

IV

For all my obsession with the wood warblers, I have not ignored other bird families. Among passerine species, the sparrows and flycatchers offer a special challenge to the photographer, of bringing out the subtle distinctions of marking and color by which they are differentiated. This is especially true of the sparrows, among which precise identification may hinge on gradations of color.

The flycatchers of the genus Empidonax present an even subtler problem, since the similarities are so great as to confuse a field observer unless their habits are taken into account. Until studies of breeding and nesting behavior, geographical distribution, song and call notes finally established a basis for distinguishing among them, taxonomists collecting and measuring specimens had debated the validity of specific and subspecific distinction among the Acadian, yellow-bellied, least, and Traill's or alder flycatcher of eastern North America. The dispute over the last, especially, went on for years. Was it a single species made up of closely related but geographically separated races, or was it in fact two species, genetically distinct and to be differentiated in their respective choice of habitat, nest construction, and song? Field observers had noted slight plumage variations, along with striking distinctions in behavior, between the Traill's or alder flycatcher of the Appalachian highlands, New England, the Canadian and boreal zones, and that inhabiting lower altitudes in the Midwestern and prairie states. The former, darker variety is associated with moist, boggy pastures and sproutland, where it builds a loosely constructed nest of dry grasses with many trailing stalks, very much like that of the song sparrow. It is usually placed low in the dense foliage of wild rose, spiraea, or raspberry bushes, or in a

tangle of blackberry vines. The song of this flycatcher can be represented syllabically as wee-bé-o, and thus the bird is commonly referred to as the wee-bé-o type. The paler Traill's flycatcher of the more westerly lowlands prefers marshes or drier bushy fields, where the nest is built at a higher level than that of its relative, usually in an upright crotch of a dogwood, alder, elder, or willow, where it is less well concealed than the other. It is constructed of thistle-down and gray plant fibers stripped from weed stalks, woven with dead twigs into a neater and more compact cup than that of its Eastern relative--one that suggests the nest of a redstart or yellow warbler. Its two-syllable song is represented syllabically as fitz-bew.

In the valley of central New York State, the ranges of the wee-bé-o overlap, and the two and fitz-bew types/are found in close proximity. Here, there is some evidence that interbreeding occurs, producing/offspring of an intermediate type whose nests and songs do not place them clearly in either category. It has been proposed that during the Wisconsin glaciation the prototype of Traill's flycatcher may have been split into two discrete populations, and that as the melting of the ice permitted both groups to spread northward, they were prevented from meeting by the developing coniferous forests, followed by those dominated by broad-leaved trees, that pre-empted the land vacated by the retreating ice sheet. As the forest cover was removed with the western advance of European settlement, this ecological barrier to the meeting of the two groups no longer kept them apart. Had the separation lasted longer, it is believed, the evolutionary path determined by environmental influence and mutational accident might have produced two distinct species.

Color photographs of the genus Empidonax clearly illustrate both the striking similarity and the subtle difference in the plumages of the species belonging to the group. For me, the most appealing is

the yellow-bellied flycatcher, with its subtle gradations of yellow in the under plumage. It is a summer inhabitant of the dark, damp coniferous forests and the sphagnum bogs of the Canadian zone from Maine to Minnesota, where the trees are mainly alder and black spruce. This bird and its close analogue, the Western flycatcher, are the only members of the family to build their nests on the ground. I have never seen the nest of a yellow-bellied flycatcher in the open. It seems to prefer the shade of young spruces or an overstory of alder in the wooded part of a bog. The first such nest I ever found was on Great Spruce Head Island, sunk in a mound of moss at the base of a spruce tree. All the others I have seen were in northern New Hampshire, Michigan, and Minnesota--and it was that past master, Dr. Powell Cottrille, who found them. His affection for these flycatchers is even greater than ^{he} mine, and/can scarcely resist tracking down their nests even when he has no intention of photographing them. The beauty of the setting these birds seem inevitably to select makes his enthusiasm easy to share.. Usually they choose a hollow in the side of a moss-covered hummock, where the concealment offered by hanging leafy stems renders the female, nestled down on her eggs, nearly invisible even on close inspection and when the precise location of the nest is known. Her unblinking black eye and wide bill are all that can be seen above the narrow rim of grasses composing the only visible part of the nest. But bryophytes are not the only reason for the mystery of these hidden sites. The slender spears of grass arching over the mound and projecting between the leafy thalli of sphagnum or cranebill moss are a tremulous further addition to the camouflage, and such sturdier foliage as the lacy, drooping fronds of the spinulose fern, the trefoils of wood sorrel, along with leatherleaf, Clintonia, Maianthemum, and miniature

snowberry vines, combine to produce the delicate unity of a microcosm.

