

## PITY POOR PIGEON: HOST TO A COMMUNITY

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A PIGEON flying by may seem to be all alone, but the chances are it is really a whole community. The bird is like an island with its own flora and fauna, carrying at least some of the 70 or so plants and animals that have been recorded as living on or in the domestic pigeon. These include two species of ticks, eight of mites, a fly, a bug, six lice, nine roundworms, eighteen tape worms, three flukes, eight protozoans, two fungi, nine bacteria, four viruses, and doubtless many others.

Ignoring the smallest microscopic animals and plants, the number of individuals of some of the larger animals (the flies and ticks may be as large as a housefly, and the tapeworms

live inside it. Some roundworm members of a bird community do not live out their life span in the same part of the bird. Their peregrinations are probably something like this: the egg, swallowed by the bird, hatches in the intestine where the adult life of the worm is spent. However, it first spends ten days traveling. First penetrating the wall of the intestine, the young worm is caught up in the bloodstream and swept into the liver, thence to the lungs and heart. Finally it burrows from the lungs to the windpipe and finally to the gullet, whence the route is prosaic, via the alimentary tract to its adult habitat, the intestines.

The food of the different members of this community is as various as their form. Flies and ticks, some mites, and some lice may

suck blood; some lice may eat downy parts of feathers; some mites, living inside quills, may feed on the pith found there, others may eat scurf and skin debris; worms in the intestines lie in a bath of partly digested bird food and absorb it through their body wall; some roundworms (filaria) and protozoans may feed on the blood.

Probably all birds support sizable communities of other animals, and of course there is the question of how they arrive on the

"bird island." Some, like lice, undoubtedly are handed down by parent to offspring when the adults are brooding, through contact. The antiquity of some of these heirlooms may be judged by the fact that a species of louse may be found on only one species of bird. The passenger pigeon, for example, had an endemic louse, and when the last passenger pigeon died, the last of this species of louse died with it.

There are also strange and complicated life histories tied up with colonizing. Some roundworms simply lay great numbers of eggs, as many as 12,000 a day, and depend on a few of them being swallowed by the right kind of bird. But with some flukes, the life cycle is very complicated. Male and female organs may be present in the same individual and self-fertilization is the rule, thus avoiding the necessity of two animals finding each other in the dark labyrinth of the bird's insides where they live. The eggs, passed out by the bird, in some species may be eaten by a snail where the young passes part of its life. Then the snail may be eaten by a fish, where the fluke passes more of its life, and finally the fish is eaten by a bird, in

whose body the worms pass their adult life.

Yet other animals, like the one-celled animals that cause malaria, some roundworms (filaria), and some viruses, are carried by such vehicles as mosquitoes, which receive them when they bite one bird, and pass them on accidentally to the next bird they bite.

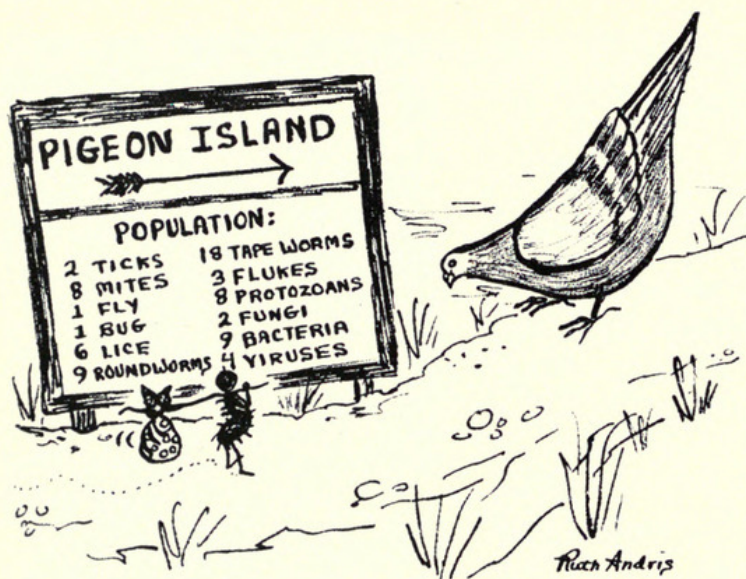
This of course brings our pigeon back into perspective. As the filaria in the blood stream is a tiny unit in the bird-island-community, so the pigeon is a small unit in a larger community. In this community it eats seeds, gives pleasure to some people who like to feed peanuts to pigeons on elevated railway stations; adds to the supply of poultry on the market; is the main actor in pigeon racing; is the main food of duck hawks wintering in cities; and in the Egyptian Delta is one of the reservoirs of the virus which causes "West Nile Fever."

