long since dead. His formula was:

I peck of sifted loam and clay, 1½ pounds of flour, together with 1 handful of each of the following: cummin, aniseed, ground cloves, carraway, fennel, dill, fenugreek, powdered assafoetida, common salt, bay salt, linseed, canary, hemp, ground all spices. Mix well together dry, then add water and mix stiffly. Make into three lumps and bake in a slow oven for one hour.

Note:—In this compound I would recommend to American pigeon men that they use fine sand instead of "loam."

Shivering.

This is a peculiar condition sometimes found in pigeons. They will stand all huddled up and shivering all the time. This, however, must not be confused with the trembling "shaker" fantails. Shivering indicates that there is something wrong and it would be well to treat the same as for liver trouble, or simply give a tonic and see if the bird does not improve.

Moping.

In visiting pigeon lofts we often see a bird "moping" or sitting off in a corner all huddled up. This is called moping. If it is not due to lice, it is due to some disease

mentioned in this book, and search should be made for a cause. Of course, all pigeons will apparently "mope" some after a full feed and in so doing are simply taking a "nap" like many people do after a hearty meal. Moping is quite likely to be caused by over feeding or irregular feeding. The old time fancier used to cure such cases by pulling out all the tail feathers of such birds. They would hold the bird firmly with one hand, and with the other grab all the tail feathers and pull all of them with one jerk. The bird would seem to pick up. No wonder, this would be a shock which would require a lot of additional food to build up another lot of tail feathers.

The Moulting and Its Management.

It may seem a little out of place to take space to tell about the moulting of pigeons in a book on diseases, but I am convinced that far greater success would be achieved by all who raise pigeons if they would only consider this phenomenon as a period of sickness and give their birds special care and attention as if they were really sick.

The act of shedding of feathers by birds is peculiar and is one of the chief evidences of the common ancestry of birds and reptiles as they both discard their external coverings at stated periods.

The earliest indication of the moult is the shedding of the first primary flight and this is likely to occur as soon as the birds raise their first pair of youngsters; and, as soon as this feather is fully grown the next one on both sides is ejected. After five or six of the flights have been regrown, the smaller feathers of the wing will begin to shed and a little later the body feathers will drop out.

In the tail, the first feathers to moult are the two outside ones, next come the next two and the center ones are the last. Of course, a healthy pigeon will have a normal moult, and the weak ones will moult badly; hence to watch the moult is a pretty good way to determine the health and vigor of your flock. If conditions are unfavorable and the weather is changeable, your birds may get a set back which will affect them for the remainder of their lives. There is no question but that the moult

is a severe strain on the system and should have the best of care at such time.

To give good care means generous feeding of all essentials and you must not be discouraged if there is a let up in the breeding operations. In fact it is because of this extra strain that many fanciers separate their birds in July when the moult is in full swing, and they keep them separated until next breeding season. If the moult does not progress as it should, it would be a good idea to give a tonic and keep some iron in the drinking water. The tincture of iron is best. Fifteen or twenty drops to the gallon of water is about right.

Feather Rot.

While I have never had experience with Feather Rot in pigeons, but have heard of it and find it is most fully treated in the work on Pigeon Diseases, by "Squills," hence it is copied herewith. He says:

"After most careful consideration, I am inclined to think the disease as we know it in England, must be classed under three different headings: (1) Disease of the Blood; (2) Skin Disease, Parsite; (3) Atmospheric).

"The symptoms are that the feathers become rotten and fall out. First the chest is attacked with bare patches, then follows a looseness in the shoulders and wing coverts.

"In cases 1 and 2, the symptoms are generally as described, but in the case of 3 the flights and tail apparently become brittle and rotten, the webbing breaking off in flakes and particles and having the appearance as though eaten by some feather devouring mite. The disease generally makes itself known in the breeding season.

"Cause 1, disease of the blood, is due to the kidneys not doing their work properly. Earthiness of the system arises and there is no proper secretion to the feather glands.

"In the development of the feather there is first a small bulb, which subsequently bursts its covering and by gradual stages the new feather becomes fully developed.

