RAPTOR RESEARCH NEWS

A Quarterly Publication Of The Raptor Research Foundation, Inc.

Volume 2 July 1968 Number 3

Editors: Byron E. Harrell, Zoology Dept., University of South Dakota, Vermillion, S. Dak.
Donald V. Hunter, Jr., Centerville, S. Dak.

Editors' Notes. As this is being written the processing of the last issue is almost done and this issue should be out in less than two weeks. The fourth and final issue of the year is scheduled now for the first week in December.

The editors are aware that some of our readers feel that undue proportion of the space is devoted to the captivity breeding projects. This can hardly be the fault of the breeders for we are prepared and can afford to extend the size of the issues with more materials on other topics. We are not favoring breeding reports, but other workers are in effect favoring them by not sitting down and preparing something in their areas.

Once we are back on schedule with the News the Board plans to do more to implement the committee structure.

Informal Meeting of Raptor Research Foundation. A special announcement was mailed out with the last issue of informal discussions to be held at Centerville, South Dakota, on Friday, November 28, 1968. A number of our members will be at the North American Falconers Association field trials in South Dakota this Thanksgiving week. The Raptor Research Foundation is planning a display at their headquarters on Friday of that week. We hope that falconer and non-falconer members will drop by to meet others and discuss raptor research problems.

Status of Monkey-eating Eagle. James K. Cleaver has written us concerning this rare species from the Philippines. The Foundation is of course interested in raptors everywhere, but we are not certain what effective action we can take. Perhaps some of our members know enough of this specific situation or have more ideas in general on this sort of problem that they could write us their thoughts. Perhaps some of these thoughts could be utilized by our hopefully soon to be organized Education and Conservation Committee.

RAPTOR POPULATION COMMITTEE

George Jonkel sent out a memorandum to those who checked this interest on our questionnaire. This memo encouraged the reader to monitor migratory and nesting populations in their areas. In order to reach others we are enclosing a copy of the form sent out with this issue of the News. The committee hopes that cooperators can fill these out at the end of the nesting season and send them to Don Adolphson, 2611 Lawndale Drive, Rapid City, South Dakota, 57701.

RAPTOR BANDING COMMITTEE

Peregrines. A number of banders are undoubtedly saving a feather or two from the raptors you trap and band in the hope that this material will some day be analyzed for pesticide residues. (At least one European lab is extracting hard pesticide residues from a single feather from each specimen.) Dan Anderson, Dept. of Wildlife Ecology, Univ. of Wisconsin, Madison, Wisc., 53706, has just gathered a substantial number of feathers from Peregrine museum specimens. If you wish to help add to this collection, which may be extremely valuable in years to come, please send him right rectrix No. 2 (the tail feather next to the middle feather on the right hand side of the bird), or a feather as near to this location as possible [see Editor's Note below]. The label should include age, sex, date, place, and your name. I always include band number on such labels, as banding records are on permanent file. Just keep the feather clean, put it in an envelope, and mail it to him with the label.

Snowy Owls. Look under the alula (bastard wing) for a possibly new ageing method. Of course, use other ageing methods in conjunction, or we won't be testing my hunch that birds of the year still may carry brown, juvenal feathers at this point. If you will send me one feather (the darkest one over two inches long from the alula) labeled as for Peregrine feathers above, I would be glad to summarize and report on the material.

Fran Hamerstrom
Plainfield, Wisconsin 54966

Editor's Note. (re. collection of feathers from living raptors for pesticide analysis.) Unlike some other birds, particularly the Columbiformes, raptors do not readily regrow feathers which have been pulled out of the follicles. While sometimes a perfect feather does replace the pulled out feather, often the follicle is damaged to a degree that no feather is ever again grown from this follicle. Often even when a feather is regrown it is defective. Therefore it is recommended that

the desired feather be cut off which will be replaced at the next molt in normal sequence. One more word of caution: while the bird will probably not suffer significant reduction in flight ability with only the loss of one tail feather, the loss of more certainly would. Also the feathers give partial support to adjacent feathers; those next to removed feathers are more vulnerable to breakage. Use of common sense is indicated in taking feathers for the above worthy purpose. (DVHJr)

CAPTIVITY BREEDING COMMITTEE

Reports of Successful Captivity Breeding Attempts. We have a report that Tony Schramm, a young man in Washington state, was successful in raising a young Peregrine from parents in captivity this year. We hope to be able to publish details at a later date.

