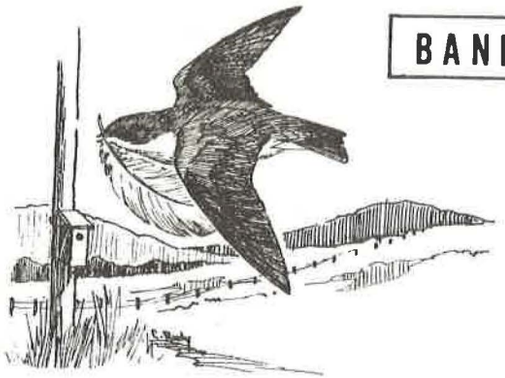

BANDERS' SHOPTALK

A PROJECT GUIDE FOR NESTING STUDIES - By Frederick S. Schaeffer

A project guide for banders, entitled: Project: The Bird in the Cage, in the Net and in the Hand, recently appeared in THE RING and in EBBA NEWS (Bub and Schaeffer, 1971). The current paper is not necessarily for banders but should be used by all those actively engaged in nesting studies. A nesting study is never complete; those using this guide will find it encourages further inquiry and will lead to the overall enhancement of their field work.

In any study, it is necessary to take copious notes; in a nesting study particularly so. Nest cards such as those issued by the North American Nest Record Card Program of Cornell University, Ithaca, New York, (illus. p.120) or those distributed on the continent by the British Trust for Ornithology, only provide a facility for recording the very basic and quantitative data gleaned during the nesting study. Data which cannot be machine recorded and interpreted generally are not recorded on these cards. By recording detailed information in our notebooks, our knowledge of the nesting cycle can be greatly increased. The purpose of this paper then, is to provide a basic structure or foundation of a nesting study which can be enlarged according to the objectives of the students using same.

When nest cards are taken into the field, it is desireable to have another small notebook or notepad along. Any field recording system should be highly portable. Notes from the field notebook should be transcribed into larger notebooks kept at the student's home or laboratory; such notes can then be properly crossreferenced to a nestbox number or grid location. Another method of recording field data which far surpasses other methods is that of voice recordings on the recently made available, highly portable, casette recording devices.

At Great Gull Island, New York (located seven miles northeast of

Orient Point, the northeastern most top of Long Island, New York) a study of Common and Roseate Terns (Sterna hirundo and S. dougallii, respectively) is in progress. A grid system was created on the island, several years ago. (Cooper, Hays and Pessino, 1970; Hays 1970). The island was surveyed and devided into quadrats measuring 25 meters on a side. Fence posts set at the corner of the quadrats were labelled with plywood signs. Decal numerals and letters were used on one side, painted markers, on the other. The paint proved to be more durable.

Lines running the length of the island were lettered A to H. These were intersected by lines numbered from 2 to 31. The posts at the points of intersection bore the letter and the number of the intersecting lines. Each nest was located by a quadrat designated by lines of intersection at its northeast corner, and within the quadrat the nest site was plotted by estimating the number of meters south and west of the intersection. Nests were additionally marked with tags, bearing a number.

Where such an elaborate grid system is not economically feasible, nests may be numbered or color coded. Ground nests (especially those well hidden in the undergrowth) may be marked by placing a wooden stick or metal rod, which can be seen above the ground cover, to the north (or other predetermined direction) at a specific distance. These marking devices can than be numbered with metal tags or polyethelene flags (safety markers). Bird boxes can be numbered but care should be taken not to place the marking on the top or front surfaces; uric acid quickly renders such markings unreadible.

I. BIRDS ARRIVE AT THE NESTING SITE

Almost immediately after birds arrive (in some cases, the male arrives before the female, or vice versa), they will begin to search for a suitable territory. A territory is any area defended by a bird against individuals of its own species (Pettingill, 1970). Questions have been raised about this phase (Hickey, 1943). The following questions are only key questions (as throughout this project guide). It is the further responsibility of the investigator to acquaint himself with all available literature on hand.

