

REPORTS, REVIEWS, AND OPINION

REPORTS: BREEDING PROJECT INFORMATION EXCHANGE

The following letter and questionnaire were sent to cooperators; B.P.I.E. 28-40 are reports returned to the RRF Breeding Committee for the Special Conference on Captivity Breeding of Raptors. B.P.I.E. 27 was submitted earlier.

Centerville, South Dakota 57014
October 31, 1971

Dear Breeding Project Participants:

We hope those involved in breeding projects will be able to send us information requested on the other side of this sheet before the conference to be held in Sioux Falls, South Dakota, November 22 and 23, 1971.

This is a slight modification of the questionnaire sent out in 1970 which was designed to help the RRF and NAFA Breeding Committees formulate procedures which are most likely to produce results in breeding captive raptors. As chairman of both committees, I feel the so-called backyard projects, whether supported or unsupported, have sufficient merit to be counted strongly in the picture, but only if the experimenters are serious in cooperating and coordinating their efforts toward a common goal. This does not mean the lack of approval of governmental projects or that we would not like reports on such projects from those in charge. We greatly need everyone's assistance, and since we feel this approach will help each of us to succeed, we are confident you will give it.

If you wish, the data you send will be kept strictly confidential (I will personally guarantee this). However, if you have no reason to want the data kept confidential, we would like permission to use it at our discretion at the breeding conference or in *Raptor Research News*.

If you have in any way attempted a breeding project this year (or in other years and have not reported same), it would be most helpful if you would take the time to answer the following questions. If you are updating a previously reported project, you need not duplicate the answers where there is no change. If you have more than one project, we would like additional reports; information that is the same need not be repeated. What you have done may be of real importance in helping solve the problems connected with captive breeding of raptors.

Sincerely,
Donald V. Hunter, Jr.

BREEDING PROJECT QUESTIONNAIRE

[We have listed the numbered questions without space for the answers so that the reports if duplicated can be more compact and for overseas correspondents

less expensive to mail. For duplication for the conference, it would help if the answers can be typewritten single spaced with a dark ribbon and sketches made carefully in dark ink; leave reasonable margins on 8½x11 sheets (or smaller paper). If the numbers on the outline are used, the questions need not be repeated in your answers.]

1. a. Respondent's name; b. Address; c. Please indicate if report is confidential, or not confidential, but not for duplication for conference or publication in RRN, or may be used at conference and as B.P.I.E. in *Raptor Research News*. [Only for publication reports included below—Ed.]

2. a. Date of report; b. Time period of report; c. Previous reports on this project (B.P.I.E., RRN, other).

3. a. Species; b. Subspecies if known.

[4-7. Answer each question for both male and female.]

4. Age in years.

5. Origin of birds (give year taken): a. Eyass; b. Passage; c. Haggard, or d. Unknown.

6. Eyrie: a. Latitude of origin to nearest degree; b. If not known, area of origin (e.g., arctic, etc.); c. Latitude where trapped (or place, date also).

7. Handling: a. Hatched? b. Manned? c. Flown free? d. Flown at game? e. Disposition? f. Imprinted?

8. Sketch the facility in which the birds are kept, giving approximate dimensions, size of windows, and direction of exposure of such windows. Also a brief description of materials and construction.

9. Was artificial light used? (Wattage, number of bulbs, duration of light period, etc.)

10. Color and texture of interior—e.g., white, black, unpainted wood, beams exposed, etc.

11. Describe provisions made for nest.

12. Describe how birds were introduced to facility and to each other; if not put in aviary together, which bird was first and by how long. Give dates.

13. Observations of behavior toward each other.

14. Nest building? a. Materials provided? Did both birds help with building or making of scrape? c. If not, which one did? d. Describe giving dates. (If no nest or scrape was made, please so state.)

15. Food: Give a description of food provided, amount, when given, consumption and observations of behavior while eating. Excess or old food removed?

16. Endocrine treatment tried? If tried give full description of technique and effect on bird.

17. Was copulation observed? If so a. Date; b. Time of day? c. Brief description of where and how it took place. (For example, on nesting place, male mounting female from side.)

18. Was artificial insemination tried? If tried give full description of technique and behavior of the birds.

19. Eggs? Date for egg No. 1; No. 2; No. 3; No. 4; No. 5.

20. a. When did incubation start? Date; b. Which sex (or sexes) participated in incubation? Explain; c. When did incubation cease? Date; Why?

21. Incubation temperatures: a. Did you take incubation temperatures? If so what were they? b. Describe variations of air temperatures during incubation; c. Humidity?

22. Did you attempt artificial incubation? a. Describe incubator; b. Temperature? c. Humidity? d. Successful hatching? Describe, date in, date hatched, etc.

23. If you used a foster brooder: a. What kind? b. In what sort of nest? c. Successful hatching? Describe as above.

24. If eggs did not hatch: a. Were they fertile? b. If so, when did the embryo die? c. Probable cause of death?

25. If parents did hatch eggs: a. Dates for each; b. Description of parental behavior.

26. If some eggs hatched and others did not, do you know which were which in respect to sequence laid? Explain.

27. Did you have unhatched eggs assayed or analyzed? Results?

28. Food; Describe food and feeding of young.

29. If death occurs to young, explain.

30. How long were surviving young kept with parents? Describe briefly parent-offspring behavior from hatching to removal of young or parents, and after if noteworthy.

31. If young hand reared, give details.

32. Final description of F1 generation.

33. Any additional information that you think important.

34. Suggestions for improving questionnaire.

*Please return reports to Donald V. Hunter, Jr.
Centerville, SD 57014*

B.P.I.E. No. 27. Peregrine Falcon—Saker Cross

1. Ronald Stevens, Formagle Lodge, Costelloe, Co. Galway, Ireland, reports on a Peregrine/Saker cross-breeding project entered into by him and the Hon. John Morris jointly.

2. 1971.

3. Male Peregrine—*Falco p. peregrinus*, owner R. Stevens. Female Saker—*Falco cherrug*, owner J. Morris.

4. Male—6 years. Female—5 years.

5. Male—eyass. Female—eyass.

6. Male—unknown. Female—near Teheran, Iran.

7. Male—manned flown at teal. Female—flown free. Disposition: male friendly, female friendly, but attacked owner on occasions while stooping to lure. Neither imprinted.

8. Wooden shed 40 feet long by 18 feet wide and 16 feet up to the eaves.

Six barred windows—3 on the east side and one at each end—each 6½ feet high by 4 feet wide. The 6th window is on the west side—6½ feet high by 6 feet wide. The shed is equally divided by a double-latticed wooden screen designed to allow the passage of air and to enable one to peer through without being seen by hawks on the other side. The floor is concrete covered with sand and there is a bath 3 feet x 3 feet let into the floor in each division, each fed by tap and hose. Two nest ledges in each division about on a level with the eaves. They are shallow wooden trays 3 feet square with sides 3½ inches deep fitted annually by fresh turves of peat in one piece. Two concrete blocks 4 feet high in each division serve for the placing of food. Perches—beams under the roof and shelves in the windows where they are cleansed by sun and rain. The breeding pair has the division at the far end with windows facing north and east and half the window on the west side.

9. None.

10. Walls whitewashed. Beams exposed.

11. (See 6.) Access by ladder.

12. Male put in shed 1968. Female introduced February 23, 1971.

13. For the first few days the female Saker was viciously aggressive but the male Peregrine evaded her attacks. Within the first week she became peacefully inclined. After about another two weeks they had the appearance of being a pair.

14. Materials provided (see 6). Did not see either of the old birds making a scrape. They adopted a shallow depression I made by punching the tray.

15. No wild birds given for fear of agricultural poisons. Up to the time the eggs were hatched, cockerels from 4 to 5 months old, an age at which they ripen sexually, was the food provided alternated with female domestic pigeons. If the pigeons had no eggs in them a bantam's egg was put into the abdominal cavity after removal of the guts except for the liver. The abdominal skin was then sewn up to contain the egg. No food additives were given until the young had hatched when a few drops of ABIDEC were smeared over the meat once daily as a precaution against rickets because no rays of the sun could reach the nest ledge occupied by the young. After the young were hatched, chickens two to three months old and young pigeons (given cold) was the food provided. Before the egg-laying period the old birds were fed once daily. They were compelled to pick every bone clean before a fresh supply was given. This was to prevent their becoming too fat for breeding. After the eggs were laid this rule was relaxed so that when either the Peregrine or the Saker took time off from incubation there was always food available and a never-failing supply of food was always there after the young were hatched.

16. —

17. No. The male was in breeding condition before the female was put into the shed on Feb. 23. Not until early April was the female seen to solicit copulation by which time the male had seemingly cooled off.