This gentle, secretive flycatcher arrives on its breeding grounds in late May or June and departs once more for the tropics in August. But although its stay in the North is so brief, nearly everything that is known about its life and habits has been obtained during this period. Thus we know it entirely as a bird whose habits are uniquely adapted to the tightly circumscribed ecological system it occupies in the swampy woodlands where it breeds. It stays close to the forest floor where it builds its nest and rears its brood, seldom if ever deserting this habitat to explore the upper levels of the forest. Through this damp environment it moves like a ghost, flitting mothlike from one low perch to another, pausing to snap up small insects with a faint click of its bill and then darting on again. But its travels are not totally silent, and herein lies the secret of tracking down its nest. By patient watching and listening in its black-fly- and mosquito-infested haunts, Powell Cottrille learned that the female flycatcher utters a characteristic note, not identical with the song of the male, during the brief intervals when she leaves her nest unattended in her search for food. The male's more incisive song is variously rendered as consisting of two or possibly three notes, with the accent on either the first or the second syllable, thus: chu-wee or pee-weep. The female's note, which Powell refers to as the nest ^{softer,} song, is a ^{a/more} drawn-out, plaintive peee-weee, without an accent, produced at frequent intervals. Though more squeaky than melodious, it has a sweet, sad quality, and Powell says it is a certain indication of a nest hidden in the vicinity. Once the author of the note has been found, if she can be kept in sight as one discreetly follows her through the lower-story vegetation, she will lead one to her nest—a principle that is simple enough, though in practice keeping track of a small,

well-camouflaged bird in the leafy environment of a sphagnum bog is something else again.

The yellow-bellied flycatcher's Western counterpart inhabits moist canyon bottoms in northern New Mexico, and I have found it there in considerable numbers. The plumage of the Western flycatcher's breast and belly is paler than that of the yellow-bellied, and although in some respects its nesting habits are analogous, there are also some striking differences. They find a suitable habitat in Pacheco Canyon, on the western slope of the Sangre de Cristo Mountains a few miles north of Santa Fe, at an elevation of about eight thousand feet. For a considerable distance the canyon is narrow and shaded, supporting a mixed vegetation of streamside willows, wild currant, aspens, ponderosa pines, white and Douglas firs. The firs thrive in the dark, wet bottom of the canyon, whereas the pines also grow along the drier sides, intermingling at the tops of ridges with scattered junipers and Gambel's oaks. It is in the canyon bottom that the Western flycatcher nests, along with Macgillivray's warblers, Audubon's hermit thrushes, house wrens, red-naped and Williamson's sapsuckers. I have found their nests in varied situations, the most usual being on a narrow ledge of a steep bank, in a cover of moss; but besides rotting stumps several feet above the ground, the sites have included, most unexpectedly, the joists under bridges--a spot more commonly chosen by phoebes.

Two other Empidonax flycatchers occur in and around Pacheco Canyon. The Hammond's builds its nest high in the branches of the tallest pines growing on the canyon floor. The preferred habitat of the Wright's flycatcher, also known as the dusky ~~or~~ gray flycatcher, is the thickets of Gambel's oak on the dry slopes and ridges above the canyon. The nests of this species are constructed of plant down and fibers in a neat, compact cup attached to the forked oak branches, rarely more

than five feet above the ground. They look like the nests of the fitz-bew Traill's flycatcher or of the black-throated gray warbler, whose chosen habitat is the pinon-juniper association of a lower altitude. Associated with the Wright's flycatcher on these oak ridges are spotted and green-tailed towhees, Virginia's and orange-crowned warblers--all ground nesters--along with black-headed grosbeaks in the oak trees, and Western tanager and Steller's jays in the ponderosa pines.