A. Arrival

1. When do resident males arrive; all at once, or over a long period of time?
2. When do resident females arrive; all at once, or over a long period of time?
3. When do transient birds of this species pass through?
4. How does the arrival of each group correlate with the development of the surrounding vegetation?
5. How and when does pairing occur?
6. Are females attracted to the singing and posturing of males?
7. Which sex appears to take the dominant role and how is this manifested?

B. Establishment of Territory

1. Does the female participate in territorial defense or not?
2. What constitutes territorial defense?
3. Is territorial defense strong or weak?
4. Does the species have a strong interest in a specific section of the general area in which it forages?
5. How does it behave relative to other members of its species, which invade the territory, or are known nesters in adjacent territories? Other species?
6. Do both members of the pair observe the territorial boundaries?
7. Do males of the species you are studying, sing often?
8. Do they sing in specific areas? During which periods of the day?
9. How large is the territory in area?

It is essential to map the area under study and the various territories thereon. An initial sketch should be made of the general area. A more detailed map of the area may be made by using the compass traverse or compass intersection method (Mosby, 1971). Maps of aerial photographs are extremely helpful. In North America, accurate topographical maps may be obtained from the United States Geological Survey, in Washington D.C.

Territories can be located by playing the song of males in the breeding season over and over again. When the birds on territory reply, the limits of the territory can be plotted (Odum and Kuenzler, 1955).

II. NEST BUILDING

The change from arrival, to territorial establishment, to pair-bond, to nest-building, is so gradual that the investigator often totally overlooks these stages. There are several reasons for this. The investigator may not be fully familiar with the terrain and favorite nesting spots (in other than box nesting sites); more often, nests on the ground, in the brush or in trees are not discovered until much later in the nesting cycle. Constant study of behavior and recognition of specific behavior patterns inherent of each stage will assure the investigator better results. The following questions deal specifically with nest building:

A. Preparation of the nest site

1. Where do the birds obtain the nest material?
2. During what period of the day is nest building more frequent? (Note- trips/minute with nest material gives a comparative index).
3. How long are the working periods in the nest by the male? female?
4. What is the nature of the nest material?
5. Is the material merely deposited into the nest or is it carefully arranged?
6. Do both mates participate in nest building or not?
7. Can any correlation between weather patterns and building activities be established?

B. Nest Lining

The following questions should be kept in mind. See section on disturbance of nesting site. Nest lining can be studied after the nesting cycle has been completed.

1. What does the nest lining consist of?
2. If other feathers, where do they originate (species and possible location)?
3. How thick was the lining layer?
4. If no lining, was the nest in use, or had it been abandoned? Could it be a 'dummy' nest? (Herrick, 1935).

III. COPULATION

1. When do birds copulate?
2. What time of day do they copulate? Before or after feeding?
3. If after feeding, did they feed alone or together?
4. Is there any posturing, prior to, or after copulation, which can be associated with this activity? (Schaeffer, 1970).
5. Do they copulate at the nesting site, or in another area within the territory? On the ground? On a branch? By whom is the invitation given? How frequently? (Note- copulations/hour give a comparable index).

IV. EGG-LAYING

A. Number of Eggs

1. How many eggs are in each clutch (twice daily observation recommended)?
2. How are the eggs positioned in regard to each other?
3. How are the eggs colored or marked?
4. What time of day are eggs laid? One or more per day?

Eggs, and the order of laying, can be studied by marking the eggs with dots. Nail polish works adequately. The dots should be very small as we do not know if the adults will or will not react to strange markings on the eggs. When eggs are so marked, the marking should be done very rapidly to cause minimal disturbance to the birds and to the nesting site. Weather conditions should be recorded carefully during this period.