“Let a check take place whilst a flight feather, in fact any feather, is in a state of partial development, and it will be noticeable that the feather is marked with a stain from side to side. Even the smallest feathers can be fret marked in this manner. Again, who has not seen youngsters in the nest with long, pipy feathers, which, for some cause, refuse to burst, or the old birds, growing blood quills, which, if damaged in this state, will burst and a disease of shrivelled feathers be the outcome?

“If I am right in assuming that one form of the disease is due to kidney trouble or blood disorder, what is the best remedy? I have noticed that the disease in this form is most prevalent in localities nearer the sea, especially where salted grits are obtainable in abundance.

“If the Gizzard and Kidney are given too much work to perform, the blood immediately becomes disordered. Improper grit, salt cats that induce birds to eat more grit than is good for them induces the disease more quickly than anything I know.

“In case of a valuable bird that is affected, a cure may be effected by the following treatment. After the moulting season, separate the subject and do not allow it to breed in the spring. Feed on good peas, tares and beans; not too old. Avoid hemp seed, canary seed or small heating grains. Do not use artificially salted grains until patient is well.

(2) “Skin disease—Arcus. At one time I considered the feather rot in all forms due to one and the same cause; but careful examination of the subject has convinced me this is not the case. When it is caused by kidney disorder the bird loses its power of flight, but when caused by a parasite the bird flies as well as other members of the loft.

A remedy I tried in a serious case was to remove the feathers around the affected part and thoroughly grease the skin of the bird with an ointment made of vaseline and sulphur and give an aperient and tonic pills.

(3) “Atmospheric. This form of the disease consists of the breaking of the ends of the flights, brittleness, rotting of the web of the larger feathers such as the tail

and flights. In my opinion, this form of the disease is due to the loft being unsuitable, low temperature of the birds, and ammonia permeating the atmosphere. Thus, over stables, where horses are kept underneath, in crowded, humid lofts, where dung is allowed to accumulate or the floor and ammonia arises, or in lofts situated in marshy districts, where the birds are always living in a state of humidity.

"The remedy lies in such immediate alterations of the lofts to insure absolute dryness. Plenty of sunlight should be admitted into the loft and the birds fed on sound, dry well-harvested grain."

This author has evidently given some thought to this subject and in the main his diagnosis is correct. I do believe, however, that 1 and 2 symptoms as "Squills" describes are simply two stages of the same trouble. Or, perhaps I had better say 2 was contracted by contagion form of No. 1. In my opinion the trouble is a form of scurvy such as sailors who have been on a salt meat diet for a long time contract. For this then, I would recommend unsalted grit and grain; and if some green stuff such as lettuce or water-cress could be obtained, it would be beneficial. Just make a small pocket on the side of the coop of one inch mesh of woven wire, and put the greens behind it and you will soon see it disappear.

Pigeons must have grit to produce feathers and when it is excessively salty it will disarrange the system.

For the No. 2 form, I would suggest a similar method of feeding, but in addition I would wash the parts twice a day with a saturated solution of Hypophosphate of Soda. Two or three applications will cause the parasite to disappear.

The No. 3 form is, perhaps, the most difficult to handle and it evidently occurs most frequently in old birds and it is undoubtedly due to impure air being taken into the system. If it is due to ammonia gases as described, a lump of Sulphate of Iron in the drinking water should be a corrective; and the pigeons should be given a tonic of some kind.

Young Dying in the Shell.

In the spring of the year, especially with the first round of eggs, we hear of many young pigeons dying in the shell. This is due to two probable causes: (1) Owing to the shells being unduly hard or the young being unduly weak; (2) owing to the old birds leaving the eggs too long to obtain food for themselves on a cold day.

As both of these troubles are due to what might be called "natural causes," or causes which are in the nature of the parent birds they are difficult to overcome. About the only thing you could do provided the parent birds are tame and will let you put your hand in the nest, would be to visit the nest with a cup of hot water night and morning after the 14th day and dip the eggs into this water for a moment or two or as long as you can hold your hand in it. The water should not be over 104 degrees F., this will open the pores of the outer shell and the warmth will put more vigor into the youngster.

Disease of the Vent.

Sometimes female pigeons, when laying will displace the vent and unless attended to inflammation will set in. This also may be caused by a tumor in the cloaca.

