

## EVERY BIRD IS DIFFERENT FROM EVERY OTHER BIRD

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CURATOR OF BIRDS

**V**ARIATION is the rule in nature. To demonstrate this to yourself the simplest way is to try to find two maple leaves or oak leaves that are exactly alike. It can't be done. The most similar you can find will still differ in details. Another way to have variation within a species impressed on you is to stand at the corner

blackbirds, nor starlings with deformed bills, but rather the normal "run of the mine" variations, which are connected by other individual variations with a "normal" or "average" bird of the species.

### DISPARITY IN TRAITS

Variation occurs not only in physical appearance. There is reason to believe that variation exists in every attribute: in

phrase for the over-all effects that weed out the weaker individuals, whose physical and mental equipment is at the extreme of variations of those less well adapted to their environment, and allow only the stronger, better adapted, to survive and perpetuate the species. In other words, we conclude that selection, acting on variation, operates to "improve the species and make it better equipped to carry on its life."

### CHANGE NEVER CEASES

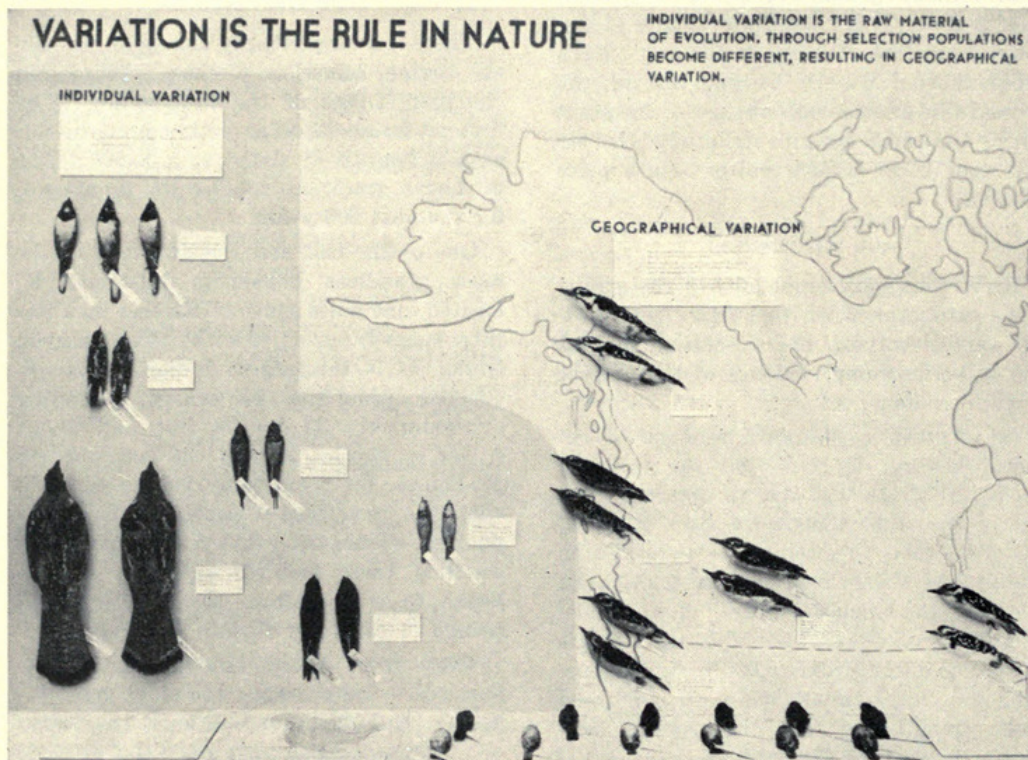
This implies that every species is continually, slowly changing. And this is just what is happening. It happens so slowly that our collection of bird skins and our written records cannot detect it. But when we turn to the paleontological record, the story gathered from a study of fossils, we find this is just what has happened.

The gradual change from an early form through successive stages to the one we know at the present day is perhaps best known for the horse. But it's probably true of all forms we know. And there's no indication the process has stopped; it is still going on. The present, which we know, is just a thin section through endless time.

