New Mexico

In 1946 I moved my family permanently to New Mexico. We settled in the small unincorporated community of Tesuque six miles north of Santa Fe. The name Tesuque was adopted from the nearby Tesuque Indians whose pueblo antidated the founding of de San Francisco de Santa Fe by the Spanish in 16 . The land to the east behind our house was uninhabited and extended to the Santa Fe National Forest boundary beyond which the hills rise successively into the Sangre de Christo Mountains. This is semi-arid country -- some call it desert -- thinly covered with stunted pinion pines and junipers and more scantily with stag-horn cactus, a variety of cholla. The Tesuque Pueblo as well as the Spanish-American community exists here because of the Tesuque River which rises on the western slopes of the Sange de Christo Mountains, flows north down a narrow valley between eroded hills then, where the hills fall away, out onto a plane for ten miles to its confluence with the Pojoque which empties westwardly into the Rio Grande. Along the course of the Tesuque -- an intermittant stream that flows during the spring run-off and later in the summer and fall only when there are rains -- grow cottonwood and box elder trees. All this terrain in the watershed of the Rio Grande is a highly eroded sequence of alluvial deposits of sand, gravel, and clay laid down millions of years ago by ancient streams and lakes ~~during the pre-glacial epoch,~~ losely consolidated, and subsequently cut down to its approximate present configuration ~~in~~ clearing the pluvials of glacial advance. The thin sandy soil along the stream bottoms and out-wash planes gives rise to a bushy vegetation primarily of Chimisa and Apache plume ~~but is nearly non-existant~~ which On the steeper slopes of the eroded hills ~~where~~ bare gravely ground is more extensive than are areas occupied by sod-forming gramma and muhly grasses. The latter grows in slowly expanding tightly packed rings of curly blades from the centers of which the growth dies back as if caused by a depletion of ~~the mineral content of the ground.~~ nutrients The former if not over-grazed will proliferate over the ~~valley floors~~ arroyo bottoms of the foot hills where

the gradient is less steep and the rains have a chance to soak into the soil before the water all races away down the ~~arroyo beds~~ eroded channels. The massed spikes of gramma grass like millions of tiny sickles, tremulous and glittering, as ~~XXXX~~ reflect the golden sun in the autumn of the year when snake weed and chimisa are all afire and purple asters declair their own private spring. And they last all winter through the snow.

Here in this environment each spring from the willow thickets of the Rio Grande and its tributary water courses to the apline meadows of the Sangre de Christo range I learned to know the birds of New Mexico. Because the mountains rise five thousand feet above the river valleys spring does not come every where at once in New Mexico. It spreads slowly from the lowest altitudes of the major rivers bottoms beginning in March and April to the mountains tops by mid-July. Throughout this altitudinal range the habitats available vary widely, which, as one would expect, has resulted in a great diversity of bird species ~~of birds~~ breeding within a rather circumscribed geographical area. Thus, in the grass lands of the ~~XXXXX~~ valleys and along the course of the Rio Grande where the Conquistados reported grass so ~~long it~~ high that it brushed their horse's bellies, but now after centuries of over-grazing scarcely reaches to a horse's hocks, one finds birds adapted to a xeric environment characteristic of the Upper Sonoran xerophytic and forest zones. The ground nesters are Horned Larks, Lark Sparrows and Western Meadowlarks and in the evergreens of the pinion-juniper association, White-rumped Shrikes, Mockingbirds, where the trees are dwarfed and widely spaced. Rarely such Lower Sonoran species as the Black-throated Desert Sparrow wander this far north to breed and nest. At a somewhat higher altitude, but not in the foothills ~~evergreen forests~~ where the junipers and pinions have begun to establish, by the density of their growth, an appearance more resembling the usual forest condition, Pinion Jays nest in loose colonies. ~~at times of year determined by the availability of food~~ These gregarious birds regulate their nesting according to the availability of their staple food, the seeds of the pinion cones. In the years when pinion nut production is poor they may