Treatment,—If any part of the internal organs come out they should be greased and put back. The vent should then be washed with a strong solution of alum water several times a day. The bird should be kept quiet by itself and fed sparingly. Do not allow such a bird to mate until thoroughly well.

Barren Hens.

Dr. Chas. L. Lang, some time ago offered in Pigeon News, the following remedy for barren hens: One quarter grain each of willow charcoal, powdered capsicum, extract of nux-vomica, and pepsin, made into a tablet and dropped down the bird's throat at night. He adds: "While the nux-vomica is poisonous, I have tested it by dropping two such tablets down a squeaker's throat, only a week old, without any serious symptoms."

CHAPTER X.

Surgery.

The surgical operations which it is possible to perform with safety especially by the novice or uninitiated are very few; and some of these operations should not be attempted until you have seen them performed by someone with experience. With this precaution, I will try to explain how to handle some of the simpler ones.

Before trying to perform an operation on a pigeon, especially if it is likely to bleed, the operator should wash his hands in clean water into which some carbolic acid has been added: one part acid to 200 parts water.

The knives or instruments to be used should have all been immersed in a similar water and this must be done before passing from one bird to another, when more than one bird is to be operated upon. Mr. Vale says he has removed entire wings and legs from the body of a live pigeon and they have soon recovered.

Trimming the Beak.

Pigeons kept constantly on a board floor or on soft earth, often grow a long upper bill and this is especially true on some of the shorter billed varieties.

Should this be allowed to grow too long it will prevent the bird from picking up grain and it will starve to death. This hard horny tip of the beak can be trimmed off with a sharp pen knife. It is more easily done when you sharp knife soon has all the excessive growth trimmed off. You must be careful, however, and not cut away too much. You can tell how much you can trim by holding the bird up to the light and you will see the tip which is clear. As this beak is like the finger nail of a person, it does not hurt to cut it away, but as you get down close it will hurt and if you get too close it will bleed.

Through such experiment some fanciers learned that the trimming made the bills of the short faced birds look better and they often practice it before show time; but should a judge be able to detect this operation he would be justified in throwing out such a specimen.

All beaks which have been trimmed will grow out again; hence I would advise to refrain from trimming unless it is absolutely necessary. If the birds are fed upon a flat stone or cement surface, it will keep their beaks short enough.

Trimming Toe Nails.

What has been said about beaks applies fully to the pigeon's toe-nails. In trimming the toe-nail, however, you should try to cut it so as to leave it in a normal and natural shape. Do not cut it off square with a pair of nippers as I saw a fellow do once. It is better to use a sharp knife and the tip should be left somewhat pointed. Long toe-nails is a sign of old age and a bird with an old band and short nails indicates that the toe-nails have been cut.

Broken Bones.

Sometimes an accident will happen and your pigeon's leg or foot will be broken. This will soon heal and the bird will recover, if you set the bone properly. To do this use some thin card board cut into narrow strips and after the bones are put in proper place the strips should be laid around the broken part and bound snugly with narrow tape. One author recommends dipping the limb into a fresh solution of starch to which a little powdered alum has been added. If it is the foot, it has also been recommended that a small stick be bound to the foot in such a way that it will extend one-eighth of an inch below the foot in the outer folds of the bandage. Of course pigeons with broken bones should be kept in a semi-dark pen by themselves and should be allowed about 14 days for the fracture to heal before cutting away the bandages.

Trimming "Spouts."

"Spouts" is the name given to a spout-shaped condition which is sometimes found in Carrier, Barbs and Dragoons or birds with large eye-ceres. They usually form below the eye, first as a small pocket into which the eye secretions fall and later they bear the eye-cere outwards making a small spout. As soon as observed these spouts should be nipped off. You must be careful and not take too much or they will bleed and if you do not take enough it will form again. Hence the first operation should be performed by one with experience and the novice can watch closely and study how.