Henry Kendall of St. Louis, Missouri, was successful this year in captivity breeding Prairie Falcons. Two males and a female were fledged. Five eggs were laid; apparently only three hatched. It is understood that a complete account of this successful attempt will be published elsewhere at a later date. An account of Kendall's last year near success was reported in the B.P.I.E. last fall. The following section is a report of the feeding of his birds before and during incubation which is of high interest.

Don Hunter
Centerville, S. Dak. 57014

Notes on Food Preferences of Captive Breeding Prairie Falcons. For the past two years, about a month prior to egg laying time (April), I have made a point of giving my breeding pair of Prairie Falcons a wide variety of food, ranging from small birds, chickens and pheasants to squirrel, beef heart and lean beef, amply fortified with Vionate (a vitamin and mineral supplement). This year, a daily capsule of wheat germ oil was also given both birds during this period. Obviously, this program of feeding was designed to insure potentially healthy chicks.

At this stage of the breeding cycle, the adult birds showed no particular food preferences, at least as far as I could discern. About the same amount of food was consumed daily and the falcon (a 1962 eyass) and the tiercel (a 1964 eyass) maintained a weight of 32 oz. and 20 oz. respectively, when on the full feed program.

During the egg laying and incubation period, which can cover as long as 45 days (as it did this year when five eggs were laid), mainly chicken was fed that was sprinkled with the Vionate supple-

ment. It's always a fresh food as I raise many batches of broiler chicks to about 3 weeks of age, over the course of a year.

When the Prairie eggs hatched at the end of May, there was some apprehension about what would be the best food to give the adult birds to feed the young. English Sparrows, both live and fresh-killed, were put in the pen, the live sparrows with the thought that catching prey might stimulate the feeding response. The falcon assumed the feeding role and each sparrow was thoroughly plucked before being taken to the nest ledge. It took the falcon several minutes to figure out bite sizes that could be handled by the newly hatched chicks, but thereafter, feeding was routine. The entire sparrow, except for legs and bill, was consumed. Starlings were given in addition to the sparrows, and for the first several days only small birds were fed to the young.

Food preferences changed rapidly and by the time the young Prairies were a week old, the adult birds were interested in feeding pigeon, squirrel and lean beef, in that order. Small birds were no longer fed and would remain neglected in the pen, until removed.

Growth rate was very rapid, as the young birds were fed often, and at the age of 16 days the pair of tiercels weighed 12 oz. each and the young falcon, 20 oz. At this time, I started feeding day old chicks and the adult Prairies preferred them to all other food, as though chicks contained ingredients not found elsewhere. Squirrels were now refused entirely as food for the young, only chicken, beef heart and pigeon accepted. Plucking was always done, prior to feeding, away from the nest ledge.

The Prairie fledglings reached full body weight at 3 weeks of age, with the adult falcon continuing to do most of the feeding; the tiercel filling in when the falcon did not respond to fresh food placed in the pen. Feeding continued at a rapid rate and the young were not left with food to pull on their own. For the next week, feeding was quite simple as live chicks were put in the pen in the morning and at noon. The adult falcons would only kill a chick when they fed the young, so it became a bit of a self-service routine. In the evening, a feeding of beef heart and Vionate supplement was offered and the young continued to be fed by the parent birds.

The pair of tiercels were taken out of the pen on June 22nd and the falcon removed about a week later; no hunger streaks of any kind developed during the period of time the young were fed by the old birds.

Henry C. Kendall
3950 Old Bonhomme
St. Louis, Mo. 63132

TAXONOMIC STATUS OF TUNDRA INHABITING PEREGRINES

Discussions of an undescribed race of Peregrine Falcon go back over 50 years and have interested falconers as well as taxonomists. Clayton M. White has examined this problem and describes Falco peregrinus tundrius (Auk, 85:175-191, 1968).