19. Date first egg seen May 14.

20. After second egg was laid. Both female and male took turns in incubation.

21. Did not take any air temperature; often hot during incubation. Very little rain.

22. No.

25. Parents hatched 2 eggs. First young seen June 22. Second young seen June 24. Parental behavior exemplary.

26. No.

27. Did not have unhatched eggs analyzed because they disappeared gradually.

28. Food: Parents did not show any awareness of any particular food needs of their young. When young pigeons were given whole the parents carefully removed the intestines before carrying the body parts to the nest. Both parents fed their young.

30. The two young eyasses fledged naturally. The first left the nest July 30. Both were out together by August 5 but between those dates the young frequently returned to the nest. The young falcon was coaxed through the doorway into the other division August 5. On August 7 the young tiercel was also shepherded through to join his sister. In neither case did parents show concern. On August 16 the young tiercel was judged to be hard-penned and was removed from shed, jessed, hooded and tied up in sinews. The young falcon followed him a week later. From first to last every care was taken not to antagonize the parents in the hope that good relations will be maintained next year.

32. Weight of male 25 oz; female 33 oz. Moustache less than that of average Peregrine. Feet greyish blue—Saker-like. Length of tail between Peregrine's and Saker's. Thighs streaked like Saker's. General appearance more like Peregrine's than Saker's. Neither imprinted.

33. Additional information: Sand was found to be unsatisfactory as a floor covering because hawks often got their meat down into it. More and more sand adhered to it while the meat was being eaten until hawks got disgusted and left it. Much anxiety was felt for the young in this respect for fear sand might accumulate in their insides. Fortunately, however, the parents almost always took the food direct from blocks and shelves to the nesting ledge when feeding young.

We were able to observe activities at the nest from the top of a ladder which was propped against the division screen on the other side, without being seen by hawks. By peering through the double lattice not only observation but photographs too were proved possible.

The breeding shed is in a sheltered secluded position. Hawks spend much time in the windows watching the activities of wild birds outside. The trained hawks often visit them when much mutual chattering is heard.

Owing to the good relations maintained with the parents we were able to enter their half of the shed daily to clean up and run the bath water. Had this not been possible flies would have swarmed and might have been a menace to the young eyasses when they were in the helpless "flab and paunch" stage.

34. Suggested additions to questionnaire: What sort of floor has your breeding pen? How do you clean the floor? Do you use sand in any part of your pen? Can your hawks see outside?

Under food: Do you give wild birds as food? Do you take care to give birds of both sexes? Do you give eggs? If so, describe how given. Do you give food additives? Did parents show awareness of any special food requirements for newly-hatched young, such as viscera?

Did the young suffer from molestation by flies? Was precaution taken to keep out flies? If so, was it successful? Were you attacked by the parents? Did they allow you to enter to clean up daily? If they did not, at what stage did they make you keep out? At what age did you take the young? Were you able to take them without being attacked by the parents? If you did not antagonize the parents, describe the subterfuge used.

B.P.I.E. No. 28. Peregrine Falcon, Merlin, Red-tailed Hawk

1. a. J. A. Campbell. b. Box 130, Black Diamond, Alberta. c. Not confidential.

2. a. November 8, 1971. b. One year. c. None.

3. a. Peregrines, Merlins, and Redtails. b. The Peregrines came from the Yukon, but by their size and color I think they are *anatum*. They came from the taiga or wooded section of the Yukon and not the tundra.

4. Two pairs of Peregrines. One pair obtained as eyasses in 1967 and one pair as eyasses in 1969. A pair of Richardson's Merlins as eyasses in 1970. One female Redtail as an adult of two years old in 1970 and one immature male in 1970. This male was a bird of 1969 nesting year.

5. See above. All eyasses.

6. The 1967 pair came from the same nest on the Porcupine River just inside the Yukon border down river from Old Crow. The 1969 pair were from separate nests. The tiercel came from the same nest as the above two birds. The falcon came from a nest on the Yukon River between Dawson City and Forty Mile Creek. The Merlins came from the South Saskatchewan River near Empress, Alberta. The Redtails—The female from near Turner Valley, Alberta, and the male from near Edmonton.

7. a. No. b. Peregrines all flown free and manned. Merlins not handled much or flown free. Redtails—female manned—male not handled much. d. Peregrines yes. Rest of birds no. e. Good—one Peregrine was a chronic screamer for first three months but eventually gave it up. Rest of birds—good. f. No—none.

8. The Peregrine pens and the Redtails each measure fourteen feet west to east and twelve feet north and south. The three pens are in line and all windows point south. Each pen has four windows about fifteen inches across horizontally and two feet vertically. The windows are taken out from the end of March until the beginning of November. They are protected by dowelling on the inside of each pen and have fine mesh chicken wire outside this. The materials in the construction of each pen are shiplap and plywood, unpainted. Each pen has its own time clock which controls a battery of four flood lights each of 150 watts. Each light can be directed in a wide arc so that the whole pen can be covered. This gives a lighting effect of about four watts per square foot. In win-

ter (from October until March) twelve hour artificial light was used. I then increased it a quarter of an hour per day until they were on a continuous daylight by mid-May. The floor of each pen was concrete covered with a thick layer of straw. A nest ledge was made of plywood and filled with fine gravel and sand. The pens were seven to eight feet high. The Merlin pen was eight feet square and had one small window fifteen by two feet. It was facing north. I lost the jack before breeding season. The Redtails were under the same conditions as the Peregrines, but artificial light corresponded with the natural daylight in this latitude.

9. See above.

10. Unpainted wood.

11. The Peregrines had a box made of plywood across one corner of each pen. The two sides measured three to four feet. The boxes were nine inches approximately deep, and filled with gravel and sand. A rough branch was nailed along the front so that the birds would not perch on the thin plywood. The Redtails were given a platform of straw bales and tree sticks and branches were placed in the pen. No nest was formed for them.

12. The 1967 Peregrines. The tiercel was put in the pen three weeks ahead of the falcon. The young Peregrines were introduced together. The Redtails were put in together. Behavior towards one another did not change. The 1969 tiercel hardly left the nest ledge from the last week in February until the middle of March. The original male Redtail died suddenly February 13th. Did postmortem in the pathology lab but could not find cause of death. An immature male was introduced about February 20th.

13. See above.

14. The 1967 female Peregrine made a scrape in the nest box April 16th. The 1969 falcon made one April 18th. Neither tiercel seemed to take part in nest building. The female Merlin made a scrape April 4th but did not sit in it or defend it. However, she is very noisy when I enter the pen.

15. From January until April 6th all birds were fed pheasant or quail. I ran out from April 6th until 25th and had to feed chicken heads. From April 25th on we went back to pheasants and quail. Food was in front of birds at all times, especially at dawn. No old food was removed except when we went in to change the bath water—about every five days. Falcons and tiercels fed separately. The falcons seemed to feed first and then the tiercels. The tiercels did not carry food to the falcons.

16. No endocrine treatment tried.

17. No, but 1969 falcon would fly up to the tiercel and sidle up to him, and gently extend a foot towards him. This was not done aggressively but very gently. The tiercel seemed frightened of the falcon and would fly away from her. She would then follow and repeat it.

18. No because I felt the birds should lay before trying it. I tried it on the immature Redtail, but could not get any semen.

19. None.

20. None.

21-34. Not applicable.

B.P.I.E. No. 29. White-tailed Sea Eagle.

1. a. David Allen, Curator of Birds. b. Kansas City Zoo, Swope Park, Kansas City, Missouri 64132; c. For use in RRN, Conference, B.P.I.E.