The member of the genus Empidonax commonly called the Acadian flycatcher is misnamed, owing to the erroneous designation of a specimen taken in Nova Scotia (Acadia) as the type of the species. It was later established that the specimen was actually a Traill's flycatcher, and that the so-called Acadian species never reaches Nova Scotia. Its habitat is in the broad-leaved deciduous forest of the Midwest and South. It is found nesting only where a high forest crown produces a condition of discontinuous light and shade unlike the continual gloom of the tropics, where the seedlings of shade-tolerant dogwoods and trees of the climax growth find a favorable balance. The scientific name Empidonax virescens (given to the species after the error in the type specimen was discovered in place of acadicus, though the common name continues in use as before) is appropriate, since its plumage is greener than any other in the group. Nevertheless, to identify the Acadian flycatcher in the field by sight alone is all but impossible unless the habitat and nest structure ^{are} ~~proved~~ verified. This is the only flycatcher of the genus commonly found in the woodland conditions just described, whereas the Traill's requires bushy open country, pastureland, or alder swamps, and the yellow-bellied is found only in the bogs of the coniferous forest. The nest of the Acadian flycatcher is usually built at a height of less than fifteen feet in the shrubbery

of the forest understory, placed in a horizontal fork of a small dogwood tree or a sapling of the principal climax species. It consists of a woven of plant fibers and grasses and shallow, pendant cup, /suspended in the manner of a vireo's at the junction of the two branches. It is a frail structure compared with the vireo's, however: the mesh is so open that the eggs can be seen through it from below, and the fabric as a whole is so unsubstantial that it rarely lasts through the winter, ~~unlike~~ the vireo's nest, which may survive disintegration for several seasons.

The altitudinal range of habitats near my home in New Mexico has made possible a great diversity of bird species within a rather circumscribed geographical area. Thus, in the grassland of the valleys and along the course of the Rio Grande, where the Conquistadors found grass tall enough to brush the bellies of their horses, but where ^{after} centuries of overgrazing it grows no more than a few inches high, such ground-nesting birds as horned larks, lark sparrows, and Western meadowlarks are to be found. Among the evergreens of the pinon-juniper association, where the trees are dwarfed and widely spaced, the nesting birds include white-rumped shrikes and mockingbirds, as well as such occasional wanderers as the black-throated desert sparrow and other Lower Sonoran species. // At a somewhat higher altitude, where the junipers and pinons are denser, pinon jays nest in loose colonies. These gregarious birds regulate their nesting with the availability of their staple food, the seeds of the pinon pine. In years when the production of pinon nuts is poor, they may not breed at all or nesting may abort after a tentative beginning. Nesting may occur at almost any time except during the coldest months of the winter. Following an abundant crop of pinon nuts in the fall, the jays may begin building their nests in March, and they may do so as late as October. In April 1946 I found twenty pinon jay nests on a ridge just south of the Santa Fe city limits.

The colony had been pointed out to me by my friend Jens Jensen, an amateur ornithologist living in Santa Fe, who had also discovered nests more nests in another area about a mile farther south on the same ridge. Young birds were successfully raised in only three of the twenty-six nests. The causes of the high degree of failure were complex. Eight of the nests had been deserted before or just after completion, possibly because the supply of pinon nuts was inadequate. Eggs were laid in the remaining nests--only one or two in some, although the majority contained a full clutch of four. Broken shells and disturbed nest linings found in many of these, and scraps of skin and fur in one, suggested that there had been predation by ground squirrels--although squirrels could not necessarily be blamed for the disappearance of eggs from nests which otherwise showed no sign of having been plundered. The mystery was compounded by the discovery of one nest on which the incubating female lay dead above her eggs. It occurred to me that poisons put out to kill rodents might have destroyed the colony.