White has examined over 1100 North American Peregrine specimens and has applied the new name to the highly migratory, small, pale population of the arctic and subarctic tundra. He follows the usual procedure of using anatum for the continental populations and pealei for those of the humid Pacific coast and Aleutians. The name nigriceps is a synonym of anatum, and naevis is unidentifiable to subspecies. A specimen attributed to an Asiatic subspecies called harterti is considered more likely to be of the new race. There is considerable detail in the paper, and it seems to represent a good and thorough evaluation of the situation. (BEH)

BOOK REVIEW

Flashing Wings, by John K. Terres, 177 pp., Doubleday and Company, Inc., Garden City, New York, 1968.

The technology as well as the asthetics of bird flight is dealt with in a most readable and engaging way. Mr. Terres skillfully builds discussions of how birds fly around his experiences with a trained Peregrine. In doing so he answers, incidentally, some of the questions falconers ask themselves as to why the depth of their involvement and love for their birds.

This book is much more than this, however. It is an excellent up-to-date treatise of the problems of air locomotion and how the various birds solve them. Combining aerodynamic experiences of man in powered aircraft and sailplanes with knowledge gained from a lifetime of interested observation of birds in flight and an understanding of avian physiology the author has succeeded, without loss of accuracy, in putting into layman's language a surprisingly comprehensive picture of the wonders of bird adaptation for mastery of the air. The story of the different types of flight, from the high energy consuming flight of the humming bird to the energy conserving flight of the Wandering Albatross is so interestingly told that I could not put the book down.

Flashing Wings is a real contribution and deserves a place in the library of every bird lover and a must for those who have flown vicariously with them.

Donald V. Hunter, Jr.
Centerville, S. Dak. 57014

CAPTIVE BREEDING BEHAVIOR

AMERICAN GOSHAWK - PART I

by Robert B. Berry
1035 W. DeKalb Pike
King of Prussia, Penna. 19406

The thought of breeding raptors in captivity has crossed my mind only casually back in 1962. Such vague aspirations had absolutely nothing to do with an afternoon in June when I robbed a small downy goshawk from its nest. Little did I know that this tiny chick would become the source of great joy and frustration--but not in the sport of falconry. It would serve as a catalyst to research, far removed from my original intent. This paper describes life with "Jill," an American goshawk, and the sequence of events which I hope one day will lead to successful breeding in captivity.

Observations have been recorded on a daily basis. My breeding chambers (Figure 1) are only 20 yards from my bedroom window and isolated, making daily observation practically mandatory and keeping bias from human interference to a minimum.

Jill was seven to ten days old when we took her from a large stick nest some 30 feet up in a white birch. Only the hen was evident, giving alarm calls, but not pressing her attack closer than 30 yards. Sign and the remains of a chick at the base of the tree suggested that at least one nest mate had been killed, probably by a raccoon.

Jill took up residence in my dining room until she became a brancher. She developed rapidly on a diet of starlings and sparrows and was fledged without fault bars. She was extremely tame and quite playful, much preferring to chase and mock attack rather than to grasp and kill. She was more of a pet than a hunting hawk.

Jill moulted normally during the spring and summer of her yearling year (1963) and seemed happy in her mundane existence of ring perch by day and screen at night. I saw no sexual behavior preceding or during the first moult.

Some months before her second moult (1964), Jill began to call wildly the typical "kac kac kac" of the territorial goshawk. She soon began to defend the territory surrounding her perch against strangers. She did, however, accept me and to a lesser extent other familiar persons. At two years of age, Jill was

definitely aggressive in defense of territory. Although no eggs were laid, she exhibited copulatory gestures like those displayed prior to laying in later years. One can only speculate about her sexual maturity as she was not encouraged nor given opportunity to construct a nest. As the summer progressed, territorialism waned. Jill was flown again in falconry for a brief period in December and January.

As a three year old (1965), Jill was subjected to considerable stress from road construction operations near my home. Her moult commenced on February 7, 1965, and progressed slowly until late August when I went away for three weeks. She appeared to stop moulting completely during my absence, only to start again upon my return and complete cleanly in October. Stress and fear had apparently suppressed the territorial aggression so apparent the prior spring. In late summer, my family moved to a quiet and remote home in the country. Jill was obviously more at ease and relaxed in her new environment.