B. Other Clutches

1. How many broods do the adults raise during one breeding season?
2. Do they use the same or another nest?

3. If a different nest, was it previously used? If so, what happened to its (former) inhabitants?

The movement of the adults can be studied particularly well when they are color marked or banded in addition to the regular banding. Note that in most countries special permission is needed to engage in color banding or marking. Color band/paint combinations can be made up quite easily (Taber and Cowan, 1966; Buckley and Hancock, 1968).

V. INCUBATION

A. Incubation Patch (Bub, 1970; Pettingill, 1970)

1. Does the male and female have an incubation patch, or just the female?
2. How well developed is this patch (photos helpful here)?
3. Can you determine the growth rate of the incubation patch?

B. Start of Incubation

1. When does incubation begin?
   a. After the first egg was laid?
   b. After the last egg was laid?
   c. Has the starting date any bearing on weather conditions?
2. Do both sexes share equal time on the nest?
3. Are the eggs unattended during feeding? How long?
4. Does the male feed the female (or vice versa) during incubation?
5. Are the eggs rotated by the adults during incubation?
6. How often is this done?
7. What are the incubation ratios? Amount of time on/off the nest by either sex? Same ratios to be recorded during different times of the day.
8. Does one sex remain on the eggs overnight? Both Sexes? Neither?

To record the information asked by Questions 7 and 8, the investigator should work from a blind, possibly with a highpowered telescope. I saw a very elaborate installation of electric eyes to measure the amount of trips in/out of the nest where these data were recorded at another location on rotating drums (similar to a drum of a recording barometer) at the Vogelwarte Untermain in Frankfurt am Main/Fechenheim during my 1962-3 visits with Dr. Werner Keil. Such installations are however not economically feasible for most field workers.

For further information on attentative behavior, an excellent source of reference is Kendeigh (1952). Although not fully up to date, this pater presents a stimulus for further inquiry.

9. How long are the eggs covered every day? (Prescott 1964,'65)

10. How does incubation correlate with temperature and other weather conditions?

VI. DEVELOPMENT OF THE YOUNG

A. Hatching of the Eggs

1. When do you notice that the eggshells become "pipped"?
2. When (what time) does hatching take place?
3. How many eggs hatch within the same time period?
4. Do the adults remove the egg shells and when, in relation to hatching? Which sex removes the shells?
5. Are both adults present during hatching? If so, how do they behave toward each other, toward the nest, toward previously hatched young?
6. If both are not present, which sex is? Where is the other?
7. Are the young hatched with eyes open or closed?

B. Nest Sanitation

Although nest sanitation should be studied during the egglaying period as well, it is particularly important during the hatching and rearing of the young. During egg laying, are insects, decayed nest material, broken or crushed egg shells removed speedily, by which parent, or not at all? Additional questions come to mind:

1. Which of the parents remove the fecal sacs of the young?
2. Are these fecal sacs removed as soon as the young deposit them, or at another particular time of the day? At random times?
3. How far away from the nest are they dropped?

C. Incubation of Newly Hatched Young

1. When does incubation begin? Is it constant? How much time does each parent spent on the young, or only the female? (Note- Section V (B) Question 7 and 8 apply here as well).
2. Often, the male is conspicuously absent during the first few days after hatching. Is this the case here? Can any reason be given for this behavior?
3. Are the young left unattended when the parents feed, or does the male feed the female and then the young? Does the female feed the male and then the young? Does the male also help in feeding the young? Do they take turns?
4. How do the parents behave toward intruders during this time? Of their own species? Of other species? Species, not of the Avian Order?

Particular notes should be kept on weather conditions and the development of the feather tracts, soft part coloration, etc., of the young.

D. Course of Development

1. What is the growth rate of the young?
2. How does the wing/tail plumage form? Does each wing fill symmetrically?
3. Which feathers grow first, fastest, slowest?

VII. MORTALITY (Lack, 1966)

1. What is the cause of mortality:
   a. Predation?
   b. Encroachment of people into the territory?
   c. Parasitism by ticks, mites, ants, etc.?
   d. Disease?
   e. Inclement weather?
   f. Abandonment by adults? Why?