not breed at all, or nesting may abort after a tentative beginning. Nesting can occur almost any time of year except in the coldest months of winter. Following a good pinion crop in the fall the birds may begin to build their nests in March and they have been known to nest in any month of the spring and summer up into October. In April 1948 I found twenty~~three~~ Pinion Jay nest on a ridge just south of the Santa Fe city limits in a colony that had been ~~was~~ shown to me by Mr. Jens Jenson, and six nests in another area about a mile further south on the same ridge where it is drained by four shallow confluent draws. Of the twentysix nests in ~~only three~~ were young birds successfully raised. The cause of such high nesting failure was complex. In eight cases nests were deserted, before or just after completion, possibly for reasons assignable to inadequate food supply resulting from ~~such as~~ a poor pinion nut crop. In the remaining nests however eggs were laid, in some although only one or two, but in the majority a full clutch of four. ~~Failure of the majority of these was probably due to predation~~ and disturbed nest linings. Since broken shells were found in many of these, and in one scraps of skin and fur, the most probable cause of failure seemed to be predation by ground squirrels, but they could not necessarily ~~account for those from which the eggs had disappeared~~ be blamed for the disappearance of eggs from those nests which otherwise showed no signs of having been plundered. The mystery was compounded by the situation in one nest in which the incubating female was found dead on her eggs. I wondered if poisons put out by some one to kill rodents might have destroyed the colony.

These pinion-juniper flats are also the habitat for the Gray Vireo and the Gray Flycatcher belonging to the confusing Empidonax genus. ~~The~~ Western Gnatcatchers, a drab versions of the eastern Blue-gray, are found here also in May. They are immediately recognized by their small size, longish tails, sizzling voices and nervous activity. When a pair are discovered in the act of building a nest in which they may seem to be completely preoccupied and indifferent to observation, it is well not to approach them too closely or to linger around to watch them at work for they have the curious habit of moving their nests as soon as the observer leaves, provided no eggs have yet

been laid. I remember an incident of this sort when I came across a very busy vocal couple, one of which was carrying 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 departed immediately. On returning a sufficient number of days later to have given them time to complete the nest and for ~~her~~ the female to lay a full clutch of eggs, I could find no trace of the nest -- not the ~~slightest~~ least scrap of material or slightest indication that a nest had ever been started in the place where I was positive I had seen them building -- nor any signs or sounds of them . So completely had the nest and the birds vanished that I began to doubt the soundness of my memory.

Other birds of this xeric-forest zone are two sedentary species, the Canyon and the Spotted Towhee, both of which live the whole year around without wandering far afield in an environment that changes only with the ocillations of the seasons. In winter they forage for wild grass/ grain and in thickets for the diminutive ~~chimisa~~ seeds that sift to the ground from the beige chimisa plumes, ~~and~~ but when the seeds are hard to find under a blanket of snow in the chilling cold of sub-zero temperatures they accept without question or hesitation the bonanza of my feeder. With the advent of warm weather the towhees retreat once more/ to the safety of the same thickets to secreting their nests; the Spotted Towhee concealing hers on the ground, the Canyon Towhee building her more bulky nest up/ among the protective branches. ~~of bushes and small trees~~. These two towhees are hardly similar in any other respects. The Spotted or Rufous-sided, except for its nesting habits, is far less secretive than the Canyon or Brown Towhee which skulks through the underbrush uttering ~~from concealment~~ a Mewing, metalic complaint ~~protest~~ when disturbed. The song of the Canyon Towhee is a monotonous series of notes all on one pitch like the rattle of the Chipping Sparrow but of greater amplitude. The Rufous-sided's song is a gayer composition more like the eastern Red-eyed Towhee/ which (it bears) a closer alliance to. The male is an indefatigable singer, ~~beginning to sing from the first~~ voicing its cheery proclamation from the first

day of equinoxial warmth in March well on into July. One awakes on one of those rare, unexpectedly spring-like and hopefilled mornings in March to the sound of his song at sunrise outside the bedroom window, and knows that life potential has revived and flows strong again after the gray dormancy of winter.

The only warbler that breeds in the juniper-pinion forest of the low foothills of the Sangre de Christo Mountains is the Black-throated Gray. In June they are not uncommon in this association and may then be heard singing as they demarcate their respective breeding territories. The song of the Black-throated Gray is reminiscent by its buzzy quality, though not in pattern, of that of the Black-throated Green to which it is genetically rather closely related. These two warblers of the genus Dendroica, together with Golden-cheeked, Hermit, and Townsend are thought to have evolved from a common prototype during the retreat of the last ice sheets of the Quaternary. That time of rapid melting and withdrawal of the glacial front closely followed by an extension northward of the coniferous and hardwood forests was also a period of expansion of the ranges of many species of birds. It may have been then, some twenty thousand years ago, that the present migration patterns for many kinds of birds were first established, and for some species to this day are still being extended and reinforced. There is no general agreement between scientists as to the initiating causes of migration among birds, but there seems little doubt that the glacial advances over the northern hemisphere drove many species towards the tropics into permanent residence for the duration of the age for those that survived. We don't know whether in the long interglacial more than one hundred thousand years ago period, warmer than today, the small passerines had established regular migration habits, nor do we even know what species lived then; palaeontology informs us little. Morphological evidence indicates, however, that with the retreating ice and the expansion northward of many tropical types speciation took place simultaneously with the development of migratory routes. As with the races of the Trails Empidonax flycatchers which could have been