As early as mid-January in her third winter (1966), Jill became restive, bating frequently and calling loudly when placed on the outside perch. It appeared she was trying to attract a mate rather than warning intraspecific intruders from her territory. Whenever a stranger approached, Jill would go through a ritual of bowing her head while raising her tail parallel to the ground and flashing her brilliant white undertail coverts, all the while screaming defiantly "kac kac kac." If the stranger approached too closely, she attacked vigorously.

It is interesting that none of the local raptors--mostly buteos and sparrow hawks--nor any other birds appeared to react to the goshawk's defense cries, not even showing curiosity.

On February 20, 1966, I introduced a wild trapped yearling male goshawk (contributed by Dr. Heing Meng) to Jill's screen perch. She was immediately resentful in contrast to her passive tolerance towards the familiar peregrines and members of her human family. Konrad Lorenz indicates that aggressive behavior is to be expected as a necessary step to establishment of the normal pair bond. For the next few weeks, they shared the same screen perch in the evening and were tethered as closely as possible on the lawn by day. The haggard male was relatively calm in temperament for a wild trapped bird of some three weeks. He was keen to the fist, but given to occasional violent bating. During this initial period of togetherness, Jill continued her vocal defense of territory, but ceased in her attempts to expell physically the newcomer.

On March 12th, the breeding chamber was almost ready for occupancy. It consisted of an enclosed room 15 x 8 feet and 9 feet high and an open air chamber 15 x 20 feet and 24 feet high

Figure 1. Breeding chamber with nest in tree crotch. The enclosed space is 15 x 8 feet and 9 feet high; the open screened area is 15 x 20 feet and 24 feet high.

Figure 2. "Jill" accepting a stick from the author.

