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AN EXPERIMENT UPON A ROOSTING COLONY OF BLACK-CROWNED NIGHT HERONS

WITH THREE ILLUSTRATIONS

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HISTORY OF THE COLONY

In the year 1898 the eastern end of the island of Alameda, in Alameda County, California, presented a primitive appearance which was in marked contrast to its present urban aspect. The city of Alameda, which now occupies practically the entire island and boasts a population of 35000 persons (census of 1930) was in those days represented by less than half that number, while most of the surrounding land was given over to extensive marshes and to grassy fields dotted with scattered stands of live oak trees. The marshes had not yet been drained, and they not only furnished a limitless hunting ground for the herons of the vicinity but were famous throughout the San Francisco Bay district as a resort for great numbers of waterfowl and shore-birds (Welch, 1931, p. 256). The open fields also had as yet suffered no disturbance, other than that resulting from the pasturage of a few cows; while the live oaks, which later were to be obliterated by the rising city, still furnished nesting sites for the herons, and even provided a last refuge for a pair of White-tailed Kites.

The first account of the Alameda colony of Black-crowned Night Herons (*Nycticorax nycticorax hoactli*) was published by Cohen (1900) after the birds had nested for two successive years in some tall cypress trees on his property. According to Cohen's statement no herons had nested on the island of Alameda during the years immediately preceding 1898, although evidence in the shape of several old nests indicated that prior to 1883 a colony of the birds had nested in the oaks. In any event the herons had regularly used the trees of the region for roosting throughout the entire period, and for that matter, as far back as any one can remember.

Included in this early record of the heron colony we find a lively description of the behavior of the birds, in which considerable emphasis is placed upon the noise which they made during the nesting season. The author of the account was a collector of natural history specimens and took an occasional set of eggs from the birds during the years that followed; however, these activities did not prevent the colony from increasing steadily in size and extent.

Mr. Donald A. Cohen, now living at Hayward, California, has very kindly supplied from his notes on the birds of Alameda much of the information given here regarding early conditions in Alameda, as well as a number of facts in the history of the heron colony itself. I am indebted to him, as well, for the kite record cited above.

During the first few years after 1898 only five or six pairs of herons nested on the Cohen estate, with an additional pair or two in the acacia trees on Central Avenue a mile or so away, but the birds steadily increased in numbers until by 1920 there were nearly two hundred pairs. Not only did the original settlement prosper, but a new heron metropolis sprang up in the tall, densely foliated cypresses in Lincoln Park, situated at the extreme east end of the island and only a few blocks from the Cohen place. During this lapse of time the city of Alameda had also undergone a considerable expansion, particularly after the earthquake of 1906, and as a result of this expansion the land around the Cohen tract had become filled in with houses.

In spite of the advance of civilization to the very borders of their habitat the tranquility of the herons continued unbroken for some years. With the exception of a few persons who resided close to the nesting trees of the birds and heard the nightly bedlam raised by the young during the early summer, it is doubtful if one passer-by out of a hundred was aware of the existence of the heron colonies. The secretiveness of Black-crowned Night Herons is due to the fact that they carry on most of their foraging after dusk and just before dawn, while during the hours of daylight they are accustomed to sit silent and motionless in the densest foliage available where they may be seen only with difficulty. More than one instance has been recorded of birds of this species roosting unnoticed and undisturbed in the very heart of a city (Gander, 1930; Soto, 1931); indeed, the environment as well as the attendant circumstances in one of these instances (Soto, *op. cit.*, p. 89) strikingly parallels that of the herons under discussion, even to the close proximity in both cases of a school playground with noisy children romping all day beneath the sleeping birds (fig. 18).

Perhaps during these years the heron colony derived some advantage, such as protection from natural enemies, by its proximity to civilization. At least we find that in constructing their nests the birds took advantage of many introduced trees such as acacia, eucalyptus and cypress; indeed, the cypresses were chosen in preference to the live oaks which represented the ancestral home of the species in Alameda. Mrs. G. Earle Kelly, to whom I am much indebted for other information concerning the history of the heronry, has recorded (1920, p. 159) that one of the birds of the Cohen estate was seen by her to break off a twig from an introduced locust tree and carry it away to its nest.