It was at one of these colonies that I photographed pinon jays and witnessed some of their peculiar habits. The birds adjusted quickly to the presence of the photographic equipment, showing signs of uneasiness only when it was necessary for me to change the film. During the first two days of photographing them, the weather was cool even though it was mid-May, and since the young were still without feathers, the female stayed on the nest to brood for long periods. From time to time she would rise up on the nest and feed her young by regurgitation, and when her mate appeared he too fed them in this manner. Sometimes she would assist by taking some of the food he had raised from his crop and give it to the young birds. She kept the nest scrupulously clean by swallowing all her young's excrement, and in every respect was a most devoted and solicitous parent. When I changed the film in the camera, she would quietly slip off the nest, to return as soon

as I went back to my car, from which I operated the remote-control switch.

Feeding by regurgitation is not practiced by scrub jays or by the Eastern bluejay, but is the method used by crows. I first watched this manner of feeding in Maine, from a blind ⁱⁿ beside a spruce tree containing a crow's nest, and the similarity of this habit to that of the pinon jays led me to recognize a closer relationship between the two than between pinon and other jays. The Spanish-American people of New Mexico have long called the pinon jays blue crows--one more illustration of the perspicacity of country folk whose understanding of nature is based not on books but on direct observation. Whether pinon jays share a propensity for polygamy or polyandry with crows I do not know, but I should be less than surprised if they did.

The pinon-juniper flats frequented by pinon jays are also the habitat of the gray vireo, the ~~Wright's~~ or gray flycatcher, and the Western gnatcatcher, a drab version of the blue-gray gnatcatcher found in the East. Birds of this species are immediately recognizable by their small size and longish tails, their sizzling voices and continual nervous activity. A pair in the act of building a nest may seem to be completely preoccupied and indifferent to observation; but it is well not to approach them too closely or to linger watching them at work, since they have the odd habit of moving their nests as soon as the observer has gone, provided no eggs have been laid. I remember once coming across a busy and vocal couple, one member of which carried an enormous beakful of nesting material that looked like cotton lint. I watched them only long enough to find out where the nest was being built, and then left

immediately. After allowing time for the nest to be completed and for the female to lay a full clutch of eggs, I returned to find no trace of the nest--^{not} a scrap of material or any indication that a nest had ever been started. It and the birds themselves had vanished so completely that I almost doubted the soundness of my memory.

In this same dry forest zone two species, the ^{brown or} ~~canyon~~ and ^{the} ~~spotted or rufous-~~ sided towhee, live the year round in an environment that changes only with seasonal cycle. In winter they forage for the seeds of wild grass and for those of the Chamisa, which sift to the ground from plumes ^{that} ~~form pale, beige-tinted thickets.~~ When snow blankets the ground and the seeds are hard to find, sub-zero temperatures send them to my feeder; but with the advent of warm weather, they retreat once again to the safety of the Chamisa thickets to nest, the spotted towhee on the ground while the canyon towhee builds a bulkier structure among the protective branches. In other respects their habits are not at all similar. Except in its nesting ^{behavior} ~~habits~~, the spotted towhee is far less secretive than the brown or canyon towhee, which skulks through the underbrush and utters a mewing, metallic complaint when disturbed. The song of the latter bird is a monotonous series of notes, all on one pitch, like the rattle of the chipping sparrow but of greater volume. The song of the spotted or rufous-sided towhee is cheerier, resembling that of its relative the Eastern red-eyed towhee, and the male sings indefatigably from the first ^{warm} day of March until well into July.

In the shaded canyons above the piñon-juniper zone, ^{of} the ribbons of the forests of fir, ponderosa pine, and aspen that grow at higher altitudes extend downward, cutting through the expanse of sun-baked slopes. Here, in addition to the Macgillivray's warbler and the Hammond's and Western flycatchers, the nesting birds include the red-naped and Williamson's sapsuckers, which drill their nest holes in living aspens, and the violet-green swallows, whose preferred nesting site is in old sapsucker holes, with hollow

trees a second choice. Still another canyon resident is the Audubon's hermit thrush, which builds a bulky nest in a seedling fir, rather than on the ground like its Eastern relative.