In an English work on Carriers, I find the following: "It is the heavy, fleshy eye that is the obomination, and that gives the greatest trouble in this direction, for if such as these are neglected other troubles to the eye will set in. A cluster of these nodules will form inside the lash in the vicinity of the spout, which must greatly irritate the eye-ball, so much so that the whole eye becomes an outlet for a constant discharge of the most offensive humors, the bird being found every morning with both eyes glued up, which you have to open before it can see to feed, and if a bird in such a state is allowed to mix with others they are liable to get infected in the same way. Such birds are a terrible nuisance, and should be avoided if possible and they give more trouble in winter than in summer time. Some fanciers advise these grapes as they are called, to be stripped and skinned clean out; but the operation destroys the mucous membrane and canker is almost sure to set in, and then it is "best to slay." The best plan to relieve the eye is just to nip off the heads of these nodules when they will discharge themselves and shrivel up. This generally entails a great loss of blood, but a little Friar's Balsam will usually stop the bleeding. There is nearly always a large spout to be cut away at the same time, and I often think unless the bird is of some great value as a stock bird it is far preferable to put it out of its misery. In cutting an ordinary spout, I very seldom do anything more than remove the spout, letting it heal under its own blood."

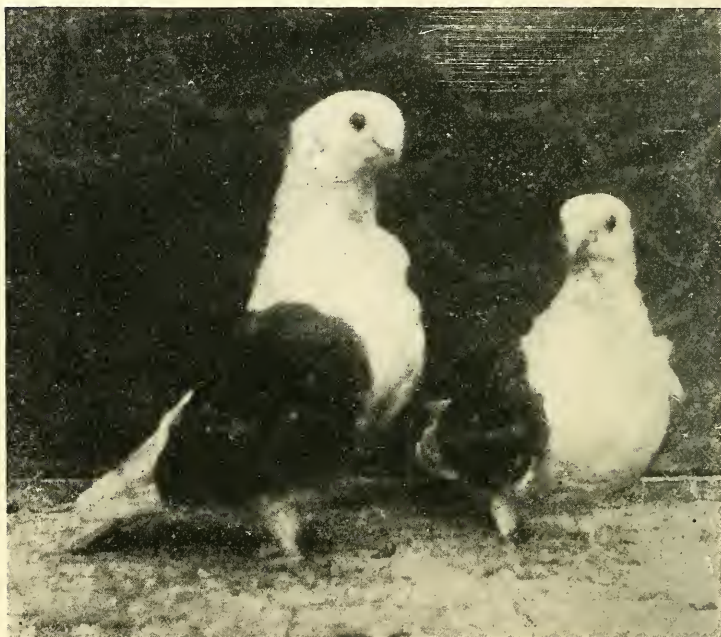
Broken Flights.

Lt.-Col. J. Long, who, by the way, is also a physician, gave the following method of mending a broken flight or treating a twisted tail feather, in *Pigeons & Pigeon Flying*, June, 1915:

“The way to treat a twisted flight tail feather is to prepare a kettle of boiling water. Then bring the bird to the kettle which should be kept over the fire so it will be hot. Straighten out the feather and holding it in its proper place, hold the bird over the steam for a minute or two, then place the bird carefully back in the loft. This operation may have to be repeated more than once, for, if neglected, the flight will eventually be broken.

“To mend a broken flight, or tail feather, great care will have to be taken. The broken flight, if one of the new ones, or a flight that is not likely to be dropped until after the races, will have to be mended to give the bird a racing chance. Proceed as follows: First, secure a small bottle of fish glue or glass cement, a small clean table, a pair of scissors, a dropped flight of same color, if possible, from some other bird, but the color does not matter. Have an assistant hold the bird with wing outstretched, then cut through the calamus, or shaft as straight as possible, leaving a bevelled edge to the shaft. Also then cut the dropped feather so it will exactly correspond and match the end of the feather on the bird. Next take a piece of a broken needle and holding it in a pair of pliers, make a hole in the end of the feather about half the length of the needle. Next make a corresponding hole in the piece of feather to be joined and gently fit the two together. When this is done the joint should match perfectly. Next separate the parts again and smear the needle half way with cement and place it in the end of the wing feather. Care should be taken so that not too much cement is used or it will get onto the webbing of the feather and cause trouble. When the cement is dry, which will be in a few minutes, place a little

cement on the remaining part of the needle and again join to it the piece of flight already prepared. In a few minutes the cement will have hardened and then leave it alone. Don't try to see how strong it is or you will cause trouble. If you have done the job well, all will be right and the bird will be able to win a race."