It is possible, on the other hand, that the Alameda heron colony increased in size as a result of an abandonment by many birds of the adjacent colonies on the mainland rather than from a natural increase in the original residents. This possibility seems all the more likely when we consider that the process of settlement and reclamation which has transformed most of the surrounding country into a region incapable of supporting bird life was at its height at the very time the Cohen heronry attained its maximum numbers.

In 1925 the Cohen estate was sold to a real estate agency and cut up into small lots. All the cypress trees and most of the oaks were chopped down, streets were laid out and paved, dwelling houses rose up in solid ranks, and the old order vanished (fig. 19). According to residents in the vicinity, most of the dispossessed birds joined their kindred in Lincoln Park; but even there misfortune followed them. There is one cypress in the park which is by far the largest and most densely foliated of all, and it was natural that these characteristics should make it the most desirable for roosting purposes. Unfortunately a section of the park where this tree grew was devoted to a base-ball field, and the grandstand had been built directly beneath the

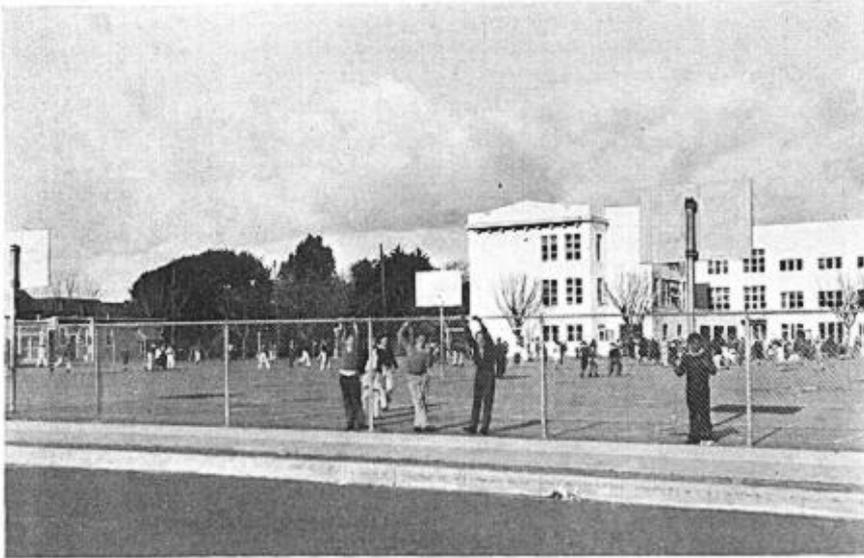


Fig. 18. CALIFORNIA LAUREL TREE WHICH FURNISHED A RETREAT FOR BLACK-CROWNED NIGHT HERONS IS SHOWN IN THE BACKGROUND AS THE LARGE, DARK MASS AT THE LEFT. THE LINCOLN SCHOOL PLAYGROUND OCCUPIES THE FOREGROUND.



Fig. 19. IN THESE OAKS A COLONY OF BLACK-CROWNED NIGHT HERONS ROOSTED FOR MANY YEARS. VIEW LOOKING NORTHEAST FROM GIBBONS DRIVE, ALAMEDA, CALIFORNIA.

shady canopy of this particular cypress. The use of the tree by herons had for a long time been a source of annoyance to those below, but when the numbers of roosting birds was suddenly increased by extensive reinforcements from the Cohen property, the situation became intolerable. A few of the birds were shot by the local police, but the problem was finally solved by members of the Lincoln Park force, who destroyed all of the nests in the tree and then placed in its topmost branches a large scare-crow, which still remains as a conspicuous object. According to workers on the park grounds, the herons have not returned to that particular cypress since the erection of the scare-crow, although I observed them in large numbers among the other trees in the park, where they are accustomed to nest undisturbed.

Not all of the birds which were forced out of their old home on the Cohen estate in 1925 repaired to Lincoln Park, however. About twenty of them sought refuge in the front yard of Mrs. Vira C. Scott, seven or eight blocks away, on Van Buren Street, and remained there until the autumn of 1931, when the experiment now to be described sent them off once more in search of new quarters.

