THE PEREGRINE FALCON — PAST, PRESENT AND FUTURE

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mmature Female Peale's Peregrine — Doug Bush

THE PEREGRINE AND MAN

In Europe, when the sport of falconry was at its height, the Peregrine Falcon was perhaps the most highly regarded and protected of all bird species. With the advent of firearms, falconry declined and with it the highly regarded status of the Peregrine subsided as well. Man no longer cooperated with the falcon to capture game but was now a direct competitor.

In North America the Peregrine was labelled "Duck Hawk" and was persecuted because of its predatory habits. This dislike for hawks was not restricted to pigeon fanciers, game keepers and "sportsmen." Ornithologists and amateur birdwatchers also killed Peregrines because of their attacks on "good birds." Audubon, although probably not harboring the intense hatred of some, wrote of the Peregrine:

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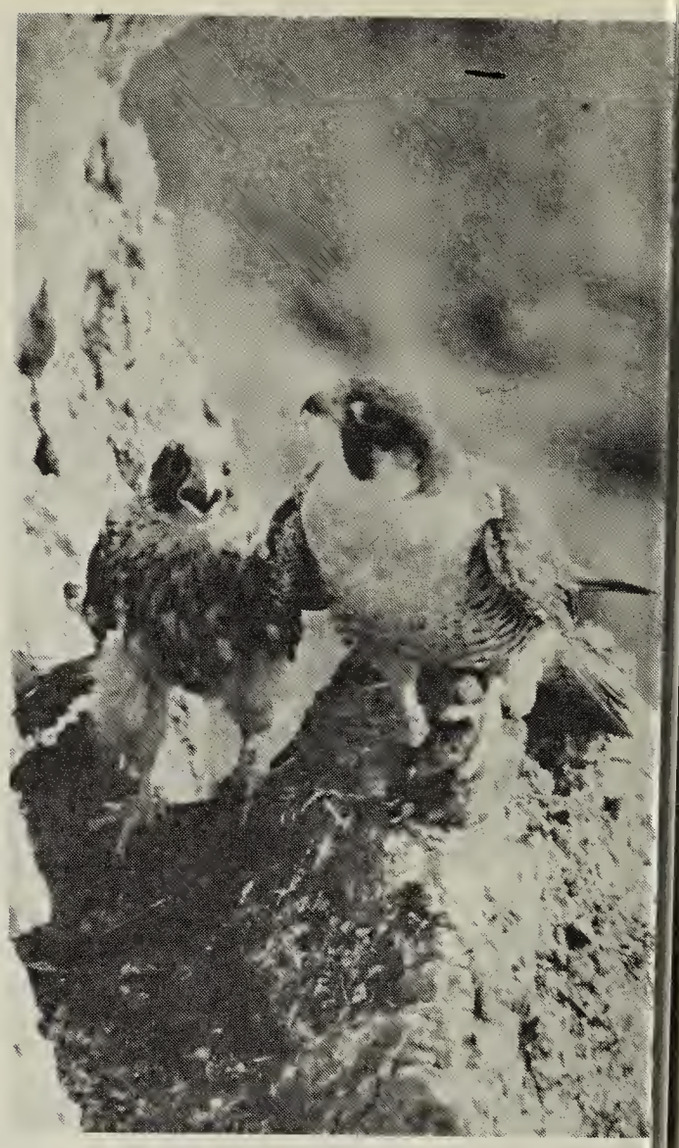
"I can well recollect the time when, if I shot one or two individuals of the species in the course of a whole winter, I thought myself a fortunate mortal; whereas of late years I have shot two in one day, and perhaps a dozen in the course of a winter. It is quite impossible for me to account for this increase in their number, the more so that our plantations have equally increased, and we have now three gunners for every one that existed twenty years ago, and all of them ready to destroy a hawk of any kind whenever an occasion presents itself."[1]

Attitudes changed slowly and it was only within the last 20 years that the Peregrine has received widespread legal protection.

In the late 1950's, it became evident that all was not well with some Peregrine populations. A marked decrease in usage of traditional eyries in Europe and eastern North America was noted. In 1965, at Madison, Wisconsin, an international conference on the status of the Peregrine revealed the extent of the decrease in these populations. The Peregrine was virtually extinct as a breeding species in the eastern United States and had undergone serious declines in the western United States and southern Canada.[9]

A number of hypotheses that attempted to explain the decline were advanced at the Madison conference. The most widely accepted theory correlated the decline with the usage of certain persistent pesticides. Since the 1965 conference many studies have been conducted which substantiate this theory. Organochlorine pesticides are known to reach high levels in the tissues of predators through a cumulative effect as these chemicals pass through each level of a food chain. These persistent pesticides are believed to interfere with reproduction by causing thinning and accidental breakage of egg shells and possibly by altering behaviour of the adults.[15]