As one ascends these canyons, the mountain slopes on either side become less precipitous, and Gambel's oaks and ponderosa pines replace the pinons and junipers. The oaks on these open slopes rarely grow more than ten feet high, in low, scrubby tangles that form a lower-story vegetation among the pines. Here black-headed grosbeaks and Wright's ^{a dusky} ~~or gray~~ flycatchers are the common residents of the oak thickets, and where the oaks are small and scattered they give cover for such ground-nesting birds as gray-headed juncos, the spotted or rufous-sided towhee, and--at the lower limit of their range--the green-tailed towhee. These slopes are also the home of the Virginia's, orange-crowned, and Grace's warblers. But the commonest breeding birds of the ponderosa pine-Gambel's oak association are the Western tanager and the Steller's jay. For nesting the jay appears to prefer young Douglas firs growing in cool, sheltered draws already partly pre-empted by aspens. Tanagers nest in the more mature pines and firs, well out toward the end of a branch where the foliage is thickest. My first experience in photographing a nest by lowering it has already been described. Another time, I used the same technique to lower a tanager's nest containing downy young. The female had accepted the new position although the male had not, and I had begun photographing her when a sudden rainstorm rapidly turned into a cloudburst, accompanied by hail. The female now disappeared, probably in search of shelter, and her forsaken young were soon soaked and in danger of being killed by the hailstones. Removing them to the shelter of my car, I dried them off and warmed them under the heater. After the storm had passed I returned them, dry and lively, to their nest before the mother returned to carry on her interrupted maternal duties as though nothing had happened.

As one moves upward in the Sangre de Cristo range, the Douglas firs become more numerous, replacing the ponderosa pines until at an altitude between nine and ten thousand feet the forest consists mainly of spruce and fir, with stunted aspens occupying slopes swept by fire in years past. With this change in vegetation, the bird life is likewise modified.

found at lower altitudes.

A few species, such as house wrens, gray-headed juncos, and green-tailed towhees, are more abundant here. So are the Audubon's warbler and Audubon's hermit thrush. And as the climate becomes the equivalent of that prevailing in the damp evergreen forests of Canada, many species known otherwise only to more northern latitudes appear. Among the most common is the ruby-crowned kinglet, quickly recognizable by its bubbling song, and trailed without much difficulty to ~~their~~ nests in the thick upper foliage of the spruce trees, which grow in parklike natural stands. Pine siskins, which likewise prefer the spruces, are also abundant. Among the wild currant bushes that flourish in the high valleys, where the soil is too wet for evergreens, and along the mountain brooks, the white-crowned sparrow nests along with the green-tailed towhee. The white-crowned sparrow's plaintive, searching whistle as it announces its territorial boundary is the same sound--or so it would seem--as may be heard on winter evenings among the willow thickets lining the irrigation ditches at a lower altitude. But the birds are not the same; the winter residents are Gambel's white-crowned sparrows, and their breeding grounds lie far to the north. The one visible difference between the two races is in the eye stripe, which in the Gambel's white-crowned sparrow starts at the bill rather than at the eye as in the race that breeds in the Sangre de Cristos and migrates farther south for the winter.

Gray jays, the camp robbers of the Rocky Mountains, roam the spruce forests, giving their whining call, along with Clark's nutcrackers, which here reach the southernmost limits of their range. In July and August, the males of two species of hummingbirds, the rufous and calliope, on

their way southward from nesting territories in British Columbia and Alaska, rattle from blossom to blossom of the Indian paintbrush.

In these high alpine basins, the spruce trees stand on ground slightly higher than the open meadow, where such disparate elements as the milky-plumed hellebore, with its fans of stiff, accordion-pleated ^{drooping,} leaves, and the/fragile blue-pink clusters of the mertensia, are part of a synthesis that is at once harmonious and marvelously complex, the undisturbed creation of a multiplicity of forces that have been at work here for perhaps ten thousand years. It was in such a setting that I discovered my first ruby-crowned kinglet's nest. While I sat looking down on the meadow and the serrated profile of a grove of spruces, I became aware of a small bird flying repeatedly into the top of one of the shorter trees, and identified it as a kinglet. Since its behavior suggested the presence of a nest, I climbed the tree and found one, still in the process of being built. After the eggs had hatched, I was able to photograph the birds by roping the top of the nest tree to a taller neighbor, cutting it off, and then lowering it gradually to the ground between the two trees. The kinglets proved remarkably adaptable to their changed situation, and I was able to carry on my photographic activities from only a dozen feet away. Once I had finished, I hoisted the cut-off top to about half its original height and left it there until after the young birds had flown. Although at first glance the situation had not promised such easy success, it was one of the simplest nest-lowering projects I ever undertook.