Such communities as that outlined for a pigeon of a city street are not restricted to birds, of course. Mammals, fish, snails and worms all may have other, smaller animals living on or in them. Each animal is a community in itself. Even the pigeon fly may have a mite on it, and the mite in its turn may carry bacteria.

An ideal, balanced community would exist happily, each species not interfering unduly with other species, though individuals must continually go to the wall. A pendulum, however, is a better comparison than a balance when thinking of populations; and even then, if you take the long view, there are always species that lose out, no matter if they are as big as dinosaurs or have teeth as long as a sabre-toothed tiger. There is always something getting out of balance. Often it has to do with a new invasion of an animal or plant, as the chestnut blight from Asia that wiped out the American chestnut; the rabbits introduced on Laysan Island that disrupted the whole community of nesting birds by eating up all the vegetation; the African giant snail in the Pacific islands; and the blood-destroying protozoan in Brazil which caused a malaria outbreak that killed thousands of people when certain mosquitoes were introduced from Africa.

Such widespread devastation by one animal or plant "kills the goose that lays the golden egg" for the invader finally suffers from food shortage. That natural checks and controls may develop is nowhere better illustrated than by the Australian cottony cushion scale insect which, introduced into California about 1868, threatened the citrus industry, but was brought under control by introducing its counter-pest, an Australian ladybird beetle.

Such intricacies are fascinating studies, showing the interdependence of living things. But no one biologist can be expected to know how to classify and name all these diverse organisms—which is preliminary to talking about them—let alone have the time to work out all their life histories. Thus the studies are co-operative and piecemeal. The bird



several feet long) are impressive. A thousand tapeworms have been found in the intestines of a single pigeon, 30 pigeon flies among the feathers of a single bird, and 20 bird lice on a single feather.

Just as the animals on an island divide the living space among themselves (birds in the trees, rabbits on the ground, moles burrowing, and fish in the streams), so do the animals and plants on the pigeon divide the living space. Among the feathers are flies and lice; on the skin, ticks and mites; burrowing into and under the skin, mites; under the eyelids, roundworms (eye worms); in air passages, mites, roundworms, and fungi; in the intestines, tapeworms, roundworms, protozoans and bacteria; in the blood stream, roundworms (filaria), protozoans and viruses; in the tissues, roundworms; and in the brain, viruses.

Even with animals living among the feathers on birds, some occupy special habitats. Some broad, round lice live on body feathers; some longer, more slender ones prefer the head or wings; some mites prefer to live on the quills, and some very small lice and mites seem to prefer to drill a hole in the shaft and



specialist sends the lice from a bird to a louse specialist; the specialist in ticks sends the birds from which his ticks came to an ornithologist for identification. With the recognition of the role that some of the units of these communities play in spreading and causing human disease, public health and tropical medicine units have devoted much time of many people to studying these problems, but these people, too, depend on the work of museum specialists, or develop their own specialists to work with series of reference specimens, in effect museum-type collections.

The personnel of Chicago Natural History Museum have not only studied the classification of many animals, great and small, in which they are specialists, but have also helped specialists in other groups and have been helped by them. They have also studied the relations of some animals to their environment, whether it be the trees and the weather, neighbors of similar size and habits, or host-parasite relationships.

Museum scientists have participated in many unusual activities. They have described a new lizard from the stomach of an African goshawk; described how cows help a Central American cuckoo catch grasshoppers; and evaluated the relationship of flamingoes in view of their lice being more like those of geese and ducks, rather than those of storks and herons. They have also advised on bats' share in the recent cases of rabies in the United States; commented on why birds wipe ants on their feathers; and helped with the demonstration that colonization of African ticks in Europe may be brought about by the agency of migrating birds. With a student of viruses they have discussed how a recently discovered Indian virus, which affects men and monkeys, occurs in birds, and is transferred by ticks, may have been introduced into India from Russian points to the north by migrating birds, either in their bloodstream or in ticks they carried.

## Books

**SEA TREASURE. A Guide to Shell Collecting.** By Kathleen Yerger Johnstone. Houghton Mifflin Co., 1957. 247 pages. 8 color plates, numerous line drawings. \$4.

