

pretation difficult. On the whole, however, the data seems to justify the conclusion that no effect is produced.

Briefly, the experiments indicate that potassium hydroxide, ammonium hydroxide and sodium hydroxide in weaker concentrations show a tendency to accelerate fission rate in *Paramoecium*, while these hydroxides in higher concentrations have an inhibitory effect. Barium hydroxide, strontium hydroxide, and calcium hydroxide show no effect, neither accelerating nor inhibiting reproduction. These results, while not so far reaching as might be wished, agree with the observations of Richards on *Haminea* eggs. It is suggested that those hydroxides which hasten division rate, do so because of their ability to hasten the oxidative processes of the cell. It is of significance that the hydroxides which were found to accelerate the rate of cleavage in the eggs have produced the same results in *Paramoecium*, while those which had no effect on *Haminea* also showed no variation in the protozoon.

IX. NESTING RECORDS FROM 1920 TO 1922 FROM NORMAN, OKLAHOMA

Margaret M. Nice

The extensive planting of trees in the town of Norman and on the University campus has made this region an unusually attractive nesting place for some species of birds. Mourning doves, grackles, mocking birds, brown thrashers and robins have been especially responsive to the opportunities offered them, and their nests may be found here in great abundance.

The numbers of nests of native birds found by my daughter Constance and myself in this vicinity from 1920 to 1922 follow:

Year	No. of Species	No. of Nests	Successes	Failures
1920	27	219	38	62
1921	19	206	41	48
1922	24	187	39	40
	—	—	—	—
Total	37	612	118	150

In 3 cases (field sparrow, blue grosbeak and sycamore warbler), the nests could not be found, but the parents were seen with food in their bills. The total number of nests should be a little larger for we failed to record all the grackle nests seen. As to the successes and failures, most of the nests were not visited often enough to determine their outcome, so it is only in the case of mourning doves of which we made a special study that the figures for successful and non-successful nests are at all representative.

Downy Woodpecker (*Dryobates pubescens*). A pair were seen excavating a hole in a dead tree by a small creek March 17, 1921; 2 days later the tree was cut down.

*Red-headed Woodpecker (*Melanerpes erythrocephalus*). One pair were seen enlarging an old woodpecker hole May 12, 1920; one of the birds was seen to leave the nest on June 17.

*Scissor-tailed Flycatcher (*Muscivora forficata*). A nest was seen June 17, 1922 at which the parents were feeding the young.

Kingbird (*Tyrannus tyrannus*). A nest was found June 17, 1920.

Crested Flycatcher (*Myiarchus crinitus*). A nest was found in 1922 in an old flicker hole in a telegraph pole 5 feet from the ground on a busy street. May 25, the nest was in process of construction; June 8 there were 5 eggs which began to hatch June 18; the 4 young left June 30.

*Blue Jay (*Cyanocitta cristata cristata*). Seven nests found; the earliest record was a nest in process of construction found April 30, 1921; it contained 6 eggs on May 9. June 13 a young bird was found that had recently left the nest.

Crow (*Corvus brachyrhynchos brachyrhynchos*). A nest has been found each year by a creek west of town, all the nests being in elms rather near each other. In 1920 4 downy young were in the nest on March 28; on April 24 they had left but 3 were nearby and were not yet expert at flying. The 1921 nest contained one egg on March 9; on March 20 there were 6 eggs; April 4 there were 5 naked, blind young which were well feathered 10 days later. The 1922 nest contained 4 eggs on March 18, but on the 28th was found deserted. One other nest was seen near the Canadian on May 13, a parent bird leaving at our approach.

*Cowbird (*Molothrus ater ater*). The birds found parasitized by the cowbird in the last 3 years have been as follows: goldfinch, 1; cardinal, 1; dickcissel, 1; Bell vireo, 3; yellow warbler, 3; and bluebird, 3. In all but 2 cases there was but one cowbird egg in the nest; in one Bell vireo's nest there were 2 cowbird eggs and no vireo eggs, and in the goldfinch's nest there were 2 eggs of the host and 2 of the parasite. One yellow warbler nest was found to have a cowbird's egg imbedded in its floor, in another nest a young cowbird was found on top of 3 small warblers, while the third pair of yellow warblers were feeding a young cowbird recently out of the nest July 11, 1922. A pair of Bell vireos were doing the same thing on the same date, one of their own offspring being found crushed in the bottom of their nest; the other 2 Bell vireo nests containing cowbird eggs have been found deserted. When-

ever cowbird eggs or young have been found by us in nests they have been removed. The earliest date on which an egg has been found is April 26, 1921 and the latest July 22 in a goldfinch's nest.