determined when the continental glacier withdrew and the birds reoccupied separate regions of the liberated continent by different paths of advance, and ~~or~~ as the differentiation between the Yellow-bellied and the Western species -- both ground nesters -- might also have been brought about ~~by a similar sequence of events~~, so the speciation of the four warblers of the genus Dendroica most closely related to the Black-throated Gray as proposed by _____ could have an analogous explanation. The five species here considered: Black-throated Gray, Black-throated Green, Golden Cheeked, Hermit, and Townsend all winter in ~~the same general region~~ Mexico and Central America north of the Isthmus of Panana. (Since) they share the same (general) ancestral home and it is not inconcievable that they have descended from a common prototype since the features of their plumages are alike in pattern. This postulated ancester would have been a tropical species, as in genetic origin are all the members of the Wood Warbler family. During the most recent period of glaciation they were confined to a sub-tropical or at least a temporate climate and when the ice sheet began to retreat climatic changes made available vast ~~new~~ regions into which the ~~ancestral~~ prototypical warblers could advance. Such creation of more habitat and new territory on a wide front in North America could not have failed to have a ~~very~~ marked stimulating ~~effect~~ influence on population growth, and the avifauna of Mexico (responded by) colonizing the empty land. The prototype species of ~~the Black-throated Gray~~ these Warblers fanned out to the east and west as it moved north into what ~~has become~~ is now the United States and in so doing established (more or less distinct) local populations which ~~the cold~~ each winter drove back the Cold towards their ancestral home ~~of origin~~. ¶ With the slow warming of the continent these fluctuating movements gradually lengthened into definitive routes for each separate population until a migration pattern ~~habit~~ became genetically impressed on each group. One population emigrated to the northeast- to New England, New York state, and The Great Lakes country and became the Black-throated Green Warbler; another from which developed the Black-throated Gray traveled north along the eastern escarpment of the Rocky Mountains. A third group, the present Hermit species, spread into the western part of the continent, reached the Pacific and continued on up the coast to Oregon and Washington, but because the Rocky Mountains - still encased in the ice of innumerable glaciers - presented a formidable barrier, the second and third populations remained out of contact on their nesting ranges. No ¶

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A fourth population possibly initially expanded northward along the Pacific Coast from Mexico, but eventually extending its range the farthest north of all to southern Alaska and the Yukon Territory. These birds were the ancestors of the Townsend Warbler. The nesting ranges of the Hermit and Townsend prototypes overlapped in the Pacific Northwest, but the populations did not hydridize, maintaining distinct identities apparently by occupying separate ecological nitches, the fine differences between which have not yet been unequivocally defined. The fourth and smallest of the emigrating groups, from which arose the Golden-cheeked Warbler extended its range the shortest distance to the dry Edwards Plateau in Texas where it adapted to a narrow ecosystem in an oak-juniper association not unlike that to which the Black-throated Gray has accommodated in New Mexico.

With the development of these characteristic migration patterns, and genetic fixation ~~make up of the group~~ which served as an isolating mechanism on the group, tending to reduce contact and opportunities for interbreeding between different group individuals, evolotionary changes followed slightly divergent lines within each coherent population, and thus the process of speciation proceeded. The differential adaptations that have taken place on the matrix of the prototype species are reflected in both the morphology and behavior patterns of the separate populations. Morphological differences are manifest by plumage variations between the five species, whereas behavior differences are exhibited by nesting habits, nest structure, and materials used. The plumages of Black-throated Gray and Townsend Warblers are almost identical in pattern the difference between them being that ~~face~~ where the former is white the latter is yellow. In the Black-throated Green and Golden-Cheeked the black auricular patch ~~of~~ present in the first two species is reduced to an eye-stripe and the cheeks of both are yellow, ~~and breasts white; the differences between them being~~ but the crown and back feathers which are black in the Golden-cheeked and greenish in the Black-

throated Green. The Hermit Warbler is like the Black-throated Gray but with an all-yellow head. They all have black throats, and all but the Townsend white breasts. These descriptions apply to the males of the species. That these five species, fundamentally so similar, arose from a prototype species by fortuitous evolutionary influences acting on geographically isolated populations is generally accepted by ornithologist. The same process has been proposed to account for the differences between the Myrtle and Audubon's Warblers, which, however, hybridize where their ranges intergrade, and for speciation within other genera of warblers, as for instance the Mourning, MacGillivray's, and Connecticut.