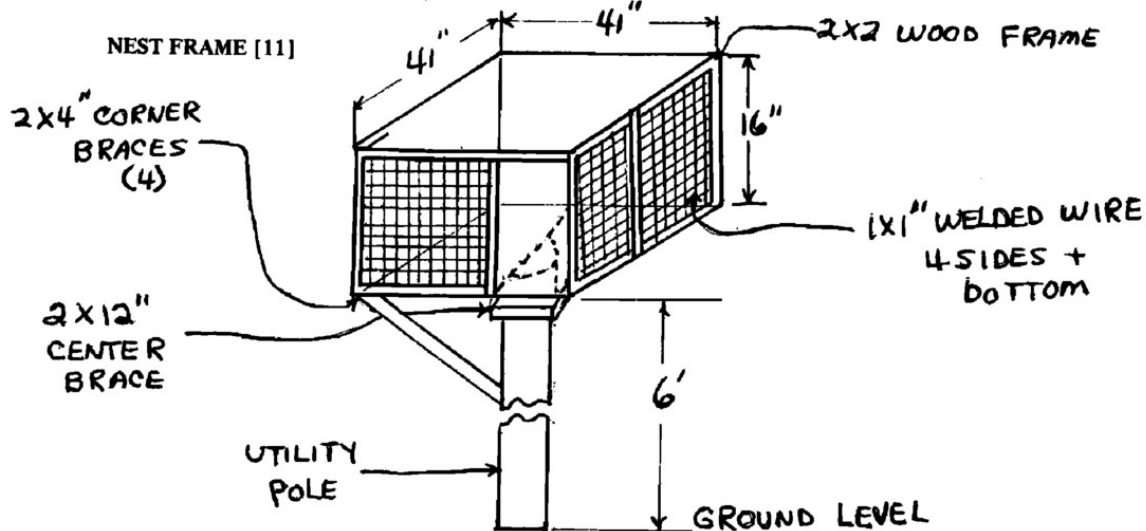
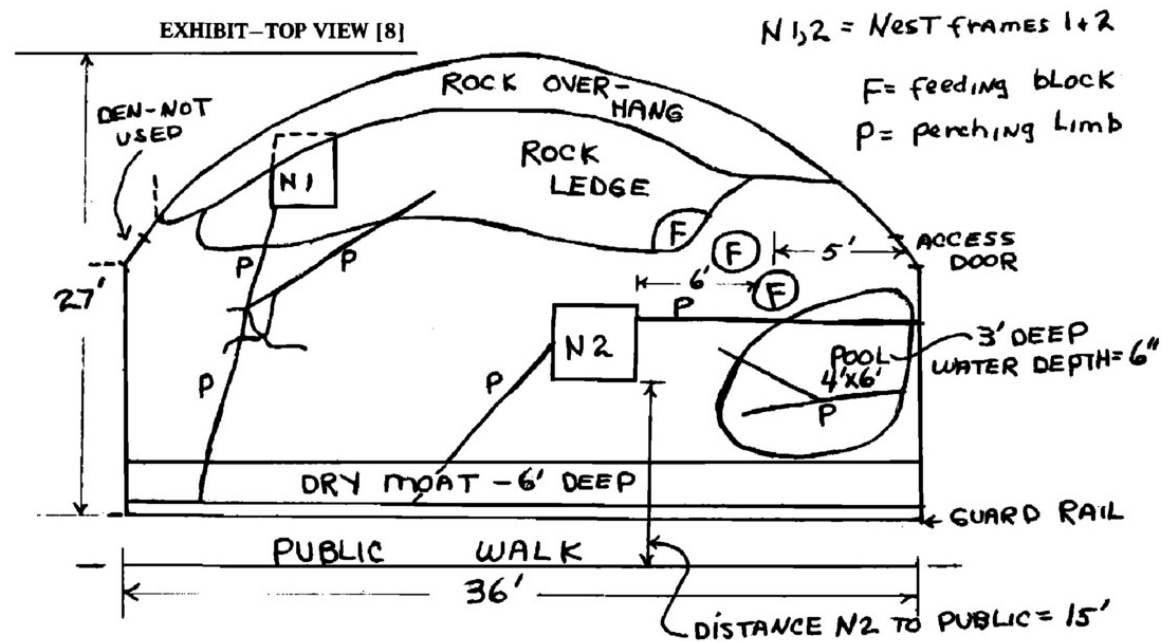
2. a. November 16, 1971; b. February 1970 through November 1971; c. None.

3. a. *Haliaeetus albicilla*.

4-6. Male and female, haggards, were purchased from animal dealer in 1964, arrived in adult plumage.

7. a., b., c., d. No, e. Excitable, aggressive; f. No.

8. Birds are exhibited at zoo in enclosure previously built for mammals (has dry moat), built in 1940 by W.P.A. No. 11 chain-link covers top and 2x4 welded wire covers front. Back and sides are stone block. Height of enclosure: from 10 feet to 14 feet. Public viewing is from front only, which faces south. See sketch below showing top view of exhibit.



9. No. Outdoor exhibit.
10. Brown stone, grey masonry, some seasonal vegetation.
11. Two nesting frames (see sketch on previous page); 2x2 inch wood framework, 1x1 inch welded wire. 16 inches deep x 41 inches square, bottom of nest 6 feet from ground. Birds chose nest No. 2.
12. Released in aviary together, 1964.
13. Introductory—unknown. Strong pair bond since 1968.
14. Yes; a. sticks, pine needles, prairie hay; b. yes; d. February 1970; February 1971.
15. ZuPreem Bird of Prey Diet*, $\frac{3}{4}$ lb/bird/day, 5 days/week; one freshly killed adult rat/bird, once weekly. Fasted one day/week. (Note: not fasted between November and June). Feeding schedule and consumption vary seasonally. Behavior while feeding—normal, birds are fed on individual feeding blocks; pre-nesting—courtship feeding—male to female on ground or on rock ledge 3 feet high. Excess and old food removed daily.
16. No.
17. Only on two occasions; April 13, 1968—time and description not recorded; December 21, 1970, 4:30 PM, male mounted female from left side, in nest No. 2.
18. No.

1970

19. Two eggs; No. 1 on March 7 or 8; No. 2 on March 11 or 12.
20. a. With first egg, March 7 or 8; b. Both sexes, female about 80% day, 100% night; male—about 20% day; c. April 15; remaining egg hatched.
21. a. No; b. upper 30 F to upper 70 F; c. not known.
- 22,23. No.
24. On March 28, one egg missing. No evidence, presumed infertile.
25. a. Remaining egg hatched April 15; b. Parental behavior—both sexes fed young, brooding of young mostly by female. During hot and rainy weather, female protected young by standing on nest frame with outstretched wings.
26. No. Eggs were not numbered.
27. No.
28. On April 14, diet changed to 3 freshly killed adult rats per day, 7 days/week. Young fed by both sexes. Diet for parents and offspring changed back to ZuPreem in August.
29. Surviving.
30. Young kept with parents until September 29 (168 days). Parent-offspring relationship went smoothly until mid-September. The young became aggressive toward the parents—was observed footing and biting parents (most often the male parent).
31. N. A.
- 32, 33. Female. At hatching, young was 6 inches long, light grey, black beak.

*ZuPreem Bird of Prey Diet, Hill's Division Riviana Foods Inc., P.O. Box 148, Topeka, Kansas 66601.

By April 21 (46 days) had lost most of down, starting primaries and secondaries. By May 22, dark immature plumage, retaining black beak. Feeding self by shredding rats brought to nest by parents. On June 30, young observed off nest (77 days).

1971

19. Three eggs; No. 1 on February 14 or 15; No. 2 on February 17 or 18; No. 3 on February 21 or 22.

20. a. With first egg, February 14 or 15; c. March 24; remaining egg hatched.

21. a. No; b. 26 F (2-day snow storm, during which egg No. 3 was laid; female did not leave nest—fed by male) to lower 60 F; c. Not known.

22, 23. No.

24. March 16—one egg missing, no evidence; March 22—egg broken in nest, contained fully developed embryo (dead), cause undetermined. Could hear remaining egg “peeping.”

25. March 23—remaining egg pipped; March 24—remaining egg hatched.

26. No. Eggs not numbered.

27. No.

28. Same as 1970.

29. Surviving.

30. With parents at time of writing. Parent-offspring behavior good. 1971 young also became aggressive (in same manner as 1970) toward parents, but ceased after a few days.

31. N. A.

32, 33. Male. Development similar to 1970.

34. Good method for reporting essential data.

B.P.I.E. No. 30. Peregrine Falcon.

1. Heinz Meng, State University College, New Paltz, N.Y. 12561. Not confidential, may be used.

2. November 12, 1971. 1967 through 1971.

3. *Falco peregrinus pealei* Ridgway (356b.)

4. Both birds are 4 years old.

5. Both birds were taken in 1967. They were almost branchers and each sex was from a different eyrie.

6. Eyrie: Queen Charlotte Islands, British Columbia, Canada.

7. Birds were handled for about a month (jesses and block perches) and then put in a small holding chamber which was 12x4 feet and 7 feet high. The falcons were kept in this chamber for 2 years.

8. At 2 years of age the pair was put in the breeding chamber which was 10x15 feet and 10 feet high at the eaves. Breeding chamber was attached to original hawk house. At first the 1964 pair of passage Peregrines (*Falco peregrinus tun-*

drius White) had the entire chamber to themselves but in 1969 I partitioned it to make 2 chambers. Partition was made out of 2x4 lumber and covered with burlap on each side. Entrance is through hawk house into chamber A. To get to chamber B one must go through chamber A. By going through hawk house there is always a closed door so that birds can not possibly escape. Window areas (facing south) are 6x10 feet and are provided with 3/8 inch vertical aluminum rods placed 2½ inches apart center to center. The window areas facing north are 4x10 feet.