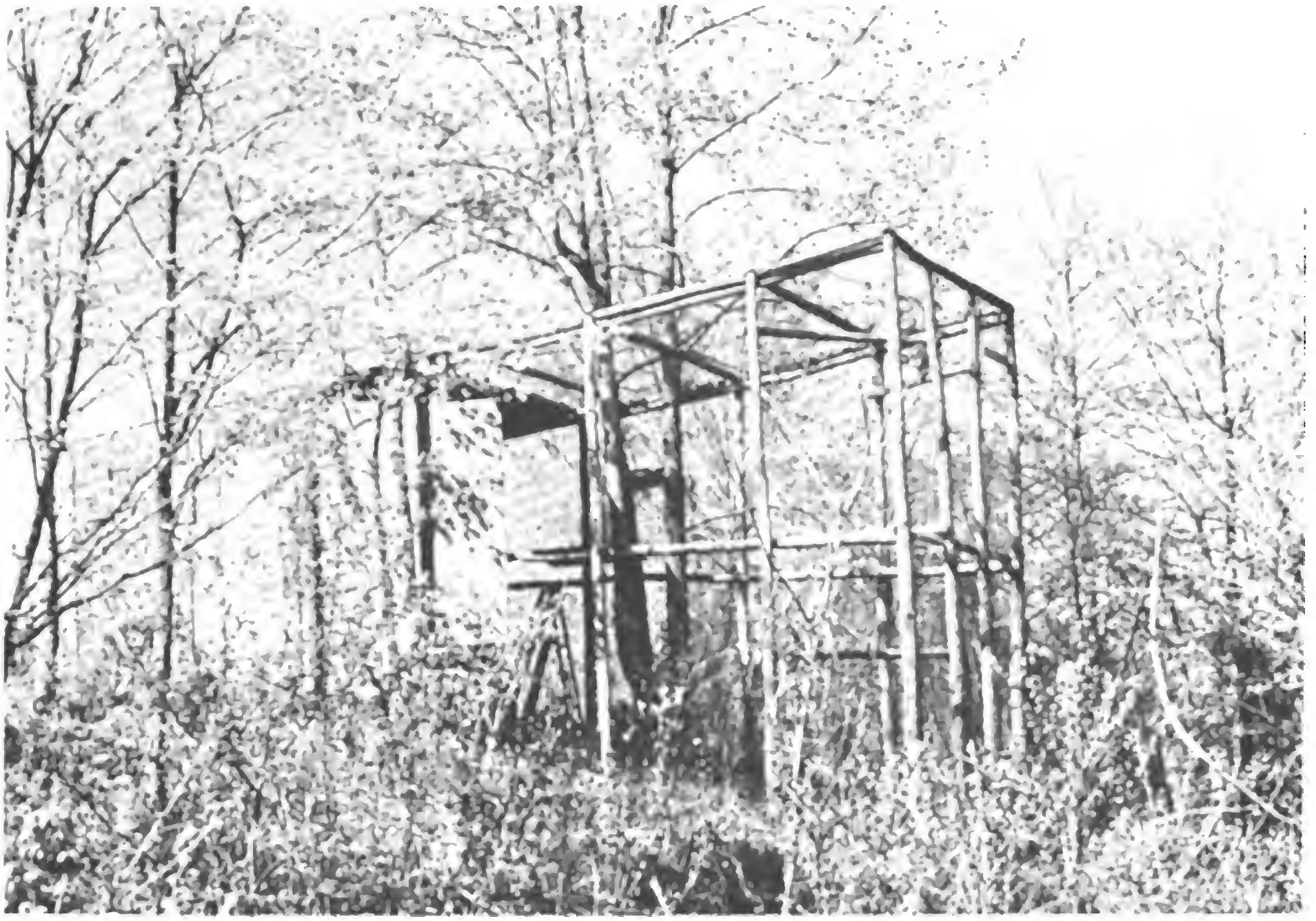

Figure 1

Figure 2

Figure 3

Figure 4

Figure 5

Figure 3. Elevated approach serves to lodge and compress sticks.

Figure 4. Precopulatory or defence display (?). I cannot predict whether an attack or copulatory gestures will follow display.

Figure 5. "Jill" preparing to incubate; note position of toes to minimize possible danger to eggs.

Figure 6. Feeding of week-old Red-shouldered Hawk chick.

Figure 7. Four week old Red-shoulder chick; still unable to grasp food.