Higher in the foothills, above the pinion-juniper zone, in the shaded canyons, where small brooks still flowing in spring before they trickle away their last water to the alluvial sands of the valley, ribbons of the aspen, pine fir, and ponderosa forests extend down ~~from above~~ to lower altitudes at which, ~~they are able to exist~~ on the exposed, sunbaked slopes, they are unable to exist. In the relative humidity of these dark canyons several species of birds find a favorable habitat. In the wild ~~goose-berry~~ currant bushes that border the ephemeral mountain brooks Macgillivray's Warblers, the counter part in the west of the Minnesota Mourning Warbler, but distinguishable from them by possessing white eye lids most marked in the male, build their nests. In all respects as regards to behavior the MacGillivray's ~~XXXXXX~~ is no less shy and secretive than the Mourning Warbler. Aspens offer prefered nesting sites for the Red-naped and Williamson's Sapsuckers who drill their nest hole in the living trees. The Western Flycatcher analagous to the Yellow-bellied of the northeastern coniferous forests ~~nests~~ (resides) here too for the short span of summer, ~~in the moss-covered banks,~~ building its nest ~~out of shreds of moss~~ ~~rotting stumps, and under bridges~~ like the Phoebe out of sheds of moss in moss-covered banks, rotting hollow stumps, and under wooden bridges. Audubon's Hermit Thrushes build their bulky nests ~~in fir seedling~~ in seedling firs, not on the ground as do their eastern relatives. And The other Empidonax flycatcher of these canyons the Hammond's places its neat compact cup-like ~~nest higher~~ nest ~~in the~~

on the high branches of mature firs. As one ascends these canyons, the mountain slopes that contain them become less precipitous and the pinion-juniper forest that cloaked them at lower altitides is replaced by a mixed growth of Gambel's oaks and ponderosa pines. On these open slopes the oaks, rarely attaining a height of more than ten feet, grow in low scrubby tangles that form a lower story vegetation among the pines. Black-headed Grosbeaks and Wright's Flycatchers are the common resident species in these thickets, and where the oaks are small and scattered they provide cover for ground nesting Spotted Towhees, Gray-headed Jumcos, and, at the lowest altitude of their range, Green-tailed Towhees.

Among the warblers three species occur in limited numbers of which the Virginia and the Orange-crowned nest on the ground in the most stunted oak thickets, and the Grace's nests in the pines. I have seen the Grace's Warbler here more often than the other two but have never found its nest, whereas by luck & hard work I have found and photographed both the Virginia -- the more common of the two ground nesting warblers -- and the Orange-crowned Warbler; but of this latter I have never seen more than one pair. To find the Orange-crowned nest I devoted the better part of a week following my discovery of the bird. The male was singing from top branches of the tallest Gambel's oaks growing on a steep gullied slope. He ranged across the mountain side for almost a quarter of a mile staying always on the same contour, voicing his feeble trill repeatedly from the same high perches for minutes on end. Any one of the singing posts, I knew, might be close to the nest and I searched for it in the oak thickets on hands and knees. I hoped to flush the female, in which case the search would be over, or at least to cause her such anxiety that she would show herself to me by scolding. Then, if only I could keep her in sight until her alarm subsided she would inevitably reveal the location of her nest as she returned to it. But it was a futile strategy. For hours, day after day, from various vantage points I watched the male as he moved about his terretory, singing always from the same stations, but he was never joined by his mate. To find that nest became an obsession - nothing else mattered - this bird above all

others I was determined to photograph. I recapitulated in my mind all the evidence for the location of that nest in different parts of the territory over which the male bird roamed, and I tried to reappraise all the assumptions on which the ~~course~~ direction of my search was based. I started from the beginning again and again to ~~redetiniate~~ establish the area that the male had staked out, and even went beyond that, assuming that his/singing territory ~~was~~ did not ~~coterminous~~ synchronize with the apparent breeding territory. This last ~~seemingly desperate~~ assumption ultimately rewarded my persistance. Early one morning a week after first hearing the Orange-crowned sing, I had wondered well beyond the boundary of what seemed could be a reasonable extension of the area ~~the warbler~~ he had ~~marked out~~ outlined by ~~his~~ small singing, ~~stations~~ and while looking across a small ravine I saw a/bird fly to the ground under a low flowering shrub. It did not rise again and while I debated the meaning of this action the male Orage-crowned ~~Warbler~~ appeared on an oak close by. He did not sing but presently the bird that had disappeared under the bush flew out and joined him. So there was the nest surely, at last ~~which~~ I had searched so long. I crossed the ravine, not hastily, for I did not want to be too soon disappointed, and there (on the ground set far) under a buckthorn bush cloaked in fascicles of small creamy blossoms was a nest and ~~five~~ eggs. ~~The ground under the buckthorn surrounding the nest was covered with~~ It was surrounded by dried sienna-colored oak leaves ; the five small eggs wreathed at the large end in speckles of brown and purple were unmistakably those of a warbler.