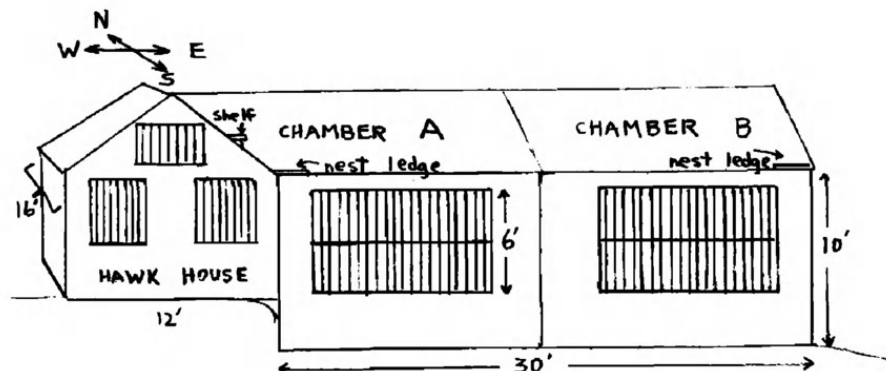
The area outside of the aluminum bars was covered with 2x4 inch mesh welded wire coated with vinyl to prevent escape should the falcons be able to push between the bars. At the bottom of the window areas on the south there is a 3 foot wide shelf with a lip 2 inches high filled with sand. At the end of each shelf there is a large bath pan. At the 3 foot mark (3 feet above the bottom shelf) there is another shelf 3 feet wide, covered with rug and astroturf material. The north window areas are the same size but have no shelves. The upper half of each area is covered with burlap to provide some protection from the north wind, but the open lower half allows some wind to circulate through. The floor is of cement. Perches are arranged so that birds can't defecate on them from above. There are only 3 rafters in each chamber and these are covered with rug or astroturf. The birds usually use these to roost on since they are the highest perches available.

9. There is a light in each chamber but during the 1971 season they were not used.

10. The interior of the breeding chamber is unpainted wood and the walls are of homosote board, a pressed fiber material.

11. In chamber A which houses the Peale's Peregrines, the nest ledge runs north and south along the eaves of the hawk house. Ledge is 2 feet wide and has a lip of a rug covered 2"x3" wood. Sand about 2 inches deep fills the entire ledge (2x15 feet). The part of the hawk house roof that is covered by the breeding chamber roof forms a darker area above the nest ledge. Half way up this sloping roof is a horizontal shelf about one foot square. Often both birds sit on this ledge together.

12. Both birds have always been together from the time they were taken from their eyries.



13. The falcons have always been friendly towards each other and when mature, especially during the winter and spring (1970-71) they went through all of the typical breeding behavior patterns.

14. Both birds engaged in scraping.

15. Food consists mostly of freshly killed homing pigeons in good health. As a precaution against trichomoniasis the heads and crops are removed; also the feet. Pigeons are torn into 3 pieces by pulling wings apart and then removing the back and legs from the breast piece that has them still attached. The food is then placed on the upper window shelf from the outside. Both birds come to the ledge and take the food from my hand. Also day-old chicks and an occasional rabbit are fed.

16. No drugs or vitamins have been used. Wheat germ oil was mixed with egg yolk and put on meat for about a week during end of February.

17. Copulation was not observed—probably occurred on or above the nest ledge where I was unable to observe the birds. In the very peak of breeding chamber A I have now put in a small partition and one-way glass so that now I can view every part of the chamber from the hawk house.

18. Artificial insemination was not tried.

19. Four eggs were laid at 2 day intervals starting on March 4, 1971. After 8 days of incubation they were candled and found to be infertile. The eggs were removed and 13 days later the falcon had recycled and laid 4 more eggs.

20. For each clutch incubation started with the third egg and female did most of the incubation at the beginning, but as time went on the male did more and more.

21. Temperatures were not taken.

22. Artificial incubation was not tried.

23. -

24. -

25. Eggs of second clutch hatched on May 8th (3 young) and May 10th (one young).

26. -

27. -

28. Freshly killed homing pigeons were provided and prepared as described under 15. Male took food to nest ledge and gave it to female. Female went to nest site and started plucking and eating, young were peeping. On May 10th, 2 days after I first heard peeping, I finally climbed to nest ledge to see what there was in it. I hadn't disturbed falcons since the laying of the 3rd egg of the second clutch. I found 2 dead young, one almost dead and another one just hatching. I brought the young into the house but the almost dead one died shortly after. The one that was hatching was out of the egg at 2 PM and immediately ate 3 small pieces of pigeon breast meat. For the next 10 days he was fed mostly skinned, eviscerated day-old chicks. These were cut up and fed with round tipped forceps. All of the bone and cartilage was fed along with the meat. A 40 watt bulb was used for heat and was so regulated that the temperature stayed at about 35 degrees Centigrade. The bird was able to move away from the light if it felt too warm.

29. Apparently the female fed herself at the nest site but not the eyasses. She brooded them well though.

30.—

31. Details of hand rearing, see 28.

32. F1 generation. One Peale's Tiercel produced. Perfect health and feather. No hunger streaks. Weight 24 ounces.

B.P.I.E. No. 31. Goshawk.

1. a. Donald V. Hunter. b. Centerville, S.D. 57014. c. No restrictions.

2. a. November 15, 1971. b. 1971 spring breeding season. c. B.P.I.E. 16 (RRN 5:115-119, 1970).

3. a. Goshawk—*Accipiter atricapillus*. b. American—*atricapillus*.

4. 5 years.

5. 1966. a. Eyass.

6. Central Rocky Mountain 42 °N Lat.

7. Manned and flown at quarry (rabbits) 1967 and 1968.

8. East room of building—20x12x10, two windows to south barred with laths. Converted chicken house made of lumber. Rafters and study exposed (2x4's).

9. No.

10. Whitewashed wood.

11. Box on top of pole. 7' from floor in west center of room. Box on east wall.

12. No male.

13. -

14. Sticks were provided as in year before. Old mat was torn down by bird in March and rebuilt partially to be torn down again. This was repeated several times. No attempt was made to build at 1969 site. When a new site in the form of a box on the east wall was provided a fairly large nest was built but not completed. This was placed in the room on June 10th.

15. One four week old chicken per day. None of excess removed.

16. No.

17. to 32.—0—

33. Providing new nest site may be important.

B.P.I.E. No. 32. Peregrine Falcon.

1. a. Donald V. Hunter. b. Centerville, S.D. c. No restrictions.

2. a. November 15, 1971. b. 1971 Spring Breeding Season (March through July). c. No.

- | Male | Female |
|--|-------------------------|
| 3. a. <i>Falco peregrinus</i> | <i>Falco peregrinus</i> |
| b. <i>pealei</i> | <i>pealei</i> |
| 4. 5 years | 5 years |
| 5. 1966 | 1966 |
| 6. Queen Charlotte Islands. | |
| 7. Manned and flown to lure 1966 only (both very wild now). | |
| 8. Room in House 15x15x7½, two windows to south, one to west. | |
| 9. No. | |
| 10. White plaster. | |
| 11. Nest box with sand 3' from ceiling in SW corner. | |
| 12. Both put in together in fall, 1966. | |
| 13. Never any antagonism between them. The female has always been dominant—at times feeds male. This happens when both are eating from same piece of food. She allows him to take food from her beak. These birds were raised in captivity by Frank Beebe's adult Peregrines (see <i>RRN</i> 1:61-86, 1967) though each was from a different eyrie. Both vocal in later winter—March—and sometimes in the fall for a short period. | |
| 14. Scraping not observed. Believe only female made scrape which was made as far as I could see just before eggs were laid—really wasn't much of a scrape. During the few days just before the eggs were laid both birds were very quiet and sitting with feathers tight and close to walls as if hiding. | |
| 15. Month old chick apiece each day or if much food was left over only one chicken for the pair. Excess food was not removed. | |
| 16. No. | |
| 17. No. | |
| 18. No. | |
| 19. Eggs—May 10, 12, 14. | |
| 20. Incubation started with second egg. Only female observed on nest. Male paid no attention to nest so far as I could determine. On May 28 eggs were removed and candled—found to be infertile—were not returned to nest. No more eggs were laid though behavior led me to believe there would be. | |
| 21. No temperature taken. | |
| 22-32. - | |
| 33. Believe that egg laying was delayed due to low level of light in room. | |

B.P.I.E. No. 33. Gyrfalcon.

1. a. Donald V. Hunter. b. Centerville, S.D. c. No restrictions.
2. a. November 15, 1971. b. 1971 Spring Breeding Season (March through July). c. No.