DETAILS OF THE EXPERIMENT

In September, 1931, after having endured the presence of the herons in her front yard for about five years, at first with satisfaction but latterly with increasing disapproval, Mrs. Scott appealed to the California Division of Fish and Game to remove the birds on the ground that they constituted a nuisance. About a month previous to this a similar complaint had been made concerning a colony of Black-crowned Night Herons in the city of San Bruno, San Mateo County. Permission had been granted to the police department of that city to shoot the offending birds and their execution had been carried out. Following the publicity attendant upon the killing of the San Bruno herons, the suggestion had been made by Dr. Grinnell, of the Museum of Vertebrate Zoology, that the birds might have been induced to leave of their own accord by some method which took into account their natural habits. The Alameda heron situation afforded an opportunity to test this suggestion and, accordingly, when the complaint was received by the Division, the task of inducing the birds to move was assigned to the writer.

An investigation of Mrs. Scott's premises showed that there had been reason enough for complaint. The California laurel tree in which the birds roosted was a large and venerable specimen which cast its shadow over nearly half the house and dominated the small yard completely. Everywhere beneath the tree were the conspicuous white droppings of the birds; they covered the flagstones in the garden path, the wooden railings surrounding the flower garden, and even the front and back steps of the house.

Almost beneath the tree was a small gold fish pool, the inhabitants of which had suffered even more directly from the presence of the birds. Within the last few days thirty fish had disappeared, and I learned that in times past a pool belonging to the Hessemeyers, who lived next door, had also been plundered. On several mornings, at 5:30, Mr. Hessemeyer had discovered two herons fishing in his pool, and each time he had routed them by throwing potatoes. On one occasion, while retreating under fire of the potatoes, one of the birds got its wings entangled in a vine which was growing on the nearby fence, and barely managed to avoid capture. After this experience the herons ceased to visit the gold fish pool in question. The awkwardness displayed here seems to be characteristic of the species, for during the experiments to be described I found that when the birds were suddenly startled into flight it was not unusual for them to become momentarily tangled up among the branches of the California laurel tree.

The problem of removal offered several difficulties. Night herons apparently see as well in the day time as at night and, indeed, are not infrequently observed hunting in the full light of day. This independence of light conditions on the part of the birds was one of the chief obstacles in the solution of the problem. Had the herons done their sleeping at night, like the majority of birds, it would only have been necessary to shake the branches of their roosting tree or in some other way disturb them enough to send them blundering off into the darkness in search of another lodging. Most birds which sleep at night are unable to find their way about after dark well enough to permit a return to their roosting places. Under such circumstances two or three evenings devoted to the disturbance of the birds would probably have sufficed to fix upon them the habit of assembling at other quarters, and since the behavior of birds is, to a large extent, dominated by habit it would not have been long before the original roosting place would have been deserted altogether.

Kalmbach (1932, p. 70) has found that, "once a Starling has been driven from a roosting spot and *has located itself at some other point* there is no urge to return to its earlier roost unless driven from its new abode"—even after a lapse of three or four years during which the birds have regularly roosted close to the original roost location. In the case of the herons, however, the birds were far from being bewildered when driven from their retreats. Instead they would settle with protesting squawks in the tops of neighboring trees and there await my departure, necks craned in my direction and wings partly raised as they balanced awkwardly among the slender top branches. Half an hour after my departure they would return to resume their interrupted slumbers. Unfortunately I did not at that time know of the successful employment of the scare-crow at Lincoln Park, and had taken it for granted that any such motionless object would soon cease to frighten the birds. It is probable that the wholesale destruction of nests, which accompanied the erection of the scare-crow, may have contributed to the effectiveness of the method. In the present instance there were no nests to destroy, however.