The Virginia's Warbler's nest which I found not far away on the same hillside was similarly situated under a seedling oak, and I discovered it in much the same way. This time ~~XXX~~ I was looking down across a wide ravine when I noticed a bird drop down from a pine tree into some low scraggly oaks. At first I thought little of it but as I continued to study the hillside the same thing happened again. A coincidence of this sort is rarely a chance occurance so I focused my ~~attention~~ glasses on the oak clump and soon saw a bird emerge. It was a gray warbler which could be nothing else than a Virginia's. As I continued to watch, I saw her return a third time carrying some kind of material in her

bill. ~~Obviously~~, ~~There was no~~ No doubt ~~question about it~~, she was busily building a nest. My curiosity ~~was so~~ unresistable ~~it~~ overcame my better judgement and at the ~~considerable~~ risk of causing the bird to desert I crossed the ravine to investigate. The risk was greater than I had anticipated for what I found was only the bare beginnings of a nest, perhaps just started that very day. I retreated hastily, discretely marking the spot, and did not return for a week. When I did I was relieved to find a completed nest with eggs, which in the usual course of time were hatched and the young birds successfully raised.

Two common birds that breed in the Ponderosa pine-oak association are the Steller's Jay and the Western Tanager. The Jay seems to prefer for its nest the young Douglas firs that ~~find the most favorable conditions for~~ germination and growth in the cool sheltered draws already partly pre-empted by aspens. Tanagers use the more mature ~~individuals of both types of conifers~~ pines and firs for their nests, placing them well out towards the ends of the limbs where the foliage is thickest. The first Western Tanagers I photographed successfully had built their nest in a ponderosa pine on the dry north side of Pecheco? Canyon. ~~This was the first~~ as previously described, that I lowered to photograph.

This was the nest I photographed by lowering as previously described. In a similar situation I used the same lowering technique with another tanager's nest containing downy young. The female had accepted the new position but not the male and I had started to photograph her when a rain storm came up which rapidly developed into a small cloud burst accompanied by hail. At this juncture, probably in search of shelter, the famale disappeared, foresaking her young who soon became soaked and were in danger of succumbing to exposure of being killed by hail stones. I removed them to the shelter of my car, dried them off, and warmed them under the heater. The storm passed and the sun came out again. I returned them dry and lively to their nest before their mother returned to resume her interrupted maternal obligations, which she proceeded to fulfill for the rest of the day, as if nothing had happened in the interval.

The aspen groves inhabited by the two species of sapsuckers, mentioned

above, also provide, in fortuitous collaboration with the woodpeckers, nesting sites for Violet-green Swallows, which, paralleling the Tree Swallow of the eastern part of the continent, nest in hollow trees, or preferentially the sapsucker holes of previous years.

The farther one ascends into the Sange de Christo range above the oak-pine zone the more numerous and generally distributed the firs become as they replace the ponderosa pines until between nine and ten thousand feet the forest is predominantly a fir-spruce association with stunted aspens occupying the slopes swept years ago by fire. As would be expected with this change in vegetation there occurs a concommetant modification of the avifauna. A few species, that appeared first at a lower altitude are found here in greater abundance such as House Wrens, Gray-headed Juncos, and Green-tailed Towhees. But in these cooler altitudes, equivalent climatically to the damp evergreen forests of Canada, many new species seen only in the northern latitudes of the Canadian coniferous zone make their first appearance. Ruby-crowned kinglets quickly recognized by their cheery bubbling songs are very common and their nests high in the thick upper foliage of the spruce trees that grow in natural park-like arrangements are not hard to find by watching the birds. Audubon's Warblers, the western counterpart of the Myrtle, and Pine Siskins both of which ~~are adapted to nesting in~~ prefer the spruces are also abundant.

Nesting in the seedling evergreens one finds here also the Audubon's Hermit Thrush, while the wild current bushes that flourish in the boggy swales of these high valley meadows - too wet for evergreens - and on the borders of the mountain brooks provide secure nesting sites for the White-crowned Sparrow - the commonest fringilid of these mountain heights - and for Green-tailed Towhees too. The ~~notes~~ songs of the White-crowned, which here are announcements of the rights of possession, to breeding, are the same searching, plaintive, whistled ~~songs~~ of winter evenings when similar ~~the~~ birds are settling noisily for their night-time ~~roost in the willow thickets~~ along the irrigation ditches. But though their songs are alike ~~same~~ they are not the same birds; those resident in winter where I live are the Gambel's White-crowned that have come down from breeding grounds in the north country. On them the white eye stripe starts at the bill, not at the eye as with the race that breeds here in the Sange de Christos ~~and~~ but migrates farther south for the winter.