- | Male (Malcolm) | Female (Lena) |
|--|--|
| 3. Gyr Falcon (dark) <i>Falco rusticolus</i> | Gyr Falcon (white) <i>Falco rusticolus</i> |
| 4. 3 years | 8 years |
| 5. 1968, Eya | 1963, Passage |
| 6. Arctic (Eastern) | 73 °N Lat. |
| ? | September 6 |
| 7. Manned very tame. Flown every day fall and early winter. | Manned but not tame. Flown fall and winter of 1963-65. |
| 8. Both birds have freedom of one room downstairs and hall and one room upstairs in house. | |
| 9. 75 watt bulb is on at all times downstairs room. | |
| 10. Light colored wallpaper. | |
| 11. Several nest opportunities are available in each room. Male chose sand box in hall. | |
| 12. Male was raised by hand in facility. Female was introduced to same in December 1968. | |
| 13. Female tries to ignore male. Male very interested in female when I am not present, becomes aggressive toward her when I am in room, usually driving her upstairs. Often observed trying to engage her in play. He is always rejected—ignored. | |
| 14. Male makes scrapes at all times of year and seems to enjoy leading me to them and showing them to me. Doubtless disappointed because female will not look at them. I do not think he is imprinted to me but transfers to me when rejected by female. | |
| 15. Staple chicken one month old. His hunting kills are fed when available (and suitable). | |
| 16-27. No. | |
| 28. Around the 4th of July two young Gyr Falcons were introduced to the pair. The female immediately went upstairs and did not come down again as long as young were there. The male adopted them and fed them until as long as they were there. Food was month old chickens and pigeons. | |
| 29. Male was given to James Weaver as a mate for one of his females mid-July. Female became ill the following week and died six weeks later after extensive treatment for aspergillosis. Full report elsewhere. | |
| 30, 31. The young female was left with male until she died. In order to keep her tame, as I intended to exercise these two together, I had fed her while Malcolm fed the young male. She remained very tame and did not resent handling, while the male, though at first tamer than the female, became very resentful of handling. | |
| 32. See 29. | |
| 33. Feeding of young seems certainly innate and also it seems certain that Malcolm will breed in this circumstance with proper female. | |

B.P.I.E. No. 34. Red-tailed Hawk.

Donald V. Hunter, Jr., Centerville, South Dakota.

In 1970 eyass Red-tail (Willard) hatched locally, in 1967 built a nest, and sporadically tried to incubate a chicken egg. He rejected female put in with him after nest was commenced. Would not allow her off the floor in one corner of large room.

In 1971 same pair placed together earlier in another location. In this case female relegated Willard to corner of room. He was removed to save his life, as she would not allow him to eat. She built no nest. When placed in an outdoor enclosure by himself, Willard built a nice nest of sticks laid with baling twine and shredded cardboard. He diligently incubated infertile chicken eggs for 34 days, then for 15 more a Swainson's Hawk egg, which after this time I opened and found nothing to indicate that an embryo had even started to develop. Ironically, we apparently stole an infertile egg. The eggs we left in the nest hatched within a week of removal of the egg given to Willard.

B.P.I.E. No. 35. Prairie Falcon.

A brief explanation of the breeding project will help clarify the answers to the Breeding Project Questionnaire.

This project was actually born at the Fort Collins Peregrine Symposium just two years ago. My two sons have worked diligently on every aspect of this with me, and we have received a great deal of help, advice and encouragement from many friends.

As we had a trained haggard female and were able to trap a magnificent haggard male in our local area, we were able to begin promptly. These birds were remarkably compatible and all was well until March 19, 1970 when the falcon developed frounce; she was taken from the project and treated with Enheptin until we were able to get Emtrol. When she recovered, she was put back in the pen, where she continued to show a great deal of "broodiness." A painted brown chicken egg was put in the scrape and incubated but no eggs were laid that first season. Accordingly we tried an adoption plan and it was completely successful. We have the foster F1 pair in another breeding pen just like the one the haggard birds inhabited. This season, 1971, our haggard female laid a clutch of four eggs and incubated them; however, they were infertile, and she did not recycle. Philip L. Shultz, M.D., Santa Fe, New Mexico.

1. Philip L. Shultz, M.D., 107 Cienega St., Santa Fe, New Mexico 87501. This report may be used without restriction.

2. a. November 17, 1971. b. December 1969 to present.

3. Prairie Falcon (*Falco mexicanus*).

4. Male and female trapped as haggards two years ago.

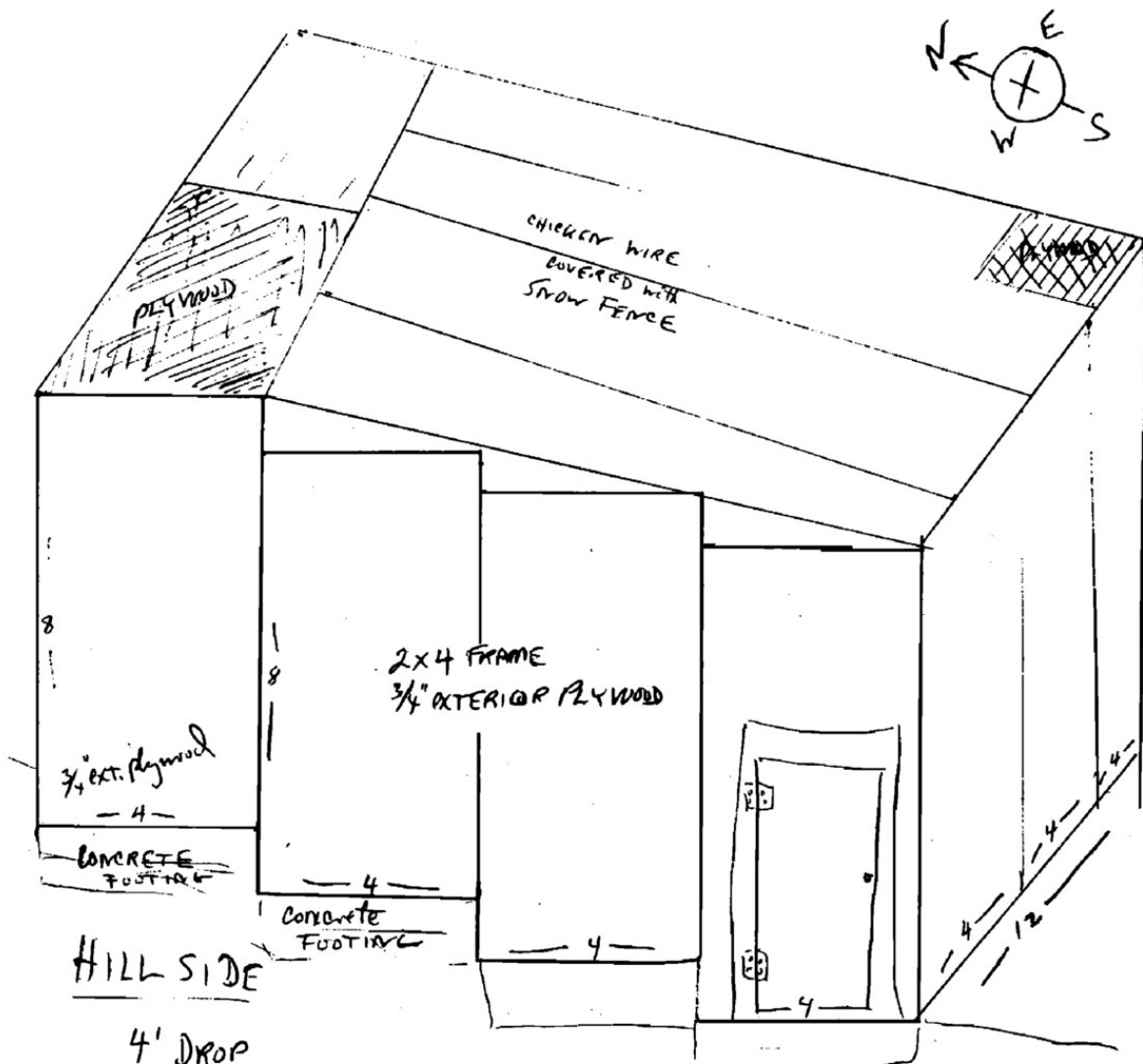
5. Female trapped September 27, 1969 in Rio Arriba County, New Mexico.

Male trapped December 18, 1969, Santa Fe County, New Mexico. 37 and 35 degrees N. Lat.

6. Eyrie of foster young in Rio Arriba County, New Mexico near 37 degrees N. Lat. and near place where female was trapped.

7. The haggard female was trapped September 27, 1969, manned, trained and flown at game, but only bagged quarry was taken. She was not flown free after the tiercel was trapped December 18, 1969. Tiercel was manned until February 1, 1970, but was not flown free. The foster (F1) male and female were taken up from the breeding pen July 26, 1970 and manned until September 8, 1970, 44 days.

8. See sketches. The pens are built on a hillside, sloping from north to south, with a four foot drop N. to S. The walls are smooth, unpainted $\frac{3}{4}$ " exterior plywood with a few 1" peepholes. The top is 2x4 frame with chicken wire over snow-fence. There are 4x4' and 2x2' plywood roofs over the nesting ledge in the northwest corner and in the southeast corner. Each pen is 12x16x8, and with the slope of the hillside an effective 12' height. There are no windows.



