for weeks have been produced in the dead of winter, months after the birds have gone far southward. In some manner these notes gleaned in summertime have been retained by the nervous mechanism of the starlings, to come out aimlessly, spontaneously, yet faithful in their vocal copy, when the starlings were in a voluble mood.

There is a third phase in the starling's mimicry which deserves mention. I refer to the persistence of a given note which will have a "run," or become a popular "hit," so to speak, over a considerable period of time, and become an element in the repertoire of a number of birds for the same period. At one time it will be the call notes of the quail, at another that of the wood peewee, then these will be abandoned, not to be heard for weeks, months or years. In this fundamental behavior, starlings are like humans, and novelty seems to have its temporary interest, but the novelty by constant repetition wears off, it would seem, and a new outlet of expression is resorted to.

The mockingbird, it may be said, is also one of our great mimics, but he is more of an original artist than the starlings. He sings loudly, loves dramatic display, as witness the conscious display he makes of the white spots in his wings as he hops along a level privet hedge with uplifted and outstretched wings, or springs up from the roof gable or chimney top in his voluble exuberance with extended wings, or sings with wild revelry the night long on moonlight nights.

Vocal mimicry may not be a simple matter. The mimic appears to plagiarize blindly, indulging in a wild and lawless flow of borrowed notes, repeating them rapidly from 2 to as many as 20 or more times, not infrequently, as the mockingbird does. It would be remarkable, indeed, if a starling or mockingbird delivered the entire song of a wood thrush in the calm, deliberate, phrased manner of this classic singer. While the individual note, call or phrase of a song may be reproduced with great fidelity, the mimic does not go so far as to reproduce the method of the song, its time relations or its structures. I may refer to the song of the common phoebe (*Sayornis phoebe* Latham). This is a simple song characterized by two phrases usually delivered in alternation in the typical song. The only obvious difference in the two phrases appear to be a lowered inflection in the one and a raised inflection at the end of the other, *i.e.*, *pee-wee* . . . . *pee-wee* . . . . *pee-wee* . . . . *pee-wee*, etc.

Now the mockingbird has very frequently indulged in the first phrase *pee-wee* of this series, repeating it hurriedly, with a very faithful rendering of its innovations, 10 times or more, but at no time has it ever adopted the simple song as a whole and reproduced it structurally as an alternation song which the peewee has learned to deliver. This degree of mimicry is a very different and more technical sort of attainment than the birds seem to be capable of, it would seem.

The mockingbird is very apt at times in its mimicry of the whippoorwill, but it apparently never introduces the low cluck at the end of the phrase whip-poor-will which the whippoorwill itself delivers.

While vocal mimicry has attained a high degree of development in a few of our birds, it would appear to be only a maudlin accomplishment, satisfying only to the whims and moods of the individuals of the species. In the process of accomplishment there must be some degree of attention and memory involved, even if only of a subconscious sort. Surely, also, there are profound differences in the capacities of the brain of different species to absorb the sounds which impinge upon the bird's attentions, since one species is an excellent mimic and another is not. So far as actual mimicry is concerned it is apparently an aimless and useless art, and of no survival value to the species. Nevertheless, one must admit that our great mimics among the birds are geniuses in their art.

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HIBERNATION OF ANOPHELINE EGGS IN THE TROPICS

THE methods of survival of anophelines through the dry season in Panama have caused a great deal of speculation. It is a recognized fact that a small amount of anopheline breeding continues throughout the dry season and probably a few adults survive this period, but the sudden increase in anopheline larvae and adults occurring 7 to 10 days after the onset of the rainy season does not seem to be wholly accounted for as coming from these sources. The numbers of adults and larvae encountered at this time would make one think that some other method of survival is utilized by the anophelines to tide the majority of them over the unfavorable period of the dry season.

We felt that hibernating eggs might be one of the factors involved in the survival of these species. As far as we know, the survival of anopheline eggs by hibernation has not been demonstrated in the tropics.

As the dry season was well advanced when it was decided to test this possibility, we were unable to accurately measure and study anopheline eggs being oviposited at the beginning of the dry season and compare them with eggs oviposited during the summer and fall. It is our impression, however, from observation of *Anopheles albimanus* eggs, studied superficially during the latter part of December, 1938, that they were larger than those secured during the summer. Many of these apparently larger eggs, instead of hatching in 24 to 48 hours, required 7 to 14 days to hatch, and some failed to hatch within the 14-day observation period, although they did not appear to be unfertile.