Disturbance of Nesting Site (by humans, predators, etc.) as a cause of mortality.

If researchers like to band nesting birds, this should not be done during the early nesting season. Banding or trapping prior to serious territory selection is not too harmful. Until after the eggs are laid and have been incubated for a length of time, trapping on the nest/eggs/young are examples of ill-timed banding efforts by well meaning students.

When visits to the nest are made, they should be most brief! Care must be taken that vegetation in the surrounding area is not disturbed. Some researchers weigh eggs and young. We do not recommend this unless absolutely necessary to your study. Gathering these data is time consuming, alerts predators to the location of the nest, keeps the parents away from the eggs/young which need warmth, causes desertion and in some cases of excessive encroachment causes mortality.

Banding of the young should be done when the young are developed sufficiently so they can be safely banded. Also, one should make note of the fact that the shiny aluminum band on the legs of wandering young will quickly attract predators! In the case where nesting sites are close to public areas, the constant presence of an investigator can draw additional and unauthorized persons into the nesting area. This is often followed by unnecessary destruction by well meaning (or not so well meaning) humans.

Very often, photos, taken with telephoto lenses are the safest method of recording the various aspects of the nesting cycle.

VIII. NEST PARASITISM

Several species of birds are known to take eggs from nests of other species and replace these with their own. The only such species in the United States is the Cowbird (Molothrus ater)(Friedman, 1929; Bordner, 1961). Several questions come to mind in this regard:

1. When does this predator does his work? How soon after the parents leave to feed, does he approach the nest?
2. Do the parents attempt to remove the Cowbird's eggs?
3. Are nests so parasitized more susceptible to further predation than unparasitized nests?
4. Did the Cowbird's egg(s) hatch succesfully? If so, which species attempted to rear all the young in this nest?
5. How do the young of each species in the parasitized nest behave toward each other?
6. In the case of the Cowbird's egg destroyed, do the parent birds of the parasitized species remove the eggshells or not?

Summary

A project guide for nesting studies has been presented. Questions pertinent to each phase of the nesting cycle have been reviewed. These questions are only key questions. Hundreds of other related questions can be and should be answered by ornithologists active in breeding biology or life history studies.

Acknowledgements

I thank Dr. Kenneth W. Prescott for critically reading this paper and suggesting numerous additional questions in several of the subsections. Further, I thank Hans Bub (of Vogelwarte Helgoland, Germany) for providing the stimulus which caused me to write this paper.

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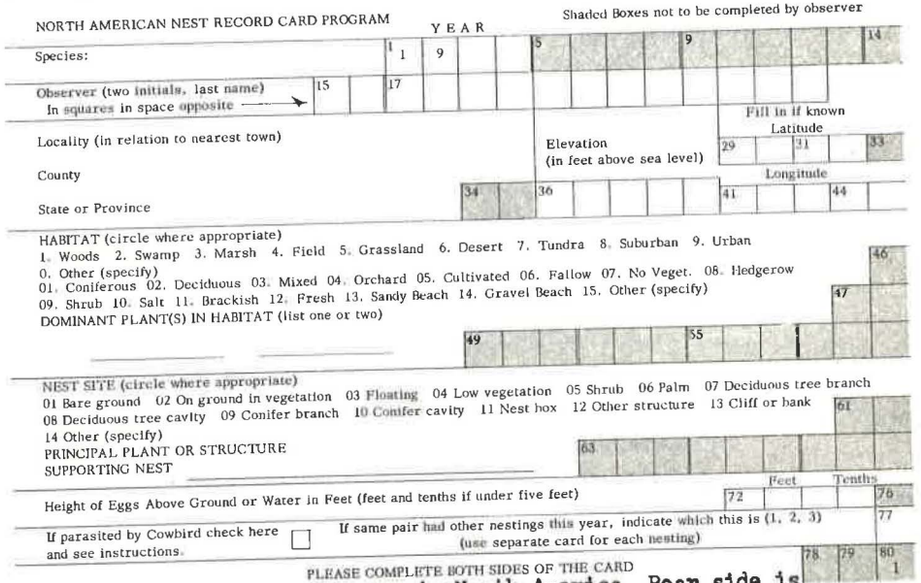
NORTH AMERICAN NEST RECORD CARD PROGRAM