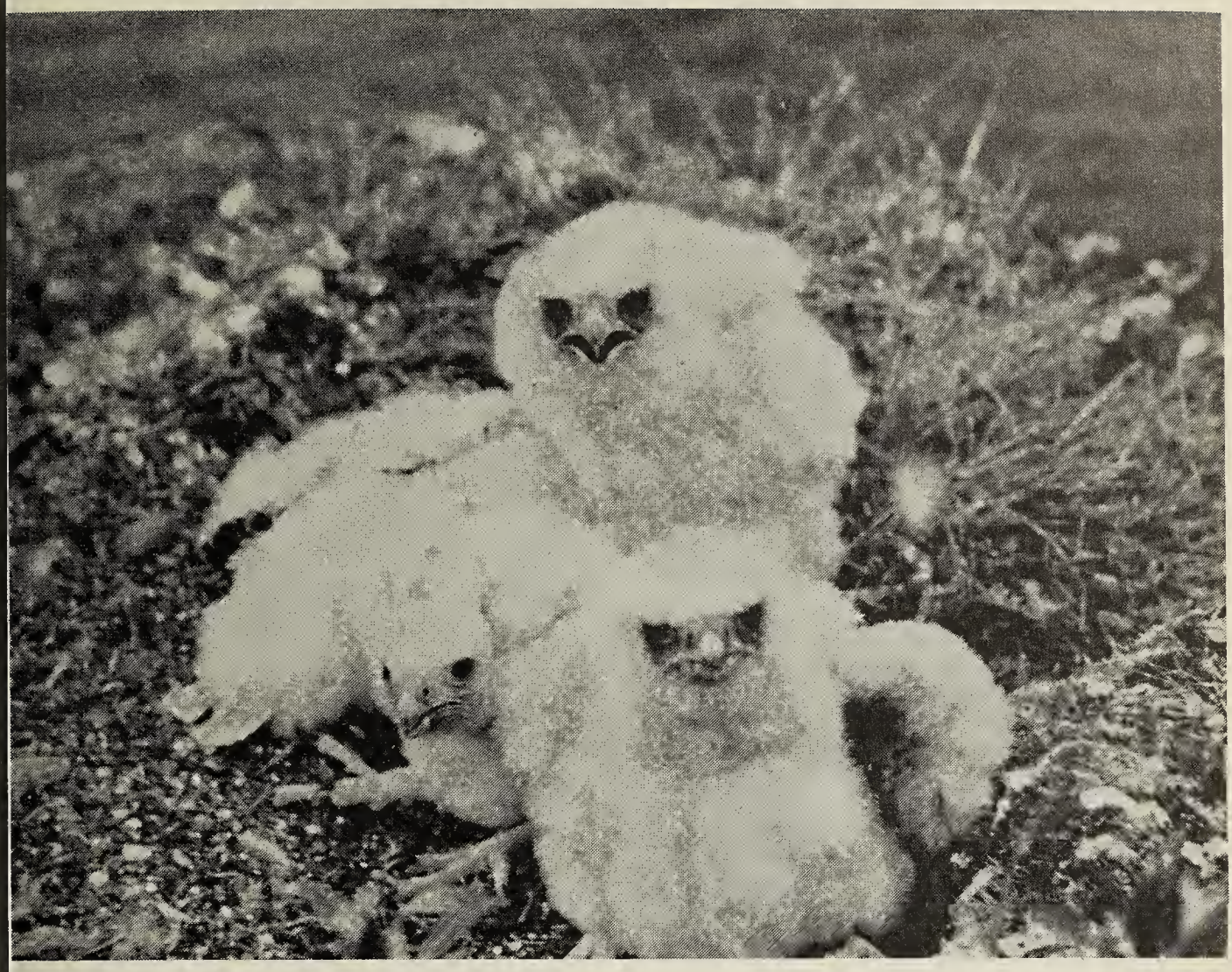


Female Peregrine with prey for 5-week-ol young, Alberta. Richard Fyf

A tremendous amount of attentio has been focused on the extirpation o the Peregrines breeding in easter North America by many conservation oriented groups which have used th Peregrine to symbolize the plight o species endangered through man' abuse of the environment. Because o this, there has been a tendency fo people unfamiliar with the species t assume that the population in easter North America represented the majo breeding population on this continen

PRESENT STATUS OF THE PEREGRINE

The Peregrine has a world-wid distribution, occurring on all the con tinents except Antarctica and on mos of the major islands. It is found on greater portion of the land surface o



Four young Peregrines, Arctic. Richard Fyfe

the earth than perhaps any other bird species.[5] Eighteen subspecies are recognized. The present status of many of these subspecies is poorly known.