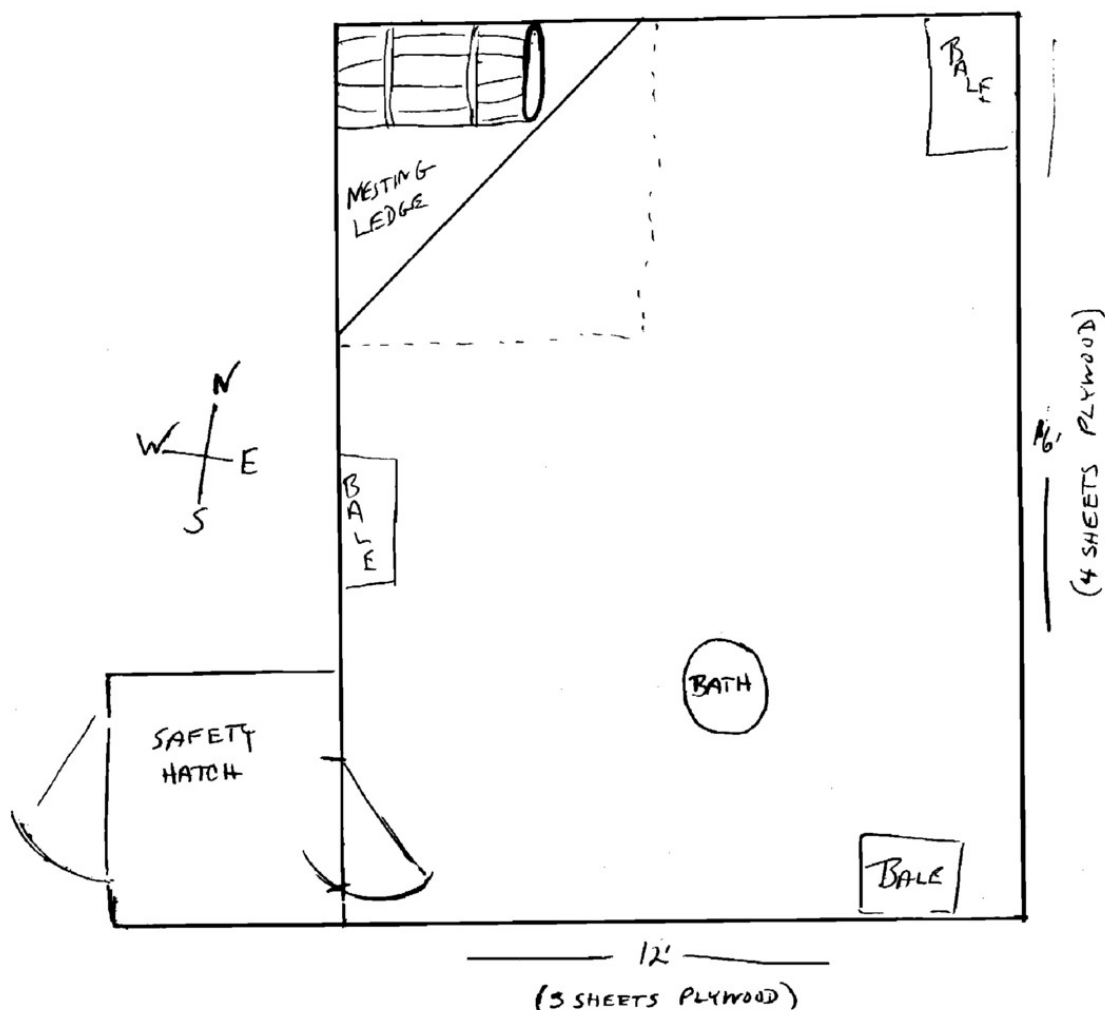
9. No.

10. Unpainted plywood. The outside is painted adobe brown.

11. For the 1970 season, a 4' shelf in the northwest corner about six feet above the floor, faced with carpet and covered with several inches of sand. For the 1971 season a wooden barrel with a padded opening, and containing several inches of sand was placed on the shelf.

12. The male and female had been weathered on adjacent round perches for several days; they were given full crops and placed in a 4x6x8' free mews on the night of December 27, 1969, where they shared a small shelf perch. They were fed together without conflict and on February 1, 1970 the slots were cut off their jesses and they were released into the new breeding pen. We did not observe any conflict, even when they were fed one undivided pigeon. Usually the falcon would eat first, but occasionally the tiercel would get first seating.

13. The pair invariably roosted side by side on the edge of the nesting ledge although numerous other perches were available and used during the day. They



engaged in various forms of courtship display, and we were able to photograph some of these from the observation peepholes. They would rouse and warble and make several types of clucking sound as they would approach each other on the ledge. The falcon would frequently crouch into a horizontal stance with her ventral pericloacal tuft fluffed out.

14. Only the falcon was seen making a scrape, but either bird would sit in the scrape, with or without eggs. A shallow scrape was observed in mid-April, 1970; it was deep by May 1, 1970. In 1971 there was a good deep scrape in the barrel by mid-March.

15. Pigeon has been the staple diet with the occasional use of chicken, rabbit, mouse, rat, or squirrel. The birds don't seem to like chicken backs, in fact the young adopted pair will completely ignore them. Feeding time is late afternoon and each bird receives $\frac{1}{4}$ to $\frac{1}{2}$ pigeon; there is seldom any excess. The haggard pair has been very reluctant to kill a live pigeon in the pen; we have tried this a few times when we were going to be away for a few days, and have usually returned to find the pigeon alive and well. The falcon would threaten the tiercel when he attempted to steal food, but no real crabbing was ever observed.

16. No hormones were used.

17. On the afternoon of April 6, 1970 the tiercel made a series of squeaking calls and was seen to mount the falcon briefly but she shook him off gently. The pair was under observation only a very small portion of the day.

18. No.

19. Egg No. 1 March 30, 1971. Egg No. 2 April 1, 1971. Egg No. 3 April 6, 1971 and egg No. 4 April 9, 1971.

20. Incubation was begun after egg No. 2 on April 3-4. On April 8, one egg was discarded and I was able to recover only about $\frac{1}{4}$ of the very thin shell under the nesting ledge. On April 11, another egg disappeared and no trace of it was found. We were trying to avoid any disturbance or confusion around the pen, so observations were made through peepholes, and the pen entered only when we felt it was absolutely necessary. On April 18, 1971 the two remaining eggs were removed, candled and both were infertile. They measured 52x40 mm and 53x40.7 mm. The female did not recycle and no more eggs were laid.

21. Unknown.

22. No.

23. During the 1970 season our falcon laid no eggs, so in May 1970 I placed a painted small brown chicken egg in the scrape; it was ignored for about ten days, and by the last week of May the falcon was incubating it steadily. By June 1, 1970 the tiercel was taking his turn on the egg. On June 10, 1970 we substituted a 2+ oz Prairie tiercel from a local wild eyrie for the egg, and he was immediately brooded by the falcon. However, she would not feed it for several days and we had to feed it until she took over. On June 27 a sibling female was placed on the ledge and was immediately adopted by the haggards. These young birds were raised by the foster pair until they were fully fledged.

24. Infertile.

25-26. -

27. No.

28. Foster young were fed pigeon by both parents (foster).

29. None.

30. Foster young were left with adults until fully fledged and were taken up July 26, 1970 and manned until September 8, 1970 when they were placed in the second pen.

31. See above.

32. The foster young which are our almost F1 generation have spent a completely uneventful 14 months in their pen, which is identical to their foster parent's. We have observed no conflicts; they molted perfectly and are a very handsome pair.

33. We are attempting to raise local birds under as simple natural conditions as possible. On June 22, 1971 our haggard tiercel died suddenly. There were no obvious lesions of any sort except evidence of marked weight loss. Weight immediately after death was 15 oz. He had weighed 19 oz when he was put in the breeding pen and had certainly gained on his generous pigeon diet. An autopsy was done the same day by Dr. James Prine, a Veterinary Pathologist at the Los Alamos Scientific Laboratory, and a hard 2½-3 cm mass was found obstructing the thoracic esophagus. Microscopic study and bacterial stains reveal this to be a granuloma, probably bacterial in origin and probably secondary to a perforated esophagus from a bone spicule. There were incidental findings of probable nematode larvae in the lungs and kidney. We hope to get another haggard tiercel in the near future.

34. -

B.P.I.E. No. 36. Prairie Falcon.

1. a. Canadian Wildlife Service (Richard Fyfe). b. 10015 103rd Ave., Edmonton, Alberta, Canada. c. Not confidential.

2. a. November 15, 1971. b. December 1970 through spring and summer of 1971. c. None.

3. a. *Falco mexicanus*.