Shaded Boxes not to be completed by observer

YEAR

Species:

Observer (two initials, last name) In squares in space opposite

Locality (in relation to nearest town)

Elevation (in feet above sea level)

Fill in if known

Latitude

County

Longitude

State or Province

HABITAT (circle where appropriate)
1. Woods 2. Swamp 3. Marsh 4. Field 5. Grassland 6. Desert 7. Tundra 8. Suburban 9. Urban
0. Other (specify)
01. Coniferous 02. Deciduous 03. Mixed 04. Orchard 05. Cultivated 06. Fallow 07. No Veget. 08. Hedgerow
09. Shrub 10. Salt 11. Brackish 12. Fresh 13. Sandy Beach 14. Gravel Beach 15. Other (specify)
DOMINANT PLANT(S) IN HABITAT (list one or two)

NEST SITE (circle where appropriate)
01 Bare ground 02 On ground in vegetation 03 Floating 04 Low vegetation 05 Shrub 06 Palm 07 Deciduous tree branch
08 Deciduous tree cavity 09 Conifer branch 10 Conifer cavity 11 Nest box 12 Other structure 13 Cliff or bank
14 Other (specify)
PRINCIPAL PLANT OR STRUCTURE SUPPORTING NEST

Height of Eggs Above Ground or Water in Feet (feet and tenths if under five feet)

Feet Tenths

If parasited by Cowbird check here ☐ and see instructions.

If same pair had other nestings this year, indicate which this is (1, 2, 3) (use separate card for each nesting)

PLEASE COMPLETE BOTH SIDES OF THE CARD

Front side of Nest Card in use in North America. Rear side is for daily observations of eggs and young. (see p. 112).

MIGRATION TRAPPING OF HAWKS(AND OWLS) AT CAPE MAY, N.J. - FIFTH YEAR

By William S. Clark

This article reports the results of the 1971 autumn raptor banding project at Cape May Point, New Jersey. The results of the first four years' banding are reported in previous volumes of this journal (see Clark, 1-4). Except for three days in November, the station was operated from September 4 until November 14.

Throughout I shall use the more esthetic names of Kestrel for Sparrow Hawk and Merlin for Pigeon Hawk.

The Trapping Station

For description of the station location, trapping equipment and methods employed at this station to catch migratory hawks, see Clark 2, 3.

Analysis of failures and shortcomings of past season's operations dictated certain modifications to the station arrangement. Those implemented this year included use of a lighter and smaller mesh mist net, more extensive use of Dho-Gazas, and rearrangement of the placement of the bow nets. Also a larger blind was constructed and placed in a location which afforded a better view of the hawk flight.

These modifications proved to be very successful as many more hawks were caught this year. (See Table 1 and discussion below.) However, the most significant change this year was the addition of a second station about 150 yards south of the other station in a salt marsh. It consisted of a blind, 3 bow nets, 2 30-foot mist nets, and from 1 to 3 Dho-Gazas. The main station is now called the North Station and the new one, the South Station.

Trapping Results

Table 1 reports the daily catch at both stations. In addition, it gives the daily average wind direction and velocity, and the stations' operators and the hours they were manned.

These results are a step-jump over past results. This season the north station caught almost three times our previous high of 271 hawks and owls. However, we caught fewer Peregrines and Cooper's Hawks than the previous year. There were more Peregrines seen this year and we recorded more passes, but a combination of the lighter net which broke through and lack of aggressiveness yielded a lower catch. Most of these birds passing over were not hunting, as this activity is pursued along the beaches. Fewer Cooper's Hawks were recorded this season and we had a high rate of misses for this species, which is difficult to catch.