Gray Jays, the camp robbers of the Rocky Mountains, uttering their whining calls roam through the spruce forests with Clark's Nutcrackers which reach here the southern-most limits of their range. In July and August Rufous and Caliope Hummingbirds, the males of the species, on their early southward migrations from nesting terretories in British Columbia and Alaska rattle from blossom to blossom of the orange Indian paintbrush, ~~blue columbine, and other alpine flowers~~.

Here in these high alpine basins the spruce trees, which ~~the perceptive eye may at once recognize~~ stand always on ground slightly higher than the open meadow, are distributed in full harmony with the entire visual scene as if planned with such incomparable sensitivity that not even the suggestion of falsity intrudes to defile the beauty of the scheme. Every feature appears as it has to appear in conjunction with all others like the pieces in a gigantic jigsaw puzzle each occupying its single possible place. No discordant note can be perceived down to the smallest detail. From the wide spreading lowest limbs of the spruce trees on the edge of a grove to the lonely topmost spire each branch assumes its uniquely predestined position in perfect agreement with those below. The trees crouded behind, some taller some less tall, seem not to conflict with those occupying the forefront positions, but with intermeshing limbs give cooperative support to the integrity of the group. And around and between these clumps of tall dark evergreens the marshy meadow with its golden brook gurgling under flowered banks joins with symbiotic intimacy the disparate elements of the scene. Milky-plumed helebore with stiff, coarse, accordian-pleated leaves is no less intrinsic to the total synthesis than is the fragile, blue-pink mertensia that decorates so subtily the pool sides. This marvelously complex yet harmonious creation could not have been the purposeful product of conscious effort; it could never even be replicated artificially for it is the work of an enormous multiplicity of mysteriously inter-webbed, cosmic forces: the imperceptible ebb and flow of (10,000 years of) seasons, ~~and~~ changing climates, and the invisible emenations from outer space that leak through the atmosphere's protective barriers. The archetect is patinet Nature herself.

It was in such a high alpine basin that I found my first Ruby-crowned Kinglet's nest. I was sitting on the mountain side, from where I could look down upon the meadow, admiring the serrated profile of a tight grove of spruces when I became aware of the repeated flight of a small bird into the top of one of the shorter trees. I ~~was able to~~ identified it as a kinglet and its behavior suggested the presence of a nest, which by climbing the tree I quickly verified. The nest when I discovered it was being built but after the

eggs hatched I was able to photograph the kinglets. By ~~ropping~~ the top of the nest tree to a considerably taller close neighbor, then cutting ~~the top~~ it off below the nest and lowering it gradually to the ground between the two trees. The kinglets were remarkably adaptable to this ~~procedure~~ manipulation and to my photographic activities which I carried on from only a dozen feet away. When I had finished I hoisted the cut-off top about half way back to its original height and left it there until the young birds had flown. This was one of the ~~easiest~~ simplest nest lowering projects I have ever done ~~successfully carried out,~~ accomplished although at first glance the situation did not appear to promise such easy success.

Higher yet on the mountain side under the crumbling rock walls of glacial cirques, in which the last remnants of Pleistocene ice melted resistingly away thousands of years ago on the slowly warming planet, small tarns retain through the short alpine summer, in glacially transparent waters, a frigid age-long continuity with the blue ancestral ice that produced and fed them. These lowering amphitheaters are the summer haunts - following the serious business of bringing up their young - of western ravens who play wild unrestrained aerobatic games in the up-rushing drafts above the perpendicular cliffs that echo and re-echo their frenzied croaks. From the stunted shrubery and sphagnum hummocks that choke the marshy outlet of the tarn, where its surplus waters flow away, the ineffably sweet song of the Lincoln Sparrow acts as counterpoint in gentle protest to the harsh cries of the ravens.