Figure 6

Figure 7

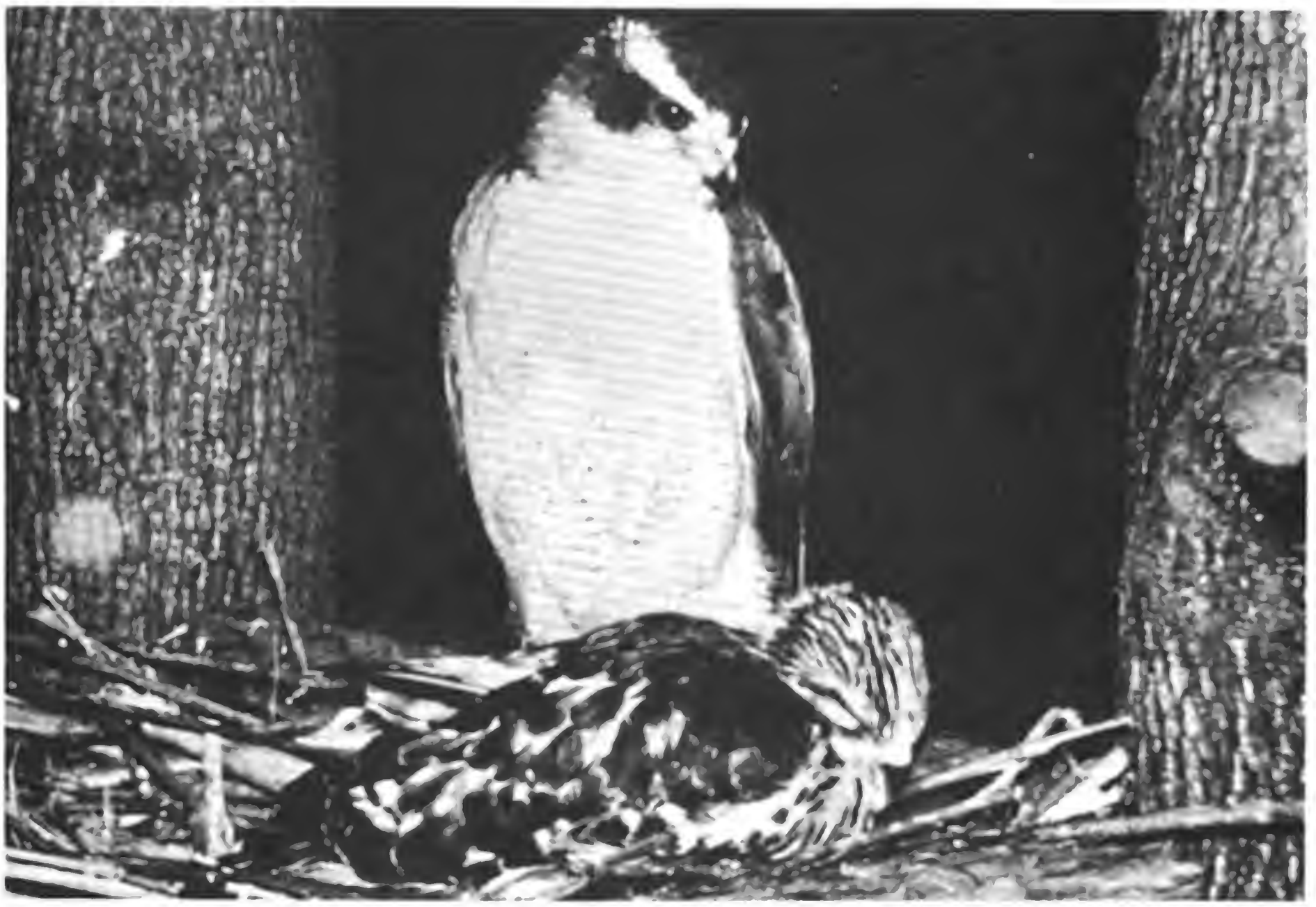

Figure 8

Figure 9

Figure 8. Youngster returned to nest to sleep; hen assumes protective posture.

Figure 9. After fledging; hen and chick were inseparable.

(Figure 1). The room had windows on all sides and a full size door leading to the outside chamber. The open air section was constructed of cedar poles covered with plastic coated chicken wire (imported from Belgium). I felt that Jill would establish territory immediately and that the problem would lie with Jill's hostility towards the male. Spruce trees were therefore hung randomly throughout both the inside and outside chambers to provide cover and protection. He could escape her most effectively by taking refuge in the semi-darkened inner room.

Since the outside chamber required additional modification, Jill was placed in the aviary alone. The male would have been greatly upset by the necessary human activity. After a brief exploration of her new quarters, she went to the ground, seized a stick in her beak and flew straight to a wire basket secured in a natural tree crotch. It took only a few minutes for her to begin constructing a nest. I was enthralled at this immediate need to build as it was certainly a giant step in the right direction.

After a week, I put the male in the aviary under cover of darkness. Before dawn the next morning, Jill began screaming, obviously aware of the male's presence. As soon as she could see plainly, she attacked with what appeared to be fatal ferocity. The spruce trees helped very little as she relentlessly pressed her attack. The male soon learned that the inside shelter meant relative sanctuary and spent all of his time there.

When not harassing the male, Jill was busily engaged in construction. She had a definite pattern for building and decided preferences in nesting material. She preferred sticks which were elevated from the ground and tried vainly to tear twigs from the live tulip poplar branches growing in her pen. She would "attack" a branch from above, grasp it in her talons and attempt to snap it off. This method is doubtless quite effective on dead sticks, but was of little value on the poplar. If I offered sticks by hand (Figure 2) or hung them in the wire, they were immediately seized and taken to the nest. As a last resort, she took sticks from the ground. She disdained crooked or gnarled twigs, or forked boughs. Green or live stems were also shunned. The ideal material was long dead, and relatively smooth, ranging from one-quarter to one-half inch in diameter and up to three feet in length. She grasped small sticks carefully in her beak, centered for balance. The larger ones she carried in one or both feet. When flying to the nest with a sizeable stick, she towered two to three feet above the platform, folded her wings and dropped heavily into the nest. This technique served to pack nesting material and was essential for lodging longer sticks (Figure 3). Jill worked in spurts, first bringing a dozen or so sticks to the platform and then, as if exhausted with such strenuous activity,

she settled herself in the center of the nest and worked each one until it was firm. Generally she dislodged nearly as much material as had just been accumulated. Before the first egg, she lined the nest neatly with strips of cedar bark.