We have another line of evidence that serves to establish the fact that selection acts on variation. Every place differs at least slightly from every other place, and thus selection differs in each place, choosing the birds most fitted. Gradually the birds from one area become different from those in another; the different populations come to have differences you can easily see. This is geographical variation and is shown by the hairy woodpeckers on the right-hand side of the new exhibit. With these woodpeckers, the differences are great enough so that most of the individuals from considerable areas can be recognized and referred to their populations on examination. When this degree of differentiation has been attained, the various populations are said to form different subspecies. As is evident, the subspecies is a human concept; it is a matter of naming populations when they have differed enough so that human eyes can recognize a considerable proportion of the individuals as alike. Biologically they still all belong to the same group of individuals in the species, and the variation is just as real whether dignified by name or not. The subspecific names for the more readily recognizable forms are a convenience in talking about variation.

### EFFECTS OF ENVIRONMENT

Variation sometimes tends to follow certain trends in certain environments; in an arid country birds (and other animals) tend to become pale in color and those from humid areas to be dark in color, perhaps in part to harmonize better with their background and so be more protectively colored. Birds from more northern areas



### COLOR, PATTERN AND SIZE VARIATIONS IN BIRDS OF SAME SPECIES

The exhibit, prepared by Miss Norma Lockwood under the direction of Dr. Austin L. Rand, Curator of Birds, with the assistance of Mr. Kenneth Woelck, illustrates its subject with familiar kinds of birds such as Canada warblers, towhees, downy woodpeckers, barn swallows, purple martins, and ruffed grouse.

of State and Van Buren and note how different are the individuals of the human species that go by.

In birds it is the same. No two are exactly alike in appearance. They differ in size, in color, and in pattern. Sometimes even in a casual acquaintance with the birds on your lawn, there will be a few you can recognize individually: an especially bright bluejay, a robin with an unusually red breast, or a yellow warbler with extra-heavy chestnut breast markings. But even the sparrows that look exactly alike to a casual glance will, on closer study, turn out to be recognizable as individuals.

A new exhibit has been installed in Hall 21 to show this sort of variation. Familiar types of birds, such as Canada warblers, towhees, downy woodpeckers, barn swallows, purple martins, and ruffed grouse of the same age and sex, have been chosen from our series of study skins. Variations in color, in pattern and size are shown. Those shown are not freaks; there are no albino

wildness; in aggressiveness; in agility; in activity; in acuity of senses; in short, in every aspect of the bird.

This variation is of fundamental importance in the scheme of things. The little differences that make one bird more attractive as a mate, or slightly quicker to catch a worm, or slightly less conspicuous to an enemy, or better able to withstand the long winter nights or long migrations, may mean the difference between surviving and leaving progeny, and perishing; in fact, between life and death.

When we realize that only a part of the birds hatched each year can possibly reach maturity and breed (else we would be overrun with birds, and have a condition of overpopulation in which there would be no room for them), we begin to see the implications of variation.

Only a part of the population will survive in this "struggle for existence." Which one will survive is determined by a principle called "survival of the fittest." This is our



tend to be larger than their closest relatives in more southern areas, perhaps an adaptation to conserve heat; the larger birds, having proportionately less body surface to bulk, thus lose less heat.

Song sparrows, of which a few examples are shown in the bottom of the case, are well known as a plastic group, becoming so modified and adapted to their particular local environment that many subspecies can be recognized. Those shown represent an area from arid, hot Arizona to the humid, cool Alaska coast and show both the trends outlined above, being darker and larger in the humid northwest and smaller and paler in the hot arid country.

We have traced the process of change from variation in individuals in a population to variation between populations within a species. We have seen that populations with well-marked differences are called subspecies.

#### SPECIES FROM SUBSPECIES

The next progressive step is when these subspecies become different enough to be called species. But up to the subspecies level the differences may be in the bird's physical appearance; they are of degree only. Biologically birds are still capable of interbreeding freely even though they may look quite different. For two subspecies to become different enough to be considered true species there must develop a difference of another kind, a biological difference. The individuals of two different species do not interbreed freely. Subspecies replace each other geographically. A species can have only one subspecies living and breeding in an area. But many species can breed in the same area. A biological factor prevents them interbreeding. It may be physical, or it may be mental.

This sort of difference, the difference growing up between two populations that results in the two populations becoming fully distinct species, seems impossible of attainment while the subspecies are spread continuously over an area. It is only when populations are isolated, in a physical sense, as on islands, that species evolve from subspecies. This aspect of speciation is diagrammed on the exhibit "Species Evolve Only in Isolation" in the alcove adjacent to the one housing this new exhibit (and was discussed in the February BULLETIN, page 4).

The two exhibits "Variation is the Rule in Nature" and "Species Evolve Only in Isolation" actually show different parts of the same thing, the course of evolution of species. To recapitulate, individuals vary; selection acting on them causes populations to vary; when populations are isolated they may vary enough to become species.