In the Canal Zone there are many seepage areas that persist for about one month after the beginning of the dry season. These areas then dry up and no water is present in them until the rains begin in the latter part of April or the first week of May. The earth in these areas is dry and fissured, except when fallen leaves and grass cover the ground, in which case the soil is slightly moist but crumbly and will not pack when squeezed by hand.

On April 10, 1939, the superficial earth from a number of these seepage areas in the vicinity of Chiva Chiva, C. Z., was collected. It was estimated that the areas in which the collections were made had been dry for at least one month and no rains had been experienced in this area during that time. The slightly moist earth was collected, placed in sterile pans and then covered with tap water containing a small amount of hay infusion. The water and hay infusion were carefully handled and protected inside a screened building to preclude any mosquitoes gaining access to them. Two days after the addition of the water, a number of first instar Culex, Aedes, Psorophera and four anopheline larvae were present in the pans. The anopheline larvae developed out to be three *A. punctimacula* and one *A. albimanus.*

Additional samples of earth were collected in the Fort Clayton, C. Z., area on April 17 and 26, and on May 1 at Fort Davis, C. Z. The same precautions were exercised in the collection and handling of these specimens as reported for April 10. Three *A. albimanus,* one *A. tarsimaculatus* and five *A. punctimacula* larvae were recovered from these specimens.

Considering the method of collection and handling of this material, we feel that the larvae found had to come from eggs present in the moist earth collected from the dry seepage areas. These findings are insufficient to generally conclude that hibernating eggs are one of the ways that anophelines survive the dry season in the tropics, but the evidence seems to indicate it as a possibility. Careful observations and tests will be made prior to and during the 1940 dry season to determine the significance of the findings reported in this communication.

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DISTRIBUTION OF ARTIFACTS MADE FROM CHALCEDONY OF CERRO PEDERNAL, NEW MEXICO

RECENTLY Kirk Bryan[1] has called attention to the chalcedony or chert bed on Cerro Pedernal and San Pedro Mountain in north central New Mexico. This distinctive pearl-gray chalcedony is in part flecked by red and yellowish splotches. Occasional small holes are scattered at random throughout the material.

This chalcedony seems to have been quarried and manufactured over a period from the historic past to a time of considerable antiquity. Any material as distinctive and suitable for the making of artifacts should have been carried far and have been regionally dispersed by trade.

A point of this chalcedony some 4.6 inches long and 1.5 inches wide, of the type usually considered to be a knife, has been found recently in the Moreno Valley in the Sangre de Cristo Mountains, some seventy miles east and north of the known outcrops. Three other artifacts, a broken, but large oval blade, a tanged point and an "end and side" scraper, all of "Plains" type, have been found in a collection gathered locally near Mora, New Mexico, on the eastern slope of the Sangre de Cristo Mountains.

These four artifacts are without question made from the chalcedony of Cerro Pedernal, and further examination of collections may reveal an even wider distribution of this material, which appears to have been used by Indians of both Pueblo and Plains affinities, as well as by more ancient peoples.

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[1] Kirk Bryan, SCIENCE, 87: 343–346, 1938.

THE PRESENCE OF NON-OXYGEN-COMBINING (INACTIVE) HEMOGLOBIN IN THE BLOOD OF NORMAL INDIVIDUALS[1]

IT is generally assumed that all the hemoglobin circulating in the blood is capable of combining with oxygen and carbon monoxide, so that the capacity of the blood for oxygen absorption may be taken as a measure for the amount of hemoglobin.

It is found, however, that on employment of van Slyke and Hiller's method—after which the ability of a specimen of blood to combine with carbon monoxide (the active hemoglobin) is determined, whereafter reduction is performed with sodium hydrosulfite followed by a new determination of the carbon monoxide fixation power (the total hemoglobin)—several cases show a not inconsiderable amount of a kind of hemoglobin that is capable of binding carbon monoxide only after this reduction.

In 82 examinations carried out on healthy persons and patients who had not taken any methemoglobin-producing remedies there was found an average amount of the above-mentioned substance corresponding to a carbon monoxide fixation of 0.64 vol. per cent. = 3.5 per cent. hemoglobin (Haldane), varying from 0–2.64 vol. per cent. (0–14.5 per cent. Hb. (Haldane)). In about two thirds of the cases the amount

[1] From the Medical Department B of the Rigshospital, Copenhagen (Physician-in-chief, Professor E. Warburg, M.D.).