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## TRENDS IN MODERN ORNITHOLOGY\*

BY JOSEPH GRINNELL

When I received word from Secretary L. L. Snyder that his Program Committee wanted a few serious comments from me at this dinner—"serious" ones, mark you, and therefore to be *written*, on the subject, "Trends in Modern Ornithology", I agreed, with little hesitation. I did so with meager notion of the amount of thinking I was in for. When I did get down to the job of thinking, as we came east through British Columbia, I was at once given pause by certain difficulties of definition, two in number: What *are trends*? And what *is modern ornithology* as distinct from ancient, or from sub-modern, ornithology?

Dealing with the last difficulty first, I ventured the definition that ornithology is the mass of knowledge possessed by all students of birds at any one time. What is not known at such time, is not yet a part of ornithology. Thus, we can quite as properly speak of what was known of birds in the days of Wilson as *ornithology*, as we can of what is known today. It is the *volume* of what is known in that field of knowledge that differs from time to time.

Looking backward, from the present time-level, we can thus speak of the ornithology of the different epochs; but the total mass, and the factual and philosophical constitution of it has changed: modern ornithology shows enormous mass, relative to that of preceding epochs, and it is subdivided into a multitude of minor fields, inconceivable in number and kind only a few decades ago. Incidentally, it is simply impossible for one person nowadays to be an all-round ornithologist, as was Wilson in his day, or Coues in his. Each of us today is an avian systematist, or an avian morphologist, or an avian behaviorist, or a paleornithologist, or an avian territorialist, or—something else.

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Now, that word "trend" bothered me even more. How can a person recognize the true trend of development as obtaining at any one time-level, until subsequent lapse of time has furnished sufficient perspective to enable him to do so? I could now, with enough study, state what were the trends in ornithological development in the year 1900, as judged from the literature of that in comparison with later years. But to say what the true trends are in the present year, 1935, becomes, as I now see it, a guess, or a prophesy, or merely a declaration of what one would like to see happen on the basis of his own personal interests or bent. And no two of us would be in any near agreement.

Therefore, the best I find myself able to do is to offer a brief catalogue of some of the sub-fields of ornithology that have emerged, or come to the fore, within the immediately passed few years. I will not give the names of persons who are now, or have been, identified with these fields, as I was not asked to deal with personalia. You will think of some of them as I recite the subjects of their respective research pursuits.

Perhaps standing first as to amount of recent attention accorded it, has been analytical bird-behavior, this as evinced in territoriality, in cyclical patterns in which reproduction is the central element, and in seasonal shiftings of populations both local and general. More and more intensive studies have been made along these lines, upon single species.

A tendency manifest (and a bit unfortunate) is to base very general "laws" upon one or a few such studies. A recent warning has properly been sounded against such premature generalization. Behavior patterns sharply different in certain respects from one another, or, on the other hand, strikingly alike, may have evolved in different orders of birds, even families and genera—quite as in the case of adaptive structural features.

Included in this subject of behavior is sociology in birds—inter-individual relations and reactions. I think of the phenomenon of "peck-order" recently described; that is, scale of dominance among the individuals in a group or flock. The superiority versus inferiority "complex" seems in certain birds startlingly like similar manifestations in the human animal; and it extends to the behavior of groups of individuals toward other groups. We see dictators and we see self-asserted, "superior" races—in birds!

Bird-voices and their meanings are being studied as never before, and investigated with the aid of modern recording devices. And inter-

pretations are being made in the light of findings in other animals, including man. Thus anthropomorphism, not long ago frowned upon, is coming into its own, in a certain conservative sense—in reverse!

The physiological basis of individual behavior in terms of internal secretions, or of vitamin activation, has been receiving much attention—and much recognition as if of supreme scientific importance. While a degree of importance must freely be acknowledged, we should not forget that chemico-physical mechanisms have likely been evolved on a selective basis. They have approached perfection only on the basis of selection toward ecological adaptation, that is, as imposed by special environmental pressures upon the internal structural core carried along conservatively by the machinery of inheritance.

Plumage change as being under control of varying hormone production is being recognized through studies in micro-anatomy and micro-physiology. Tie-ups with varying courses of general development become apparent.

Gross morphology is no longer content with the cataloging of structures in the dead specimen. Only as correlated with functions, does anatomy appeal to workers nowadays. And clearly this correlation carries over into behavior in all its manifestations. It is the *living mechanism* that holds the attention of the enthusiastic anatomist today. And thereby the building of new phylogenies, improvement of earlier “trees”, goes on—with the increasing promise of that ideal, near-perfect system of classification which we all envision for the future. In that millennium only one A. O. U. Check-List will be needed every fifty years—instead of four in the same period!

As to systematics, the day of the brief description of new forms, and of that type of group revision which is concerned only with dead anatomical features, has nearly or quite passed. Indeed, I may say safely that there is no such thing any more as “pure systematics”. Rather, does the modern student of speciation concern himself with his birds as living organisms that react in manifold ways, each species, each subspecies and each minor population group within a more or less different environmental set-up. The systematist of today is open-minded toward the findings of biologists in the field of genetics, in that of animal behavior, in that of ecology in the broadest sense; for his major problem is not only to find out how phylogeny as we see it has been attained, but how and why it is proceeding as it does in the present.

Nomenclature continues necessary, of course; but it is subservient to the aim of more and more accurate expression of truly genetic

relationships. The recent tendency appears to have been more toward synthesis than analysis; the race-group has of late come into the taxonomic scheme.

Exploration, ascertainment of geographical distribution, according to the earlier methods of amassing huge series of specimens, seeking among them new kinds and listing all the species, with meager distributional notes, has lessened in importance. Field-work on a large scale is now organized toward general ecological analysis, with searching attention to the other animals associated with the birds, and to the plant-life which is basic to the fortunes of all of the animals. Enormous possibilities remain in the direction of faunal analyses, faunal derivations, interactions of faunas, the behavior of bird populations in-the-large, both spatially and through time. This means field projects of continuing duration, projects that can be correlated for many parts of the world, projects that take into account many sorts of physical phenomena.

The main methods used in ornithology already for many years remain those: (1) of studying dead material in the museum and laboratory; (2) of experimenting upon live birds in captivity or as banded, hence more or less under control; and (3) of observing birds altogether unfettered or undisturbed in any way, under the conditions under which they carry on their natural existence. Although these three methods may best be used simultaneously, it looks to me as though the last-named method has, just now, come into greater prominence. This is the method of intensive, disciplined bird-watching out-of-doors. It is the method by which deeper and deeper insight is being gained into *birdness*—I mean as to what constitutes the animal we call a bird—*what* it does in an infinite number of respects under different circumstances, and *why* it does each of these things.

I venture to say that the outlook at this moment is exceedingly favorable for worthy contribution to science from the student of birds alive and out-of-doors, without, or with, the aid of binoculars and camera. The present trend may prove to be along that route. Thank you for listening to these "serious" remarks!

MUSEUM OF VERTEBRATE ZOOLOGY, UNIVERSITY OF CALIFORNIA,  
BERKELEY, CALIF.