Nearly every person who visits the seashore picks up a few shells on the beach and brings them home as vacation mementos. Usually the interest is fleeting and the beach-worn shells or curio-shop souvenirs gather dust on the mantle or are buried in a small box 'way back in an overcrowded attic. Yet the beautiful forms, colors, and intricate ornamentation of seashells sometimes kindle a curiosity that rapidly grows into a desire to have more and more kinds,

bigger and better specimens, and rare species that "Mr. Jones" doesn't have. Many people are bitten by the "shell bug." Some pass beyond the "stamp-collecting" stage and through their interest in the shell as part of a living organism become very competent amateur naturalists. If infected early enough, professional biologists may even result from "shell fever" (the author of this review is an example).

The gaps between the levels of interest are large and bridged but slowly. Recent years have produced a revival of interest in shell-collecting as a hobby, and many excellent books have been published that aid the collector in identifying his specimens. For the person with some background information and a definite interest, these books offer excellent summaries of the common species and are often instrumental in converting an admirer of beautiful shells into a serious amateur student of mollusks.

The biggest gap, and the hardest one to cross, is that between the first flicker of interest and the first attempt to make a collection of shells. The identification manuals, with their imposing scientific names and pictures of a bewildering variety of shells, are confusing to the novice and may even discourage a potential hobbyist. There has long been a great need for an introduction to shell-collecting that attempts to explain general principles and provides guidance for the person with an interest but no knowledge. *Sea Treasure* does this more than adequately. Written in a very simple style, it can be understood by an intelligent nine- or ten-year-old; yet it offers enough information to be of value to the new conchologist of sixty-five. Few books are at all comparable. R. Tucker Abbott's *Introducing Sea Shells* is aimed at a higher level of interest and might serve as the next step for a budding conchologist. The only other general introduction, A. Hyatt Verrill's *Handbook for Shell Collectors*, contains many inaccuracies and is not recommended.

Besides the expected summaries on how and where to collect shells and the mechanics of housing, cleaning, and identifying a shell collection, *Sea Treasure* adds several very useful features.

From the viewpoint of a scientist, three items are extremely welcome. The emphasis on the shell as *part* of a living animal (Chapters 5 and 6) is a long overdue subject for consideration in popular books on shells. Few people realize that conservation of good localities is as important to other shell collectors as the fish-and-game laws are to sportsmen (Chapter 10, "Don't be a Pig"). And the advice on the care and handling of museums by the amateur (pp. 109-111) may help alleviate one of our biggest headaches as professional malacologists.

*Sea Treasure* is not an identification manual, and the illustrations were chosen

## SPECIAL EXHIBITS

The following special exhibits are scheduled for the summer months:

**Panorama of the Pacific**, through August 31, Albert W. Harris Hall (Hall 18). Selected material from the Fuller Collection of South Seas artifacts.

**The Music Makers—Exotic Musical Instruments of the World.** Through August 31, Edward E. and Emma B. Ayer Hall (Hall 2).

**Indian Art of the Americas**, August 1–September 28, Stanley Field Hall. Selected art objects from the North, Central, and South American collections of this and other leading museums. The exhibit coordinates with Chicago's Festival of the Americas in connection with the Pan American Games.

to show unusual or particularly beautiful shells, thus serving to lure the reader further. The black-and-white drawings are excellent, but the many color-figures suffer from an "artistic" treatment. While generally accurate, the intensified coloration and surface "sheen" of the pictures may make the actual specimens seem dull and unattractive by comparison.

For the person who knows nothing about shells and wishes to learn, *Sea Treasure* is unhesitatingly recommended. As a museum scientist who receives many requests for general information on how to collect shells, I welcome *Sea Treasure* as a useful and accurate aid to help answer these questions.

ALAN SOLEM

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## Technical Publications

The following technical publications were issued recently by the Museum:

Fieldiana: Zoology, Vol. 36, No. 4. *Catalogue of Type Specimens of Reptiles and Amphibians in Chicago Natural History Museum.* By Hymen Marx. 90 pages. \$1.25.

Fieldiana: Anthropology, Vol. 36, No. 8. *The Old Copper Culture and the Keweenaw Waterway.* By George I. Quimby and Albert C. Spaulding. 13 pages, 7 illustrations. 40c.

Fieldiana: Anthropology, Vol. 36, No. 9. *Lizard Hunts on the North Coast of Peru.* By Allan R. Holmberg. 18 pages, 15 illustrations. 75c.

Fieldiana: Botany, Vol. 29, No. 4. *Mono-graph of the Genus Russella (Scrophulariaceae).* By Margery C. Carlson. 70 pages, 7 illustrations, 3 maps. \$1.50.

Fieldiana: Zoology, Vol. 39, No. 11. *The Races of the Shrike Lanius validirostris.* By Austin L. Rand and D. S. Rabor. 2 pages. 10c.





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