Red-winged Blackbird (*Agelaius phoeniceus phoeniceus*). Three nests seen in 1920, the first being in process of construction on May 11. (In 1919 we found a nest with three small young on July 23.)

*Orchard Oriole (*Icterus spurius*). One nest seen May 23, later found destroyed. Young recently out of the nest were seen June 22, 1920 and June 23, 1922.

*Baltimore Oriole (*Icterus galbula*). Four nests seen in 1922, the first on May 24; June 17 two apparently grown young were being fed by a female.

*Bronzed Grackle (*Quiscalus quiscula aeneus*). A common summer resident but we have kept few notes on the nests found. Birds have been seen gathering material for their nests April 25, 1921. On May 13, 1922 a nest was found containing one egg and five young, one of which was frightened out of the nest 8 days later. (May 24, 1917 the contents of 7 grackle nests were as follows: one nest had one egg, two nests had 4 eggs each, three nests had 4 young each, while the last nest contained 3 dead young.)

American Goldfinch (*Astragalinus tristis tristis*). A nest contained on July 22, 1920 two goldfinch and two cowbird eggs. One young bird hatched July 24, but died three days later, due apparently to neglect by its parents; the male was never seen while the female was so exceedingly timid that, although she had built her nest by the sidewalk, she flew away whenever anyone passed.

*English Sparrow (*Passer domesticus*). An abundant resident. The earliest nest found contained young about a week old on March 20, 1920. April, May and June are the height of the nesting season; by the middle of July there are few birds still nesting and very few in August. My daughter Constance destroyed in Norman in 1922, 480 eggs and young of this pest.

*Western Lark Sparrow (*Chondestes grammacus strigatus*). Two nests in small pine trees, each containing three eggs, were seen June 16 and 30, 1922; both were later found destroyed.

Field Sparrow (*Spizella pusilla*). A pair were feeding young in the nest May 15, 1921.

*Cardinal (*Cardinalis cardinalis cardinalis*). Six nests were found in 1920, one each in 1921 and 1922. The earliest was in process of construction April 13, 1921, contained one egg, April 21; and one young and one egg on May 5. The latest broods seen were one bob-tailed young bird just out of the nest on August 22,

1920 and another brood of fully grown young that were still begging from their father on September 2, 1920.

Blue Grosbeak (*Guiraca caerulea caerulea*). Females have been seen with food in their bills on July 17, 1922 and August 22, 1920.

*Dickcissel (*Spiza americana*). A nest found May 15, 1921 contained two dickcissel eggs and one cowbird's; this was later found deserted.

Purple Martin (*Progne subis subis*). In 1920 the martin box on our grounds housed 4 pairs, in 1921 only one, while in 1922 none favored us by nesting there. In 1920 one pair began to build April 16, but 3 pairs of young birds that arrived May 1, began to build May 8; their young left July 27. In 1921 the martins began to build April 7.

*White-rumped Shrike (*Lanius ludovicianus excubitorides*). One nest has been found each year; June 4, 1920 a nest contained two young nearly ready to leave while two others had already left; May 15, 1921 parents were feeding young in the nest; April 2, 1922, a nest was found finished but empty, on May 2 it contained 5 blind, newly hatched young and one egg, and on May 22, 3 young were seen near the empty nest.

*Bell Vireo (*Vireo belli belli*). Seven nests were found, 5 of which were failures, 3 on account of cowbirds, the other two nests being found destroyed. The earliest dates each year were: bird seen with building material May 12, 1920; nest with one egg May 29, 1921 and a partly built nest May 14, 1922. The latest date on which birds have been seen building was June 11, 1922.

*Yellow Warbler (*Dendroica aestiva aestiva*). Two nests found; June 19, 1920, 3 young left their nest which had a cowbird egg and warbler egg imbedded in its floor; June 30, 1922 a nest contained 3 small warblers and a cowbird twice as big. A young warbler recently out of the nest was seen June 19, 1922 and another July 17, and a pair of warblers were observed feeding a young cowbird July 11, 1922.

Sycamore Warbler (*Dendroica dominica albilora*). A parent bird was seen near the Canadian with insects in its bill July 8, 1922.

*Western Mockingbird (*Mimus polyglottos leucopterus*). Eighteen nests were found. The earliest dates were: nest in process of construction, April 16, 1920; nest with 2 eggs, April 24, 1920; nest with complete set of 4 eggs May 2, 1922. Late dates were: nest with one egg, July 14, 1922; 4 young just hatched August 1, 1920 and another brood that had left the nest but were being fed by their parents August 20, 1920.