The possibility of throwing a large fishing net, such as a seine net, completely over the tree so as to prevent the birds from alighting in its branches was considered; but the size of the tree and the cramped quarters available for work rendered this plan impracticable. The use of pole traps was also out of the question, not only because of the attendant danger to the birds, but because such traps work efficiently only when baited or when placed upon prominent and convenient perches of the sort which furnish look-out posts for certain kinds of birds. In the case of Black-crowned Night Herons, however, the use of bait would result in failure because the birds feed upon shrimps, insects, salamanders and the like, which they are accustomed to seek on the ground or in water, not on the tops of elevated posts. Moreover, whether baited or not, the traps would be of little use, because of the circumstance that Black-crowned Night Herons are not attracted, as are hawks and owls, to isolated look-out perches, but instead are accustomed to plump themselves down into the thick foliage of a tree as soon as they arrive.

Dr. Jean M. Linsdale suggested that any strange object, such as a cluster of tin cans or a string of Japanese "wind-bells," might prove successful in frightening the birds away. As later events proved, however, the effectiveness of any disturbing contrivance depended more upon whether or not it operated without preliminary warning, and upon the degree of novelty which it presented to heron experience, than upon shape, size, or volume of sound emitted. A sudden light tapping upon the roosting-tree, for example, when performed at intervals far enough apart to prevent the birds from becoming accustomed to the sound, served to disperse the tenants, whereas a very loud noise, kept up all day long, would probably have been of no avail.

On September 22, I fastened four alarm clocks to the top of the bay tree by means of cords running through pulleys, which permitted the clocks to be lowered to the ground for re-setting and winding. From seven until nine in the morning the alarms were set to ring at half-hour intervals, and then shortly after nine I would arrive and set them to go off again at intervals of an hour until one o'clock. In the early part of the experiment I used to return once more and reset the clocks for the afternoon, but gave this up within a few days when it became certain that the birds did not return after the first two or three alarms in the morning.

Unfortunately the pressure of other duties always prevented me from arriving in time actually to see the effects of the alarm clocks upon the sleeping herons. Once I waited fifteen minutes until one of the clocks which I had just set should go off, but the birds, which had been disturbed into leaving at my winding the clock, stood in the tops of two nearby cypress trees, eyeing me with inquietude, and refused to come back. That the clocks did their work, however, is shown by the sudden decrease in the numbers of the birds. At my first visit there had been about nineteen herons present, and this represented the original quota according to the testimony of several residents. From the time when I first began to use the alarm clocks, however, I never found more than six herons in the tree.

By the third day all but the most obdurate herons had begun to form the habit of roosting elsewhere. It was seldom now that any of the birds ventured to come back after being driven away on my first morning visit, although as yet the old associations were too strong in the case of certain individuals to permit them to fly directly from their feeding grounds at dawn to the new roosting place; they still required to be pushed, so to speak, by the stimulus of fright. During the next seven days the number of herons which flapped out of the tree when I arrived in the morning fluctuated from one bird to six. Sometimes for a day or two there would be only one tenacious individual, but on the next day there might be three or four. From this it appeared as though one heron which refused to learn might be responsible for the occasional presence of the others, which had been lured back to their old quarters by its continued presence.

On October 2, the tenth day of the experiment, there were no herons in the tree all day, nor were there any to be seen during the six days which followed. On October 10, however, two birds were again present. From October 11 until October 20 the number of herons was never more than two, and on some days there was none at all, while those that did occasionally return had taken to roosting in a part of the tree which was farthest from the alarm clocks. There was no indication of any desire on the part of the birds which remained to leave permanently, however, and it was clear that they were losing their fear of the clocks.

On October 20, I found that the number of roosting herons had increased to three, thereby indicating that new methods of dispersal would have to be devised. The throwing of sticks into the tree top had always been a sure method of scattering the birds, but until now I had preferred to rely upon the clocks because they did not require my presence so often. Now, however, since the herons were in the habit of remaining absent for the rest of the day when once routed out, I substituted the throwing of a stick each morning for the winding of the clocks. From October 20 to December 1, I drove away the birds on twenty-two mornings. On some of my visits there were no herons present, but usually there were two or three, doubtless the same individuals each time. Toward the last the birds had begun to show an increasing toleration even for the commotion caused by the heavy stick which I kept for the purpose of throwing at them. Sometimes I would send it crashing into the branches

two or three times before the last birds would depart, and I found that the only sure way to get them to move was to strike the branches upon which they were actually perched.