#### RAW MATERIAL OF EVOLUTION

Thus individual variation is the raw material of evolution, the stuff of which

## PEACE, 4000 B. C. TO A. D. 1000, IN THE SOUTHWEST

(Continued from page 3)

while the occupants of Pit-house K entered through the roof by means of a ladder. The obsolete pit-house had no indoor firepit, but in the center of Pit-house K a pit containing gray ashes was discovered. Around the north wall there was a good-sized adobe bench and in the center of the house, forming a square around the firepit, were four long grooves. As charcoal was found in these grooves, they presumably contained logs that had been plastered over, thus forming a cozy bench around the fire.

A house the size of Pit-house K, if it was a family unit, must have been the chief's house, for most certainly the man-hours of digging needed to construct it must have been enormous and the entire tribe would have been required to work on it. It is more probable, however, that Pit-house K was a ceremonial chamber and that its construction was a male communal project, for it is known that in later times women were not permitted to have anything to do with the ceremonial chambers or kivas.

#### TWICE-BURIED INDIAN HOUSES

It took an expedition crew of five husky workmen using good sharp steel picks and shovels almost two weeks to excavate Pit-house K. It must have taken the Indians twice as long to build it, not counting the time consumed in cutting and hauling the huge logs used to support the roof (six logs, each 1-1¼ feet in diameter) and in constructing the roof itself.

At the end of the season's excavations, the expedition crew had to refill the houses

new species are made, little by little, over a long period.

Such conclusions as this are the result of studies of large numbers of specimens, representing the "thin section through endless time," the stage at which we now stand in the continuing process of evolution. The studies on birds in museum collections have had an important place in reaching such widely applicable conclusions. It is perhaps fitting that in this new exhibit the birds shown are not mounted birds but are the conventional study skins such as are used in museums for carrying on such research. They are made to resemble a dead bird, lying on its back, with the legs, to which a label is tied, crossed. Specimens such as these form the bulk of the research material of a bird collection. From the label, the date and place of capture and sex, and perhaps other data, can be read, and a study of the characters of the specimen yields further data.

The new case was prepared by Miss Norma Lockwood of the Museum art staff, under the direction of the Curator of Birds and with the aid of Mr. Kenneth Woelck.

that had been dug. Backfilling, an essential part of the archaeological season, is required by the government permit. The hot and constant sun beat down on the windless ridge as six men wielded shovels. Huge dirt mounds had to be moved back into the ancient Indian pit-houses that had been excavated. Fourteen Indian houses had to be reburied.

But as the houses were refilled, one thought of the knowledge scooped from New Mexico's hard-baked earth—the double occupation of Pit-house C (its entrance had been converted into a ventilator), the mysteriously scattered male skeleton of Pit-house D, and the curious wall cupboard of Pit-house E. Pit-house F had led us into an unknown and later period of Indian prehistory, and Pit-house G filled in another time gap, the period from A.D. 500 to 900. Pit-houses F and G had revealed the beginnings of decorated pottery along with many additional discoveries. Pit-house H had provided more needed evidence for the above-mentioned time periods, and Pit-house I, dated A.D. 900-1050, had provided a nicely completed time sequence. Pit-house K, the huge rectangular house, provided an exciting contrast to the ordinary Indian family dwellings.

Pit-house L was a shapeless house because of numerous pits dug into the walls, but two of these pits were so dug as to form a perfect figure 8. Pit-house M had a short, stubby entryway and Surface House No. 1 proved a lucky find because of the wealth of pottery and stone tools it yielded. Pit-house N was a small, deep, perfectly formed house while Pit-house O was irregular with an extremely rough floor.

Viewing the collected evidence covering a span of time from 4000 B.C. to A.D. 1000, we find the broad outlines of a fascinating story of ancient American Indians. First these Indians roved, houseless, in quest of water and food. Thousands of years later they dug into the earth and for 500 years developed and stylized their cellars with roofs, only to emerge again into the bright sunlight, but this time to build on the earth's surface.

It is the story of man's past development, sketchy to be sure, but a story that will be better filled out and better understood with further excavation.

#### Radio Programs for Children

Stories prepared by the staff of the James Nelson and Anna Louise Raymond Foundation are presented Saturdays at 5:15 P.M. and Sunday mornings at 9 on the "The Children's Corner," a program broadcast by radio station WCFL.





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