*Catbird (*Dumetella carolinensis*). A nest with one egg was found June 6, 1922; on June 21 it contained 3 newly hatched young and one egg. One young bird recently out of the nest was seen August 22, 1920.

*Brown Thrasher (*Toxostoma rufum*). Nineteen nests were found in 1920, 23 in 1921 and 16 in 1922; of the 58 only one was placed on the ground, the others being built at heights varying from 2 to 20 feet. The earliest nests with complete sets of eggs were found as follows: April 25, 1920, 3 eggs; April 15, 1921, 4 eggs; April 20, 1922, 3 eggs. The latest nests contained 2 and 3 young on July 7 and 11, 1922. The majority of sets have consisted of 3 or 4 eggs; in 2 cases we have found 5 eggs and once 6 eggs—May 15, 1921.

Carolina Wren (*Thryothorus ludovicianus ludovicianus*). A wren was seen building its nest April 6, 1921; the nest with one egg was later found deserted.

*Texas Bewick Wren (*Thryomanes bewicki cryptus*). Four nests has been found, 3 of which are known to have succeeded. These wrens usually build their first nests about the middle of March, bringing off their young in early May. In 1921 a pair built their nest in February but no eggs were laid until the last of March; these hatched April 16; some of the 7 young left April 30 and the rest May 1; the parents coralled their family into an old mockingbird's nest for the night of May 2 and into a woodpile May 4; they were still feeding them on May 9. May 15, there were 4 eggs in the same nest.

*Plumbeous Chickadee (*Penthestes carolinensis agilis*). Four nests have been found, one in a wren box on our grounds. A parent was seen building its nest March 30, 1920 and carrying food to young April 17. May 1, May 6 and May 24 are other dates when young have been found in nests.

*Robin (*Planesticus migratorius migratorius*). Nine nests were found in 1920, 25 in 1921 and 15 in 1922. The earliest dates were: in 1920 a robin building on March 18, a nest with 2 newly hatched young and one egg found April 18, one young bird out of the nest May 1; in 1921 a nest with 4 eggs was found March 23, the 2 young leaving April 23, while a young bird from another nest left as early as April 21. In 1921 we found 9 nests with complete sets of eggs in March, but in 1922 the first nest seen was in process of construction on April 8. Late dates were: a nest in process of construction June 17, 1920; 2 newly hatched young and one egg on June 30, 1922, and a brood that had left their nest being fed by

parents July 24, 1922. Robins have markedly increased here of late years as breeding birds.

*Bluebird (*Sialia sialis sialis*). Twenty nests have been found in the 3 years; 8 of these are known to have succeeded and 2 to have failed. The first broods are started in late March or early April and the second broods from the middle of May till early June. The earliest egg found was on March 24, 1921; the latest brood were still in the nest on June 29, 1922. Two broods left the nest when 16 days old, two when 17 and one when 18 and 19 (there were 6 young in this brood). In one case the young of the first brood helped feed the young of the second.

X. IDENTIFICATION. AND ECOLOGY OF POLYPODIUM (Sw) AN EPIPHYTIC FERN INCLUDED IN THE OKLAHOMA CRYPTOGAMIC FLORA

M. M. Wickham

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Polypodium incanum (Sw.) is one of the rare, if not the only epiphytic fern, recorded in the Oklahoma cryptogamic flora. In March, 1914, while conducting a party in field biology at Blue Falls, Armstrong, Bryan county, Oklahoma, the writer observed a peculiar growth on the high and arched branches of a bur-oak tree (*Quercus macrocarpa*) which resembled a coarse and scurfy moss, or lichen growth. Closer inspection revealed this to be a perching fern.

Among its common names are: "hoary polypody," "scaly polypody," "tree fern," and "resurrection fern." "Tree fern," is from its habit of growing in the tree tops, and "resurrection," refers to its habit of revival after drought.

The growth began about ten feet from the ground, and ascended on the north side of the trunk to a height of some twenty-five feet, passing out on the north sides of the major branches, as well. The running rhizomes were branched and embedded in a substratum of moss which found a symbiotic protection beneath the fronds of the fern. The fronds were thick, scurfy, and about three to six inches in length. Where exposed, they were rolled inward in the desiccated condition, and where shadowed the fronds were practically expanded exposing a mossy green upper surface.

Ecology

Polypodium incanum (Sw.) "the little gray polypody," may be termed a 'straggler' into our territory (Clute) ranging from a warmer region. It is most abundant in the tropics, where it grows