On the treeless tops of the highest peaks where summer begins in July and ends in August the vegetation becomes sub-arctic. These isolated tundra-like areas are sprinkled along the Rocky Mountain range all the way to Canada to coalesce ultimately at a lower altitude with the Hudsonian vegetal zone. As in the arctic, the trees here are miniature - the willows when fully mature only six inches high - and the flowering plants include saxifrages, gentians, alpine primroses and phlox, and the sky-blue stary eyes of dwarf forget-me-nots. Two species of birds nest on these arctic barrens: the Townsend Solitaire that migrates vertically from its winter home in the river valleys, when,

by the end ofjune, the mountains have shed their ~~white~~ snow mantles; and the American Pipit, a truly arctic species, the center of whose range stretches across the the western hemisphere in thehigh latitudes of ~~between~~ the sixties and seventies from southern Greenland and northern Labrador to the north coast of Alaska. It is a bird of the tundra of which some races have retained a post-ice age foothold on the isolated mountain-top Arctic islands ~~arctic of tundra~~ ~~down the length of the Rocky Mountain chain~~ to as far south as New Mexico. Both the Solitaire and the Pipit place their nests in sheltered nooks under logs, slabs of stone, or sod banks which provide for them ~~with~~ some concealment from the searching eyes of Gray Jays and Nutcrackers.

~~To return now to the grasslands of the valleys~~: For each of the first few years of my residence in New Mexico I began my photographic activities in April in search of Desert Horned Larks. With these birds I spent many hours observing, ~~and~~ recording in detail their activities, and photographing ~~them~~. I had never known birds like them before and was tirelessly fascinated by the way they behaved near their nests. All the North American Horned Larks have a curious habit of collecting small pebbles which they arrange on one side of their nests as a ~~sort of~~ paved door step. The function of this structure is as obscure as is the pitch that Red-breasted Nuthatches smear around their nest holes. On the grasslands areas where I have studied Horned Larks in New Mexico the adobe clay soil contains very little gravel (instead of pebbles) and the larks use clumps of clay, ~~therefore, being unable to find the usual material for the pavements use instead of pebbles~~ for the pavements in front of their nests. Larks go to their nests by running along the ground, a ~~way~~ manner of approach which is least likely to reveal its location. Sometimes they make low, reconoitering flights ~~over their nest~~ before alighting on the ground a dozen yards away, where for minutes on end they may stand upright with stretched necks to peer over a clump of weeds. When reassured at last they dart forwads their nests with lowered heads from one tuft of grass to the next. To keep them always in view requires unwavering attention because they are the same pinkish color as the sandy soil ~~and when they freeze~~ with which they blend in perfect camouflage (when they freeze to immobility in moments of alarm). Then if the postion has not been well noted the bird is not easily found again.

Curious as the behavior of Horned Larks is, that of Pinion Jays, that nest in the junipers and pinions distributed in patchy groves across the high savannahs ~~of New Mexico~~, is even more interesting. For one thing they nest in loose colonies, a habit not shared by the ~~XXXXX~~ common ~~XXXXXX~~ ~~XXX~~ Woodhouse's or Scrub Jay of New Mexico. I have already described two colonies of Pinion Jays observed over a period of several weeks, in which, mysteriously, only three nests out of twentysix survived

successfully
predation or desertion and produced young birds. It was at one of these
nests that I first photographed Pinion Jays and was able to witness some
of their peculiar habits. The birds responded very well to the photographic
and seemed to be disturbed only
equipment and to its operation, ~~the only major disturbance to their activities~~
the first two
~~being caused~~ by the necessity for changing film. During the days on which I
the weather was
photographed were cool despite its being mid May, and because the young were
as yet featherless, the female stayed for long periods on the nest brooding.
on the nest
From time to time she would rise up and feed her young by regurgitation, and
when her mate appeared he too would feed in this manner, assisted often by
her taking some of the food he had raised from his crop and giving it to the
babies. She kept the nest scrupulously clean by swallowing all her offsring's
ecrement, ~~nor offspring produced~~, and in every respect was a most solicitous
and devoted parent. When I changed film in the camera she would quietly slip
off
the nest, but would return immediately when I went back to my car
from which I operated the remote control switch. Feeding by regurgitation
a
is not/practice of Scrub Jays or of the Eastern Bluejay, but is the method
first
used by crows. In Maine I watched this manner of feeding from a blind beside
impressed
a crow's nest in a spruce tree, and was subsequently ~~struck~~ by the similarity
among
of the habit ~~of these~~ Pinion Jays in New Mexico, and I began to recognize
a closer corvine relationship between them and crows than between Pinion Jays
and the other two genera of blue-plumaged jays. This insight revealed to me
the homely perspicacity of the Spanish-American, shared with country folk
understanding of
everywhere whose ~~observations on~~ nature, though not unfounded on book learning or
(off hand)
scientific observations, should never be dismissed as superstitious
for long
nonsense. The Spanish people of New Mexico have ~~always~~ called these Pinones
Blue Crows, and with good reason; not because they knew how they fed their
(and behave like)
young, but because they do look like small blue crows with their short tails
(they pull) (and flocking tendencies)
and long straight bills. / whether they share with crows a propensity for
poligamy or polyandy I do not know although I would be less than surprised
if they did. Crows ~~are birds that flock, as do Pinion Jays, and establish~~
are well known for their

