

ORNITHOLOGY—AVIATION

# Birds Excel Man's Airplanes As Efficient Flying Machines

**T**HE DUCKS that wing their way northward through the March dawn, the hawks that hang and watch for a chance to pick one of them off, even the robins and blackbirds that flit across the lawns, are still more efficient flying machines than the best of man's inventions. They have better design, and they get more mileage out of a calorie of energy, than any airplane now in existence or likely to be built.

This is brought out in a number of points in a study of bird flight which has been made by Dr. Lucien H. Warner of White Plains, N. Y. His findings were published in the *Quarterly Review of Biology*.

Birds have so reduced the weight of other body-parts that they can devote from one-sixth to one-half their total weight to the flying muscles, notably the big ones that form the breast of the bird and pull the wings on the down-stroke. In the pigeon these muscles weigh as much as all other parts of the bird taken together.

The streamlining of birds' bodies has long been noticed. It shares this low-resistance shape with fishes and other swimming animals, but has the advantage of smoothing out hollows and irregularities with almost weightless feathers instead of heavy flesh. Many flying birds tuck up their feet, being prototypes of planes with retractile landing gear, and those that are too long-legged for this trail their legs so as to make the least possible resistance in flight.

## Get More Out of Food

Highly efficient also is the utilization of food by birds, and its combustion in the tissues to produce energy. Analysis of food remains after digestion shows that birds assimilate much more of what they eat than do mammals. Their blood carries a higher number of red corpuscles per cubic millimeter, and therefore transports more oxygen to the final burning-places of dissolved foods, which makes for more efficient energy production.

Birds have a system of breathing peculiarly adapted to the needs of flying animals. The active part of respiration is exhalation, or breathing out. This is

accomplished by compression of the ribs and breastbone, which surround the lungs. Thus the more rapidly the wings are moved, the greater the amount of air forced in and out of the lungs. A bird is thus less likely to get out of breath than is a mammal, which has a breathing apparatus quite independent of its movement muscles.

Dr. Warner also discusses the different methods of flight used by birds, and offers a new theory regarding the soaring flight of such birds as hawks and buzzards. It is his belief that they take advantage principally of the gustiness of the wind, adjusting themselves instantly to changes in its direction or force in such a way as to exploit its energy to gain additional lift.

*Science News Letter, May 9, 1931*

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