On the treeless crests of the highest peaks, where summer begins in July and ends in August, the vegetation becomes subarctic. Scattered along the Rocky Mountain range all the way to Canada, these tundra-like areas ultimately coalesce at a lower altitude with the Hudsonian zone of vegetation. Here, as in the arctic, willow trees are fully mature

only six inches high, and the flowering plants include saxifrages, gentians, alpine primroses and phlox, and sky-blue dwarf forget-me-nots. Two species of birds nest in these arctic barrens: the Townsend's solitaire, which migrates vertically from its winter home in the river valleys at the end of June, when the mountains have shed their mantles of snow, and the American pipit, a genuinely arctic species, whose range stretches across the Western hemisphere from southern Greenland and northern Labrador to the northern coast of Alaska, and some of whose races have ~~have~~ retained a foothold on these mountaintop outposts of the last ice age as far south as New Mexico. Both the solitaire and the pipit nest in sheltered nooks under logs or slabs of rock, or in sod banks that offer some concealment from the searching eyes of gray jays and nutcrackers.

In September, when the birds begin to come down from the mountains, my wife and I walk out each morning into the pinon-juniper region behind our house to watch for them and to look for wildflowers. After a wet August, flowers spring up everywhere as in a second spring, and as in spring the birds are singing. One call, a single, sweet, clear, flutelike note, sounds again and again. After spending the summer on Great Spruce Head Island, it is no longer familiar. And if I do not remember the note, neither can I find the bird, blinded as I am by the sunrise over the western foothills of the Sangre de Cristo range. From the top branches of the low pinons and junipers, other birds answer the call; but their silhouettes are indistinguishable from the bushy outlines of the trees in the sharp morning light. Then, as one begins a soft, melodious warble not unlike a bluebird's, I remember it from high in the mountains in June, and suddenly recognize the song of the Townsend's solitaire.

After nesting in June or July, the solitaires move down from the boreal mountaintops to the desert foothills, where they spend the winter. In autumn they sing in unison, as though to say: "Here am I, where are

you?" But the question remains, why do they sing? They cannot be announcing their claim to a territory at this time of year. I believe they sing as a response to the sun, from which all life flows, from sheer exuberance of spirit. To the scientist, however, the notion of sun worship is unacceptable when imputed to creatures less intelligent than he. Offering what he considers a more logical explanation for the singing of birds in the fall, he says that as part of the cycle of the solar year, the onset of migration, song, and mating in spring is in response to the increased intensity of light from the sun as the earth swings around the ecliptic, and that in autumn when the light is dwindling it passes through the same degree of intensity that initiated the cycle six months earlier. September, he says, is a false spring to which birds respond, though in a lesser degree, as they did to the true spring in March in April. But although this explanation may be scientifically acceptable, it does not account for bird song throughout the winter months, when white-crowned sparrows whistle at dawn and dusk from the willow thickets where they roost for the night. And when the solitaire sings at noon during a January thaw, whether he is or is not a sun-worshiper is a distinction of little moment. Why should he not be? We human beings are all sun-worshipers: we have no choice. The physicist who works to harness the energy of the sun with a thermonuclear device is a sun-worshiper in a very practical sense, whether or not he will admit it. When science reaches beyond the phenomena of nature into metaphysics, it enters a realm where such distinctions lose their meaning.

The solitaire is not alone in his response to the light. House finches also sing from their high perch on television aerials, their rosy throats glowing in the sun. In the brown fields, invisible among the dead stalks, Western meadowlarks gurgle melodiously. Robins too

ing on winter days when the sun is warm, and when we ourselves are half deluded into believing that spring is on the way.