a ~~primative~~ gregarious ~~community~~ way of life (which includes a primative intra-group ~~system of~~ communication system of signals and alarm calls from posted sentinels. Pinion Jays also have adoped ~~cooperative~~ community foraging living, roaming the country-side in large groups in winter and nesting in loose colonies at whatever time of year, by virtue of abundant food, is auspicious for breeding. Whether they have developed as sophisticated means of communication as have the crows has not been determined. It is not surprising that within crow society an attenuation of the isolating influence of terretorial claims and defense that surrounds the mated pairs of most bird species should have occured, and that more complicated relationships between individuals of a group have developed. The weakening of pair-bond barriers thus permits cooperative associations, among three or more individuals, to form for the care of the young, but also to allow ~~observers to allow~~ nest sharing by two females, a situation for which some evidence has been aduced. The acceptance by a mated pair of a third bird of the same species as a helper at the nest in caring for the young is a phenomenon that has been frequently observed with many other species, and I too have ~~too have~~ seen ~~this kind of~~ assistance given with complete tolerabce by the proprietor birds at the nests of Florida Scrub Jays ~~XXXX~~ and Brown-headed Nuthatches. Therefore the tolerance of a helper at the nest is not a circumstance that can be considered derivatively related by evolution to communalization since it happens where no community structure exists.

An equally interesting behavior of Pinion Jays that protects their young from discovery by predators, and therefore has survival value, is the way they approach their nests by walking to them from some distance away and then climbing up from branch to branch. Never have I seen a Pinion Jay fly directly to its nest, or to the tree in which it is situated, or even to one close by; nor have I ever seen one perch in the top of its nest tree. ~~In respect to~~ this as secretiveness Woodhouse's Jays behave in a similar way, although I have found their nests by watching them through glasses from a hillside, and seeing where they perched, and then searching all the trees around.

A peculiar type of behavior that I have observed in many species of birds while photographing them, which seems to be universal in the passerine order, is a nest probing habit practiced almost exclusively by the female. It usually starts during inactive periods in the feeding routine when she is brooding or shading her young. She gradually becomes more and more restless and begins to poke at the nest lining but soon is so engrossed in her works that she is prodding deeply into the bottom of the nest. The vigor of her efforts increases until with head down and out of sight she seems to be poking with the whole strengh of her body. This process is continued often for considerable lengths of time. At first I thought the action was an effort to rid the nest of parasites or insect invaders, but on examination I could find no parasites or ants or other insects to account for it. Incidentally, and inexplicably in view of the vigor of the probbing, the nest lining showed no signs of having been disturbed. I began to wonder then whether this behavior was perhaps not an example of displacement action brought on by the accumulated tension caused by my presence despite the apparent acceptance by the birds of my activities. Displacement ~~action~~ is that phenomenon of animal behavior in which an irrelevant action is substituted for a logical response to a stimulous, such as an aggressive reaction to a threat, as a face-saving or tension relieving mechanism. But the cayse of nest probing in unresolved.

As I sit at my typwriter every morning I can look out of my studio window at low hills to the north east. A flock of Pinion Jays making their rounds of the feeding grounds in the Tesuque valley, where they know all the hand-outs, frequently fly directly over the studio shortly after sunrise. They sail down from the hills in small groups of less than ten until the whole flock of more than one hundred birds has gathered in the cottonwood trees overlooking the house where they often sit for a while mewing, quehing, and whawking before settling on my feeder in a blue, squabbling greedy mass. Seen as they approach they appear to be beaded straight at the studio window only to veer upwards and over the top of the building at the last minute.

Gliding towards me on short triangular wings they look very much like those paper gliders we used to make as children and launch surreptitiously in the school room. They recall too a more recent vivid experience with Yellow-throated Sandgrouse in East Africa. At the Lake Lgarja Lodge in the Serengeti where I stayed for several days in 1970, each morning the grouse would come sailing between the umbrella acatias to drink at an artificial pond. They announced collectively their approach with a flow of gutteral calls - arr, arr, arr . . . . - which though they did not resemble very closely the whawks of the Pinion Jays in quality, were strickingly remeniscent of them by the volumn of the chorous.

After gorging themselves on the bounty of my feeder the jays fly back in stragling columns towards the hill from which they came, but since the return is up hill the increased exertion is manifest by a steady flapping flight in marked contrast to the swooping ease of the downward passage.