As the days grew longer and the weather milder, Jill's attacks on the male were more frequent and sustained. There was no real sanctuary and it became increasingly obvious that their acquaintance was too short to inhibit her aggression in the slightest.

There was a definite pattern to Jill's aggression and her attacks were usually predictable. Perching on one foot, or while bathing, was never followed by an attack. She was satisfied if the male perched on the lowest log, some two feet from the ground. She would sit contentedly, fifteen feet above him or even carry sticks to the nest so long as he remained on the single low perch. Jill also allowed the male relative sanctuary in the inside chamber. Only when he took one of "her" perches did she object.

Hostility was generally preceded by the territorial "kac kac kac." She would plant both feet firmly on her perch, lower her head menacingly with hunched and ruffled shoulders; her undertail coverts fanned out in a flash of brilliant white (Figure 4), accentuating her hostility. Her attack was direct and swift--its intensity and duration a function of her mood and his reaction.

Often a single attack gesture was enough to ignite frantic escape flight, which in turn stimulated her aggression.

Direct aerial assault resulted in a frenzied chase throughout one or both chambers and might last upwards of a full minute. He was terrified by such aggressiveness, crashing headlong into the sides of the pen in an effort to escape. Actual physical contact was, however, limited to mid-air sparring and split second locking of the talons. Bloodshed was never observed, nor was there ever footing of the body. Finally, with a crescendo of peeping, chittering and wailing, he would take refuge on the ground. She then withdrew, it seemed psychologically unable to press her attack to a conclusion.

On May 13, Jill appeared broody and spent the night incubating, and I later found the shell of an egg, probably produced on or about that date. The second, third and fourth eggs were laid in the nest May 17, 20 and 23 respectively, allowing a known three day interval for three of the four eggs. Incubation was continuous after the first unbroken egg, and probably after the first egg.

During egg laying, Jill became extremely thin and weak, although her diet of frozen starlings had not been altered. She drank to such excess during this initial period that I was forced to remove her water pan periodically, fearing for her health. While there were no overt respiratory symptoms, I suspected aspergillosis and commenced fogging with Amphotericin "B" twice daily. Her health deteriorated rapidly until she had to be hand fed. At one point she was too weak to stand, but continued incubation. I felt she would surely die but after the fourth and final egg, her condition improved rapidly.

In retrospect, I suspect egg blockage caused by either a dietary deficiency from frozen birds or more probably from lack of fresh water immediately before laying. Later experiments suggest that a supply of clean fresh water is critical to normal egg production. Ron Austing's prairie falcon fed entirely on frozen chicken heads mysteriously became very thin and subsequently died during incubation. I assume she had fresh water.

After the final egg, the male goshawk was permanently removed from the aviary. He had undergone sheer Hell for the past two months. His plumage was battered, with considerable damage to wing tips and tail. His cere wore a thick scab from repeated collisions with the wire. He was possessed of such extreme fears that after partial intermewing, he was released to the wild.

During the first week of incubation, Jill broke and perhaps partially ate two of her three eggs. I do not know whether breakage was by design or the accidental result of her weakened condition, or due to thinness of shell. Considerable egg was on her breast feathers which suggested accidental breakage, and the egg on the beak may have resulted from her efforts to remove shells from the nest. The final egg was placed under a bantam hen, and later proved to be infertile. Jill continued to incubate a pair of glass eggs.

It seemed imperative that Jill become experienced in motherhood. On May 31, I secured a fledgling red-shouldered hawk about three days old. While Jill was busily downing a starling, I substituted the chick for her two glass eggs. I literally hovered about the nest platform poised to snatch the downy hawklet from her talons. Upon completing her rations, she flew directly to the nest, stared at the peeping chick, and settled gently to incubate. It was a truly touching sequence.