The birds that appear first in the fall have been driven from their cool summer homes at high altitudes by freezing weather. Some, such as the cerulean mountain bluebird, have been forced by ~~driven~~ ^{driven} ~~back~~ ^{back} of their insectivorous habits to come in search of dormant pupae, the eggs and resting stages of insects and spiders. Junco and white-crowned sparrows come to feast on the tiny seeds of the chamisa. Clark's nutcrackers make their appearance in late September, when the opening of the pitchy pinon cones reveals the brown fruit nestled inside. Along with them come the Steller's and pinon jays, both of which like to feed on the topmost cones of the pinon pines.

During the greater part of the year, foraging bands of pinon jays roam the low foothills and juniper flats. As winter approaches, these groups gradually coalesce into flocks of several hundred. When September comes around, these flocks are already well developed. During the period which in New Mexico amounts to a second spring, when the arroyos between the ridges are golden with a variety of blossoming herbaceous plants and shrubs, the jays begin to appear near my house in undisciplined troops that eventually become a sort of ragged confederation. Alighting in the cottonwood trees, they caw noisily while they look the place over. Although they have been here before and will ~~return~~ ^{return} when natural forage becomes scarce, they do not yet approach my feeder, whose contents are not to their liking. On a sudden unanimous impulse they all take off, still conversing, in a straggling flock,

Although the behavior of pinon jays is affected by the seasons, they are nonmigratory birds, and do not even change their habitat to the same degree as the nutcrackers and Steller's jays, which migrate

vertically between the high mountains and the foothills. In this respect the pinon jays are like their relatives the scrub jays (Woodhousei), which live all year round in the pinon-juniper region. Whether they have developed as sophisticated a means of communication as their similarly gregarious relatives the crows has not been determined. But it would appear that the isolating influence of territorial claims that affects the mated pairs of most bird species has been attenuated, permitting cooperative associations such as the presence of a third adult bird as a helper at the nest.

As I sit at my typewriter on a winter morning, I can look out through my studio window at the low hills to the northeast while a flock of pinon jays makes its circuit of the feeding grounds in the Tesuque valley; they know where all the handouts are, and often they fly directly over the studio shortly after sunrise. They sail down from the hills in groups of less than ten, until the entire flock of more than a hundred birds has gathered in the cottonwood trees near the house. Here they often sit for a while, "mewing," "queching," and "whawking" before they settle on the feeder in a blue, squabbling mass. After they have gorged themselves, they fly back in straggling columns to the hill from which they have come.

As the weather becomes frostier with the approach of winter, bluebirds begin to appear: the all-blue mountain bluebird, which commonly nests among the firs and aspens at the same altitude as the solitaire, and the Western bluebird, which differs from the Eastern species in being marked with chestnut on its back as well as on its breast. Traveling in groups and small flocks that stay together, the bluebirds are easily recognized by their gentle, piping calls and by the peculiar, wing-flicking flight that is characteristic of

thrushes, including the solitaire. The Western bluebird, like its Eastern counterpart, nests in hollow trees or old holes made by sap suckers. In the valleys they are also particularly attracted to rundown apple orchards, where they find an abundance of nesting sites. Once I found a mountain bluebird nesting well below its usual altitude, in the hollow in an adobe wall under the eaves of a barn, and I found another building its nest in the deserted burrow of a ground squirrel in the steep side of an arroyo.

In spring when nesting begins, bluebirds and scrub jays have both acquired their brightest plumage. All three species go through a postnuptial molt in summer, leaving their plumage grayer and more somber. Mountain bluebirds, clear azure in spring, are slaty blue following this molt, leaving the sexes less easily distinguished and more like the juveniles. From intense purplish ultramarine, the Western bluebird has become quite drab; even the chestnut on the back is less conspicuous. The scrub jay is less affected by the summer molt, although its hue is noticeably less brilliant. The adults of this species do not molt in the spring; instead, the conspicuous spring plumage is acquired by the wearing down of the duller-colored feather tips had concealed the intenser blue underneath. The transformation is gradual and unnoticed until we begin to feel spring in our bones.