4. Both birds three years old.

5. Male "Sandy" taken as five week old eyas. Female "Philea" taken as four or five week old eyas.

6. Male latitude 503 x longitude 1050 Alberta. Female latitude 491 x longitude 1050 Saskatchewan.

7. Male hand fed and flown on line to lure up to 30 feet for 2 weeks. Female flown at game by several falconers.

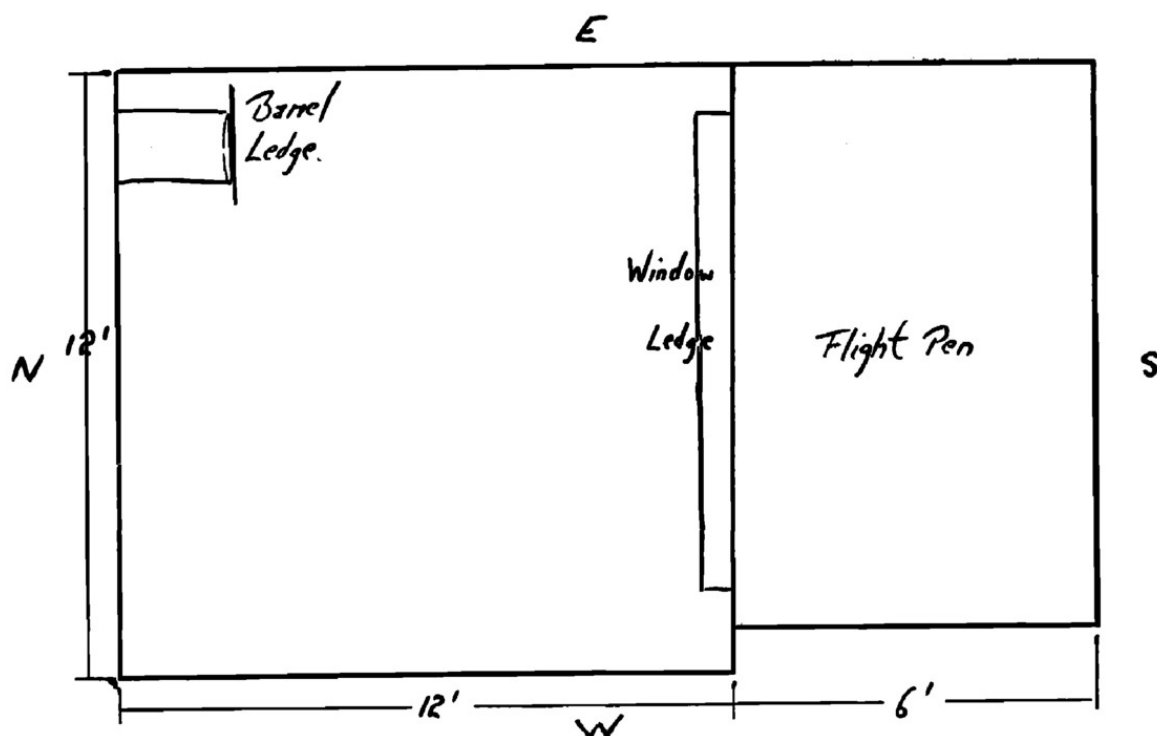
8. Pair housed in a wooden room built onto the north side of a barn. Dimensions 12 feet wide, 27 feet long; roof 12 feet high sloping to 6 feet. "Fylon" translucent corrugated fiberglass was used in the ceiling and on two of the largest windows. All windows had a log or branch perch placed at the base and the large west window had a branch placed along upper half of entire length of window to eliminate the birds flying into the ¾" mesh weld wire.

9. Total natural daylight—no artificial light.
10. Walls painted white non-toxic latex paint.
11. Two nesting ledges provided one flat ledge 2'x4'x2" one "barrel type"—covered with plywood dome 20"x30"x16" both approximately ten feet above the floor and filled with clean dry river gravel. Flat ledge was used.
12. Both birds placed in temporary pen together and then into breeding pen December 1970.
13. Birds quiet in breeding pen. February 1 female "cached" when pen entered. February 26 male heard "chirping." No animosity between birds. April 5-8, both birds calling. April 9, copulation observed for first time.
14. a. Yes (female not observed making nest scrape movements until day of second egg). Male started April 9.
15. Freshly killed coturnix quail, thawed pheasant, rodents. Fed twice daily in cold weather. No artificial dietary supplements.
16. Not used.
17. Observed for first time April 9, 9:00 AM. Male flew directly from perch onto back of female and copulated with her.
18. Not used.
19. First April 15; second April 17. Eggs three and four not seen until April 22.
20. a. April 19. b. Most incubation carried out by female.
21. Not taken.
22. Not used.
23. Not used.
24. Hatched.
25. a. May 28 three newly hatched young and one egg seen. May 29 fourth egg hatched. b. Both birds would, and did, strike an intruder when given the chance to do so.
26. All eggs hatched.
27. All eggs hatched.
28. Food as in No. 15. Both parents fed young.
29. -
30. Both adults appeared to take almost competitive interest in the care of the young. June 18 at exactly three weeks of age, two of the young females were removed to be hand raised. June 24 remaining female removed. Last remaining chick (a male) removed from adults on June 27.
31. Turned loose in holding pen.
32. Four young birds maintained at breeding project site.

B.P.I.E. No. 37. Prairie Falcon.

1. a. Canadian Wildlife Service (Richard Fyfe). b. 10015 3rd Ave., Edmonton, Alberta, Canada. c. Not confidential.

2. a. November 15, 1971. b. Spring and summer 1971. c. None.
3. a. *Falco mexicanus*.
4. Male "Homer" three years old; female "Toba" same.
5. Male taken as an eyas from southern Saskatchewan; female same.
6. Male latitude 491 x longitude 1050; female same.
7. Male kept extremely tame and flown at times; female raised as falconers bird.
8. See sketch. Pair housed in room 10'x12'x6' with 8'x6'x6' enclosed wire flight pen.
9. No artificial light used.
10. Interior painted white.
11. One nesting ledge provided—barrel type 20"x30"x16" in northeast corner of room—2" of river gravel.
12. Pair put into breeding room February 12, 1971.
13. "Chirp" calls heard but no copulation observed.
14. Nest scrape made—not known if male participated.
15. Freshly killed coturnix quail, thawed pheasant and rodents made up the food. During cold weather they were fed twice daily. No dietary supplements were used. Excess food removed except during breeding season.
16. Not tried.
17. Not observed.
18. Not tried.
19. May 20—first egg. May 23 three eggs noticed, May 27 five in nest scrape.
20. May 20.
21. Not taken.
22. Not tried.



- 23. Not used.
- 24. Eggs not fertile.
- 25-26. -
- 27. Not analyzed.
- 28-32. -

B.P.I.E. 38. Peale's Falcon.

1. a. Canadian Wildlife Service (Richard Fyfe). b. 10015 103rd Ave., Edmonton, Alberta, Canada. c. Not confidential.
2. a. November 15, 1971. b. Spring and summer of 1971. c. None.
3. a. *Falco peregrinus*. b. *pealei*.
4. Both birds five years old.
5. Male "Joey" taken as eyas; female "Charlotte" taken as four week old eyas.
6. Male Queen Charlotte Islands latitude 541 x longitude 1330; female same.
7. Male raised as falconer's bird. Flown at lure and quarry; female same.
8. See sketch. Pair housed in loft of wooden barn. Dimensions 27'x28' and 18 ft high at peak of roof sloping to 8 ft of eaves. Three-quarter inch weld wire covered three windows in east south and west walls and in roof.
9. Total natural daylight—no artificial light.
10. Walls painted white non-toxic latex paint.
11. Three nesting ledges—platform ledge, 2'x4' and 12 ft from floor, placed on east wall. Platform ledge 2'x3' and barrel ledge (plywood dome cover) 20"x30"x16" both on south wall. All were filled with two inches of clean dry river gravel.
12. Charlotte and Joey were first put into their loft during the early spring of 1970. Two clutches of infertile eggs were eventually produced and they were given two young Swainson's Hawks to raise. Charlotte and Joey remained together during the fall and winter of 1970-71.
13. March 15th both birds very restless, vocal calls to each other—"wailing" and bowing. Feeding of the female by the male seen at this time. Male appeared to "distrust" female and avoided coming in contact with her throughout the season.
14. March 26 female observed making nest scrape movements April 1 male observed making nest scrape movements.
15. Freshly killed coturnix quail, thawed pheasant, rodents. Fed twice daily in cold weather. No artificial dietary supplements.
16. Not used.
17. April 7—attempt at copulation observed. No actual copulation seen—male appeared "timid."
18. Not used.
19. Eggs first seen on April 12. April 14—four eggs removed and placed in artificial incubator. April 26—first egg of second clutch laid. April 28—second

egg laid. Five eggs eventually found.

20. a. Partial incubation with two eggs. b. Both male and female observed incubating. May 28—eggs candled and proved infertile—removed.