A PAIR OF TURBITS ILLUSTRATING DIFFERENCE IN SIZE
BETWEEN MALE AND FEMALE.

CHAPTER XI.

Special Information.

Determining the Sex.

It is difficult to explain to the novice how to determine the sex of pigeons and occasionally it is very difficult for the old-timer to pick the male from the female, especially during the winter months. But, generally speaking, pigeons are slightly different in size, the females always being smaller.

To do this correctly it is necessary to permit them to fly about with other birds the sex of which is known. If it is a female, other males will fly to it and "coo" around it. If it is a male the other males will fly at it and drive it away.

It is also said that a female in "cooing" will never turn or twist its body in a circle, while a male always does this.

Other methods are sometimes used by fanciers, such as holding the bird between the palms of the hands, and swing it in the air. If it holds its tail down, it is said to be a cock, and if it raises it, it is said to be a hen. But this is not an infallible test. Watching the pigeons perform in a flying pen is the safest and surest.

Washing Pigeons.

Fanciers who live in communities where soft or bituminous coal is used, will be compelled to wash their birds before they will be in the best condition for showing. This is not considered "faking" by pigeon judges as it is simply doing what the bird would do itself if it had a chance and the weather was right.

To many the washing of a pigeon may seem a difficult task, but it is comparatively easy and should take only a few minutes after you have everything ready.

What is needed? First you need a place to warm, or dry the birds after washing and this will have to be fixed before you begin to wash. A good method for city fanciers would be to place a clean box on a chair alongside a steam radiator that was good and hot. Or, if there is hot air heat, a box placed so the hot air would strike the interior would be an excellent plan. For people in the country who have stove heat, a box placed alongside a good hot fire will answer the purpose.

This box need not be too large as the wet bird will not flutter much and cannot fly until it gets partly dried. Then it would be well if you had a muslin or sheeting curtain that was fixed so as to hang over the front of the box, or between the bird and the source of heat.

Next, you will need three basins with water sufficient to fully immerse the bird. I have found a dishpan to be useful for this purpose. You will also need two rinsing waters, and for them I generally use a common pail with enough water in it to completely cover the bird.

The first water should be so hot you can just put your hand in it. You will also need some good soap, such as Castile, Ivory or Wool, and a nail brush and towel. In the second and third vessels, put luke warm water sufficient to cover the bird. The second water is to rinse off the soapy water, and the third water is to complete the rinsing. For white birds, it is sometimes beneficial to add a little blueing to the third water. But do not put in too much, or you will have blue birds instead of white ones.

Pigeons should be washed several days before showing, and the way to proceed is as follows: Dissolve some borax in the water to soften it, then with your hands and soap make the water soapy. Next immerse the pigeon until it is good and wet all over. Of course, keep its mouth and nose out of the water. After the feathers are wet, you can scrub them pretty hard with the nail brush without doing them any

harm. For this purpose you can lift the bird out of the water and scrub the wings and feathers until they are clean. You will soon see them getting whiter. After you have the flights, tail and body feathers clean, you should wash the head feathers. For this purpose a sponge is very good, and try to prevent the soapy water from getting in the pigeon's eye. When you are sure that the bird is clean, you can next put it in the second water to rinse off the soap. After the soapsuds are pretty well off, you can then put the bird in the third water for a final rinsing. Then it should be dried off with a clean towel by rubbing the feathers along the way of the web, and put in the drying box. When the feathers begin to dry the bird will preen itself and straighten them out. By washing several days before the show, you can tell if you have done a good job, and if not you can try it over again. Of course, after washing the bird, you must be careful and keep it in a clean coop or it will get dirty again. If you get too much blueing in the water you can wash the bird again and it will look all the better for it.

Many fanciers do not wash their colored birds, but they would certainly look better for it.

Mating Pigeons.

Pigeons always breed in pairs and, unless some accident occurs, a pair of pigeons allowed to remain together will remain true to each other in a loft with many others.