During the winter, flocks of strange birds occasionally appear in the cottonwood groves along the watercourses that drain the western slopes of the Sangre de Cristo range. They come unexpectedly to stay a few hours or day, departing with as little forewarning as they came. Notable among these erratic visitors is the evening grosbeak, whose migration routes, breeding grounds, and wintering localities are continually shifting. They may be abundant one year and absent the next, or they may come and go during the same season, especially during the

winter months. For nesting they seem to prefer the coniferous forest, either high in the mountains of the West or among the firs of northern Michigan, Minnesota, and Canada. But even in this they are not consistent. In New Mexico the first intimation of their abrupt arrival is often a multitudinous chirping, like that of English sparrows, from the tops of the cottonwood trees. Perched there in the dead of winter, they may sit for hours simply talking among themselves. If they arrive in spring after the sap has begun to rise, they feed on the swollen leaf buds—though without causing appreciable harm to the trees. They are usually not interested in the bird seed I put out, which attracts other birds in large numbers. However, as confirmation of their unpredictable behavior, one year a large flock stayed around for weeks, eating enormous quantities of cracked corn that I spread in the driveway. Sometimes they appear at sunrise to drink from the pool I keep unfrozen all winter with an electric heater. At such times they can be seen at best advantage, and the differences between the sexes are easily discernible. Across the forehead above the massive, greenish-white beak, the male has a band of lemon yellow extending backward as a superciliary stripe. The crown is black and the feathers of the neck, throat, and cheeks are dark olive brown fading to olive yellow on the back, sides, and breast. The tail and primary wing feathers are jet black, but all the secondary wing feathers—as though by a capricious afterthought—are immaculately white. When the bird is perched, these large white patches and the huge, light-colored beak are its most conspicuous features. The female grosbeak is much less gaudily marked: her dark head, without the yellow band, and its color blends into the soft, silvery gray ^{along} of the back ^{which} plumage, which becomes lighter toward the tail—^{which} itself a much darker gray, as are the wings.

The aggressive appearance of evening grosbeaks does not belie

their behavior. Coming to drink in the morning, they drive away all the robins and even attack one another.

A less frequent visitant, and the only other bird whose wanderings are equally erratic, is the Bohemian waxwing. Late one winter a few years ago, a large flock mysteriously appeared in our Chinese elms and cottonwoods, where its members spent several days feasting on the winter buds. The number of waxwings around Santa Fe must have been very large, since they were reported simultaneously by many observers. Unlike its smaller relative the cedar waxwing, the Bohemian waxwing is generally confined to the Western states. It breeds in the boreal forest, and roams widely over the Rocky Mountain area throughout the rest of the year. Both waxwings are sleek, fawn-colored birds with neat, unruffled, pointed crests. The Western species is the darker of the two, and differs also in possessing white wing markings and rusty undertail feathers. The presence of red, waxlike tips on the wing feather margins is not an invariable attribute of either species. On the occasion I have mentioned, it was their voices that first drew my attention to the presence of a flock of waxwings—a continuous sibilance overhead, such as a swarm of very large and noisy gnats might make, which caused me to look up and find the trees covered with birds. At first I thought they were cedar waxwings; but the sound had a hoarse, grating timbre, and unlike the clear, monosyllabic zee of that species, it consisted of two syllables, the first very short: zereee. With field glasses I noted immediately the white on the wings and the rusty feathers under the tail, and knew the visitors were Bohemian waxwings although I had never seen one before.

As the days grow warmer with the approach of spring, the house finches begin to sing in earnest, and to investigate all their favorite nesting sites: the lamp by the front door, the open Mexican birdcage

that hangs on the wall under the west portal. These first signs of courtship are premature; nest-building by the house finches will not begin seriously for another month. Another sign of the imminence is the trilling of plain titmice of spring/as they explore cracks and crannies and broken-down woodpecker holes with an eye to setting up a household. But it is not until the Say's phoebes appear and begin their frantic courtship, trilling sweetly in unison as they flutter seductively around the portals, that one can be sure ~~that~~ the cold weather is over for another season. And on the day when the rattle of hummingbird wings cuts through the air, one can be confident that spring has truly arrived in New Mexico.