21. Not taken.

22. Yes—but eggs proved infertile.

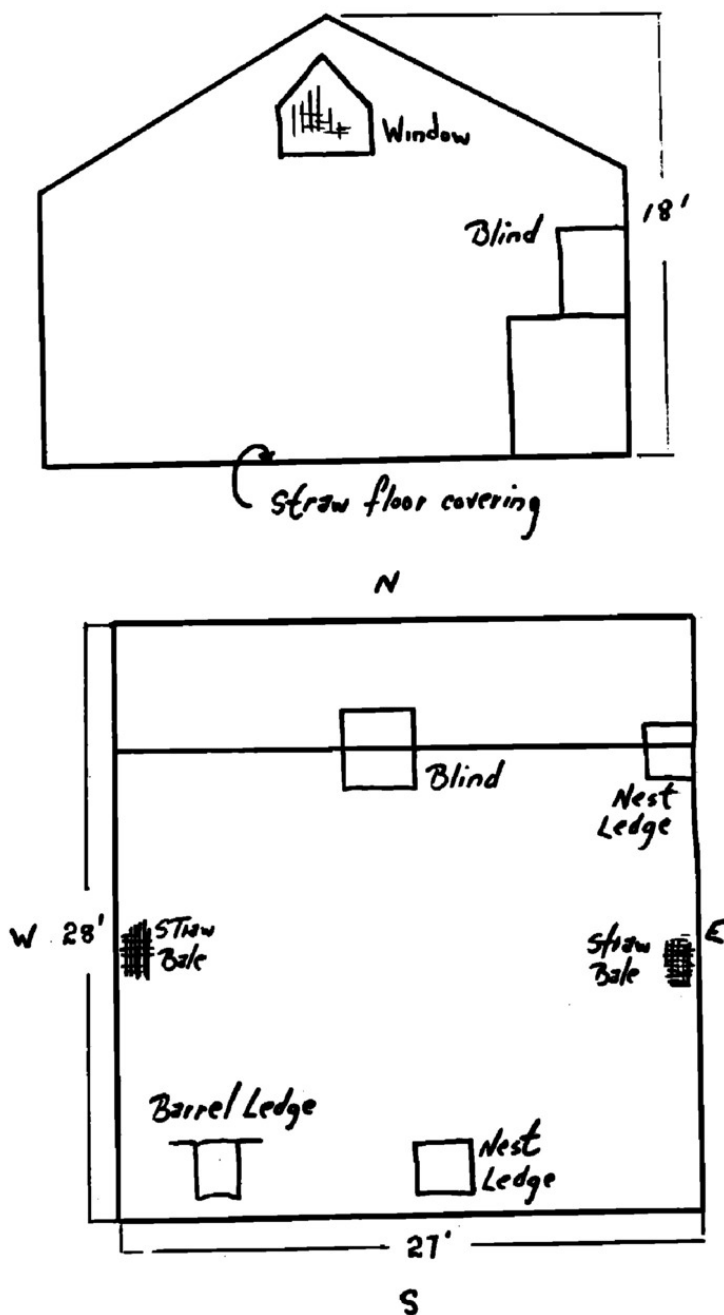
23. Not used.

24. Infertile.

25-26. -

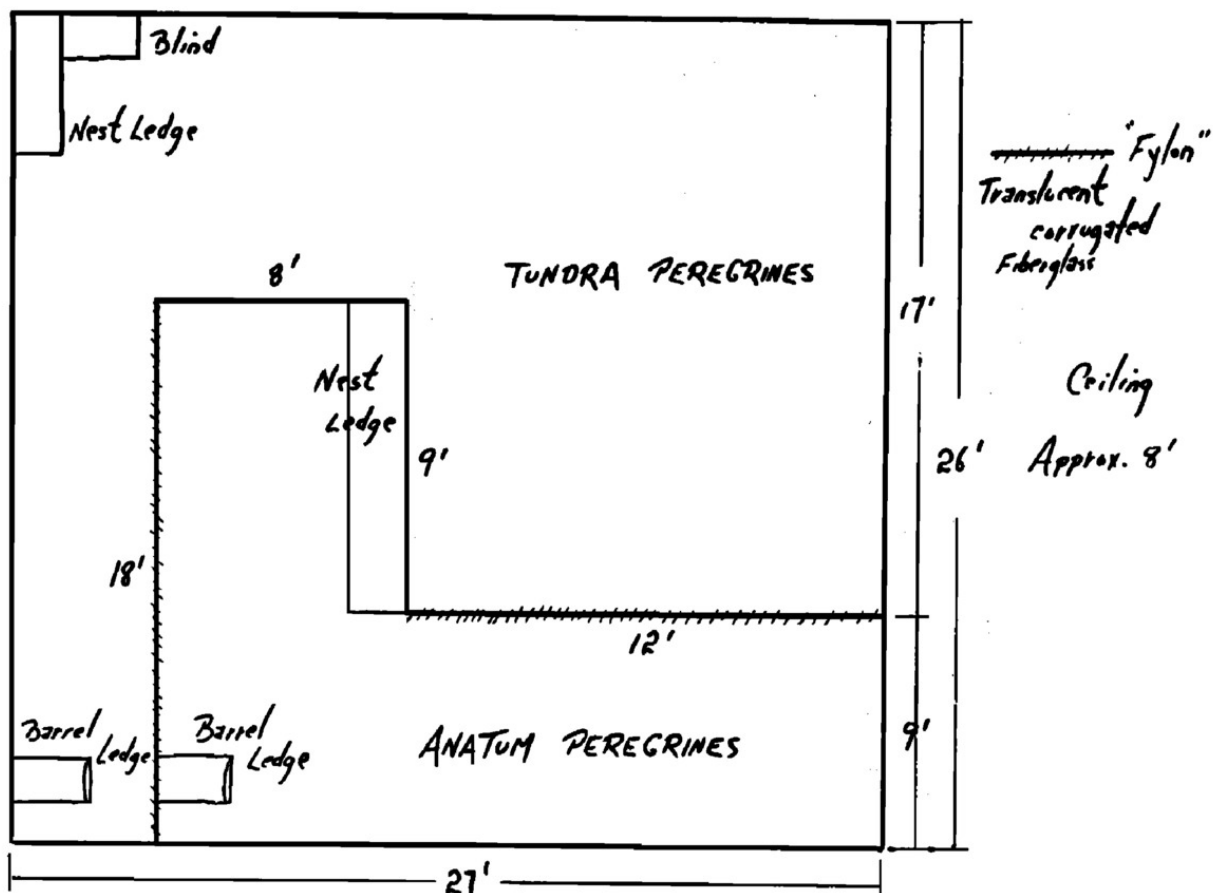
27. No.

28-32. -



B.P.I.E. No. 39. Peregrine Falcon.

1. a. Canadian Wildlife Service (Richard Fyfe). b. 10015 3rd Ave., Edmonton, Alberta, Canada. c. Not confidential.
2. a. November 15, 1971. b. Spring and summer 1971. c. None.
3. a. *Falco peregrinus*. b. *tundrius*.
4. Male "Benjy" two years old; female "Attee" seven years old.
5. Male taken as an egg in July 1969 from Frobisher Bay, Baffin Island, North West Territories; female taken as 3-4 week old eyas from Coates Island, North West Territories 1963.
6. Male latitude 634 x longitude 682; female latitude 625 x longitude 815.
7. Male raised from egg and flown daily for several months; female also flown free.
8. See sketch. Pair housed in a room on ground floor of barn.
9. Artificial light not used.
10. Interior of room was painted with white non-toxic paint.
11. Two nesting ledges were provided—ledge type 2'x3' in northwest corner, barrel type 20"x30"x16" in southwest corner both contained approximately 2" of clean dry river gravel.
12. Pair introduced to pen in January 1971.
13. No signs of courtship or any other possible breeding behavior were ever observed between this pair.
14. In late June and July the female was seen lying down on a hay bale but



no eggs resulted. The male was not involved.

15. Freshly killed coturnix quail, thawed pheasant and rodents made up the food. During cold weather they were fed twice daily. No dietary supplements were used. Excess food was removed except during breeding season.

16. Not tried.

17. Not observed.

18. Not tried.

19. None.

20. See 14.

21-22. -

23. Molt of this pair started late but then was completed normally. Female seemed to exhibit territorial behavior towards humans.

B.P.I.E. No. 40. Peregrine Falcon.

1. a. Canadian Wildlife Service (Richard Fyfe). b. 10015 3rd Ave., Edmonton, Alberta, Canada. c. Not confidential.

2. a. November 15, 1971. b. Spring and summer 1971. c. None.

3. a. *Falco peregrinus*. b. *anatum*.

4. Male "Pach" one year old; female "Kappa" two years old.

5. Male taken as eyas in 1970 from Labrador; female taken as eyas in 1969 from Alberta.

6. Male —; female latitude 533 x longitude 1140.

7. Male handled to limited degree—not flown; female not flown.

8. See sketch on page 40. Pair housed in room on ground floor of barn.

9. Artificial light not used.

10. Interior of room painted white.

11. Two nesting ledges provided—platform ledge 2'x9' in north central part of room, barrel ledge 20"x30"x16" in south west corner. Both contained river gravel.

12. Male was introduced to female in March 1971.

13. Birds showed no hostility towards each other.

14. No nesting activity was observed.

15. Freshly killed coturnix quail, thawed pheasant, and rodents made up the food. During cold weather they were fed twice daily. No dietary supplements were used.

16. Not tried.

17. Not observed.

18. Not tried.

19. None.

20. None.

21-22. -

23. No results were expected of this pair since a mature male *anatum* Peregrine was not available at that time.



Hunter, D V. 1972. "REPORTS BREEDING PROJECT INFORMATION EXCHANGE."
Raptor research 6(1), 16-41.

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