Should you have two pigeons, male and female, that you desire to mate, the way to proceed is as follows: You should have a coop about 18 inches by 24 inches and 18 inches high, with a wire division between. If this coop is placed away from other birds, all the better. Into one side of this coop, place the male and into the other place the female. They may not pay much attention to each other, especially so, if they have recently had other mates. But in spring or early summer, they will usually notice each other in a short

while, and this is shown by the male cooing and showing off in front of the female. After a day or so she also will parade in front of the male, and then you can remove the wire partition. When this is done, the male may attack the female with its bill and she may strive to get away from him at first, but later, they will make up and put their bills together like when a pigeon feeds its young. This is called "billing," and when they do this normally, they are said to be mated and can be removed to the nesting place in the loft where you expect them to breed.

They should be confined in such a place until the female lays its two eggs, which will be about nine days after the "billing" date. After they have laid, they can be liberated and allowed to fly with the rest of the birds.

Pigeon fanciers usually remove the first egg laid and in its place put a dummy.. For dummy eggs, some use artificial ones; others use old or stray eggs they may have handy, while still others use eggs made from plaster of Paris by blowing out the contents of a worthless egg and filling it with the plaster of Paris. The second egg is usually laid the second day, and then, of course, the first egg is replaced. By this method, both young should hatch within an hour or so fo each other and they will thrive more equally.

Pigeon eggs hatch in 17 days. Sometimes they go 18 days, but if they are not hatched in that time, they are not much good.

Pigeon eggs are sometimes removed from a certain pair and placed under another pair. Care must be taken, in doing this, to be sure the new pair laid the same day or not more than two days off. The reason for care in this respect is that, when the young pigeons come, they must be fed first upon a milk which is secreted by the parent birds, and in nature this will come at the right hatching date. If, by changing the eggs, the hatching date is delayed, this

“pigeon milk” will come too soon and cause trouble with the old birds.

The old pigeons will feed their young in the nest for about four weeks, and then the young will want to get out and after that date will be found out of the nest and upon the floor. When they get out of the nest they will soon begin to eat grains from the floor, but still they will beg food from the old birds until they are nearly six weeks old, and even longer, if the old pair do not go to nest again. Usually the old pair will start to make a new nest about two weeks after hatching date.

The male and female both take turns in incubating the eggs. The female will remain on the nest all night until about 9 o'clock each morning and the male will then take his turn until about 3 in the afternoon, when the female will return to the nest for the night. Both birds also feed the young, but the female will not continue this very long, if they start to make a second nest.

Pigeons always lay two eggs. If more are found, there is something wrong. Two hens have been known to mate and lay four eggs, which, of course, were infertile and did not hatch. Pigeons that are good breeders, will take care of more than two young, and it would be possible to give such a pair four eggs to hatch. But this would be rather trying on the old birds, to raise four young, and it is not to be recommended.

Some squab breeders have tried using a male on two females, with fair results. The way they did was to have two pens and put the male with one hen until the eggs were laid and then remove the eggs to another pair, and put the male with the other hen until she laid, when the process was repeated. While this might work all right for a couple of sets of eggs, I cannot recommend it as a good rule for continuous practice.

When at liberty, pigeons will build their own nest

by carrying to it stray, sticks and leaves. In aviaries, you must furnish something for this purpose and the best thing is tobacco stems, as the odor tends to keep away pigeon lice and the pigeons do not seem to mind the odor. When they are dry, they will absorb considerable moisture. Fanciers generally use earthenware nest bowls and put some sawdust or sand in the bottom of it for the birds to build their nest in.

(The End.)

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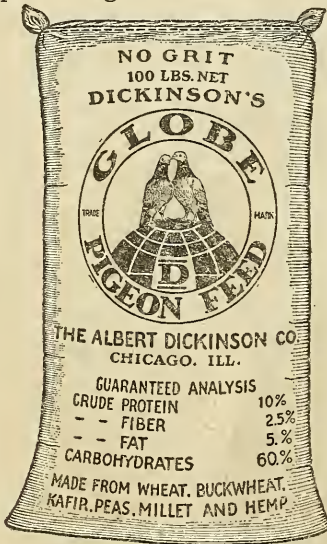
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