During the next thirteen days, as a result of persecution more determined than heretofore, the number of roosting herons gradually diminished. Sometimes upon leaving, the birds would fly across the block to one of the scattered live oaks which remained as last mementos of the old Cohen estate, but usually they made straight for the cypresses in Lincoln Park, where the more adaptable members of the group had found refuge ten weeks earlier. Although none of the herons had taken alarm on the first day of the experiment until I had climbed seven feet up into the tree, the remaining birds had now become so timid as a result of persecution that they would leave the tree each day the moment I began to tiptoe under it.

In marked contrast to the timidity just mentioned was the behavior of one heron, which on several occasions was discovered roosting in plain sight in the top of a fig tree growing some thirty feet from the garden path. Earlier in the season when this tree was covered with leaves it had been a most secluded roosting spot, but now the

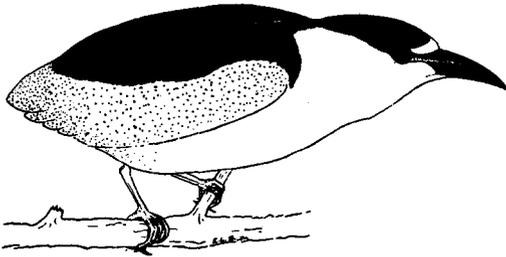


Fig. 20. DRAWING TO SHOW CHARACTERISTIC POSTURE ASSUMED BY A BLACK-CROWNED NIGHT HERON WHEN ALARMED.

leaves were all gone and the branches stood up bare and white against the sky, with the heron sitting full in the glare of the midday sun. Whether such eccentric behavior may have been dictated by habit is not certain; at least it was not due to a scarcity of other roosting sites, for even the most thoroughly pruned and cemented of the live oaks which survived in the neighborhood would have afforded more seclusion. This bird allowed persons to pass back and forth beneath it at a distance of twenty-five feet without apparent alarm; at least it never changed that hunched-up position which is characteristic of Black-crowned Night Herons in repose and which gives them such an aspect of dejection. Once, when I sent a small missile in the direction of the bird, it became somewhat aroused and took up a peculiar rigid position, with the head and body held nearly horizontally, which seems to be characteristic of these birds when they are alarmed (fig. 20). Perhaps this position represents an adaptation designed to enable the bird to spring into the air and escape in the least amount of time and with a maximum of efficiency; again, it may be occasioned, in part, by the efforts of the bird to see what is below it; probably both causes contribute.

After January 2, 1932, no herons roosted in the California laurel tree until the following March, when two or three of them returned once more. It seems likely that this was the same group of birds which offered so much resistance to the various attempts at driving them away which have just been described. From March until the present time (January 2, 1933) the number of herons in the roosting tree has at no time been more than three and has usually been represented by but a single individual; and since the presence of such a small number of birds has resulted in no inconvenience, they have been allowed to remain. The fact that the majority of the original flock of nineteen has never returned indicates that, as in the case of the

starlings cited above, when the birds have once become settled in a new roosting locality they do not return to the old site, provided they are not further disturbed.

SUMMARY

The Black-crowned Night Herons of Alameda have suffered an extensive reduction of their haunts during the past thirty-five years, due to the settlement and reclamation of the surrounding country.

In a portion of their last refuge some of the birds recently became such a nuisance that they had to be removed.

The problem of removal was rendered difficult by the fact that the birds were able to see to return to their roosts in the day-time after having been disturbed, thus retarding the formation of associations with a new roosting site. The majority of birds roost at night, do not possess the ability to return to their roosts when disturbed, and so would have offered less resistance to the process of education.

The removal of the herons was accomplished by means of a scare-crow in Lincoln Park, and in the case of the present experiment by the use of alarm clocks, the throwing of sticks, and by other agencies calculated to spare the lives of the birds.

When the length of time required by Black-crowned Night Herons to form new associations is considered, it appears that the birds are less intelligent than some other species, for example the starlings observed by Kalmbach.

In conclusion, it may be suggested that the methods here described indicate the possibility of "controlling" bird life, when this becomes necessary, by methods which do not involve extensive destruction of the birds.

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