When approaching the nest to incubate, Jill was careful to land gently on the elevated sides. She would then extend her hind toe beneath the ball of the foot so that all talons were in a forward position (Figure 5). This technique is obviously designed to minimize the possibility of egg puncture or damage to young from the formidable talons. Once in the nest bowl, she moved about on

her haunches with all toes and the lower portion of her leg on the horizontal. She never literally placed her weight on eggs or young, resting on her lower legs in a semi-standing position. The slightest movement from beneath caused her to rearrange her position, often elevating herself and peering at the nest contents.

Jill's incubation was interrupted only long enough for defecation, feeding and the removal of unwanted food particles. Upon returning to the nest, she nearly always snatched a green poplar leaf or strip of cedar bark to freshen the nursery.

Jill fed the chick only breast and leg muscle, meticulously removing and swallowing all bones and organs--including the heart, liver and viscera which were never fed. If I hadn't fulfilled the male role of plucking to her satisfaction, she would fly to a far perch and remove every last feather prior to feeding. Very small bits of meat were torn from the carcass and held out to the youngster in a partially opened beak (Figure 6). These tidbits were eagerly seized and consumed. If by chance the youngster got a piece that was too large or dropped food in the nest, it was immediately seized by the hen and eaten.

In a few short weeks, the tiny downy chick quadrupled in size and his reptilian forlegs became wings. The dainty feeding ceremony became one of voracious chittering and flailing of wings in an effort to seize food from the hen. A ritual soon developed whereby she encouraged him to grasp the prey and attempt tearing by himself. When it appeared he was having difficulty, she firmly extracted the meat from his talons and fed him in the normal manner (Figure 7). Even while he was making forays to limbs throughout the aviary, this give and take ritual continued with most of the feeding accomplished by the hen.

At six weeks of age, the youngster was flying adroitly about the pen, returning to the nest only at night to rest lying down (Figure 8). Jill would assume a protective posture, always roosting on the edge of the nest.

The instinct to hunt and kill required no encouragement. Frogs and large insects were handled successfully from the start. He was, in fact, considerably more adept than she at capturing this ignoble but elusive quarry. If she were successful, he would promptly relieve her of the morsel.

During late July and the first half of August, both hawks lived in complete harmony. They roosted within inches of one another (Figure 9). He was permitted to take her food at will. Her entire existence seemed devoted to his well being. Her aggressive nature, which continued at a high pitch, was directed only towards possible danger to the youngster.

On August 13, 1966, after successfully taking innumerable bagged frogs, lizards and insects, I felt the red-shoulder could fend for himself. He had never been handled, but appeared quite tame and I expected that he would remain in the vicinity of the nest at tame hack. I tricked him into taking a juicy leopard frog on a creance and snatched him by the foot. He was highly incensed at this treatment, and upon his release he promptly flew out of sight never to be seen again.

The following morning, Jill called for several hours, which was not her practice. She did not, however, persist. For the next few weeks she flew to the nest with bark and rearranged loose sticks. She continued to respond to my presence in a friendly fashion often perching close by for no apparent reason other than company. By late August, all territorial aggression ceased. She had passed into a period of total sexual quiescence. She now showed fear of strangers but her attitude towards me was unafraid and uninterested.

Early October brought about a radical change in Jill's behavior. Once again, she screamed the territorial "kac kac kac" and began to rearrange the contents of her nest. Her awakened sexuality reached a peak towards the middle of the month and continued at a lesser pitch into the dead of winter.

In summary, Jill was possessed with an urgency to procreate that can be aptly compared with the most maternal of domestic hens. With the exception of her inability to accept the natural mate, she has fulfilled all the requisites for the successful captive breeding program. The behavior exhibited by the wild trapped first year haggard male cannot be expected to reflect the normal attitude of the sexually mature mate in the wild.

Two dominant patterns of behavior have pervaded the entire study: (1) Jill's aggression in defense of territory, including her hostility towards the male of her species; and (2) her pair bond relationship with me. With the benefit of a second full year of observation, to follow in Part II, I will attempt an analysis of Jill's behavior and prospects for future experimentation.