The viability of Peregrine populations in western Europe (*Falco peregrinus peregrinus* and *F.p. brookei)* varies greatly in different areas. The Peregrines of Spain, Portugal and Italy have large, viable populations with no evidence of a decline. This contrasts sharply with the rest of Europe which has suffered serious decreases.[17] The numbers of breeding Peregrines in Great Britain are well known with accurate data going back far before the advent of pesticides.[9] Prior to 1940 it is estimated that 85% of the 805 known eyries were occupied yearly by breeding pairs. A serious decline was noted in the 1950's and in 1963 the lowest point of occupancy (44% of pre-war expected numbers) was recorded. This was accompanied by poor production of young in the same year. Since then there has been some local recovery correlated with a decrease in the use of persistent pesticides. In 1971 a minimum of 341 eyries were occupied by pairs or single birds (55% of pre-war expected numbers).[16] It is estimated that a minimum of 300 fledglings per year have been produced during the last 3 to 4 years.[16 17]

In North America there are three recognized subspecies: the Peale's Peregrine *(F.p. pealei),* the Tundra Peregrine *(F.p. tundrius)* and the Anatum Peregrine *(F.p. anatum).*

The Peale's Peregrine breeds along the British Columbia coast through the Aleutian Islands of Alaska. The birds breeding on the Queen Charlotte Islands are among the densest known populations and numbered about 50

pair in 1968.[4] One well-studied part of this population declined to about one-third of its former numbers between the mid-1950's and the mid-1960's[7] but has remained more or less stable since then (Nelson and Myres, Condor, in press).

The population on the Aleutian Island chain has been estimated at 300 pair.[7] This population appears to be in good shape, experiencing rather low levels of pesticide contamination and eggshell thinning and reproducing fairly well but containing disconcerting levels of PCB's (an industrial pollutant).[19]

The Tundra Peregrine nests in Greenland and throughout the North American Arctic, north of the treeline. It represents the largest segment of the Peregrine population in North America and is the most migratory of the three subspecies, wintering in Central and South America.[18]

The Anatum Peregrine formerly inhabited most of the rest of North America. During the last few decades it disappeared as a breeding bird in the eastern United States and has been reduced to a few dozen pair in the western United States and southern Canada.[9] In a survey of the Rocky Mountain states in 1973, the population was found to have declined by at least 50% and the 14 pair found attempting to breed fledged a total of three young.[8] The Anatum still occurs in substantial, though reduced, numbers in the boreal forest from the interior of Alaska through the Yukon and Northwest Territories. In 1970 four previously studied areas were surveyed in this region and all showed between 40 and 65% occupancy.[7]

The combined populations of Anatum and Tundra Peregrines in northern Canada (north of 55°N) were estimated at over 7,500 breeding pairs in the mid-1960's.[9] At the time of the Madison Peregrine Conference (1965), the populations in northern Canada and Alaska appeared vigorous and unaffected by the decline which had taken place in southern Canada and in the southern 48 United States. By 1970, data on seven populations from Alaska to Ungava showed declines in the number of pairs, poor reproduction and/or evidence of relatively high pesticide levels.[2, 7, 11] The 1970 North American Peregrine Survey, organized by Tom Cade of the Cornell Laboratory of Ornithology and Richard Fyfe of the Canadian Wildlife Service, represented a great deal of effort by many investigators. Even so, only a portion of even prime Peregrine habitat could be covered — 117 eyries in northern Canada and Alaska, along with much potential nesting habitat. However, the fact that all the sample areas which were studied showed the falcons to be experiencing difficulties strongly suggested that the northern populations too had become involved in the same problems which had earlier crippled the southern populations. More recent work on Tundra and Anatum populations in both the Canadian and Alaskan Arctic indicate the declines are continuing to the extent that some populations of Tundra and Anatum Peregrines are on the verge of extinction. (R. Fyfe, pers. comm.)

It is difficult to assess productivity of birds such as the Peregrines that breed at low densities over vast areas. Attempts have been made to monitor their population trends at concentration points during migration to avoid these difficulties. Migrating Peregrines pass down the Atlantic coast, over the Great Lakes and along the Gulf coast of Texas. Studies in these areas have indicated no obvious decrease in numbers in recent years and, in general, the adult/immature ratios of the migrants suggest that the northern populations have been

eproducing well.[10] [16] It should be oted, however, that there probably re as many diffieulties involved in rawing eonelusions from migration ata as from field surveys of nesting opulations.

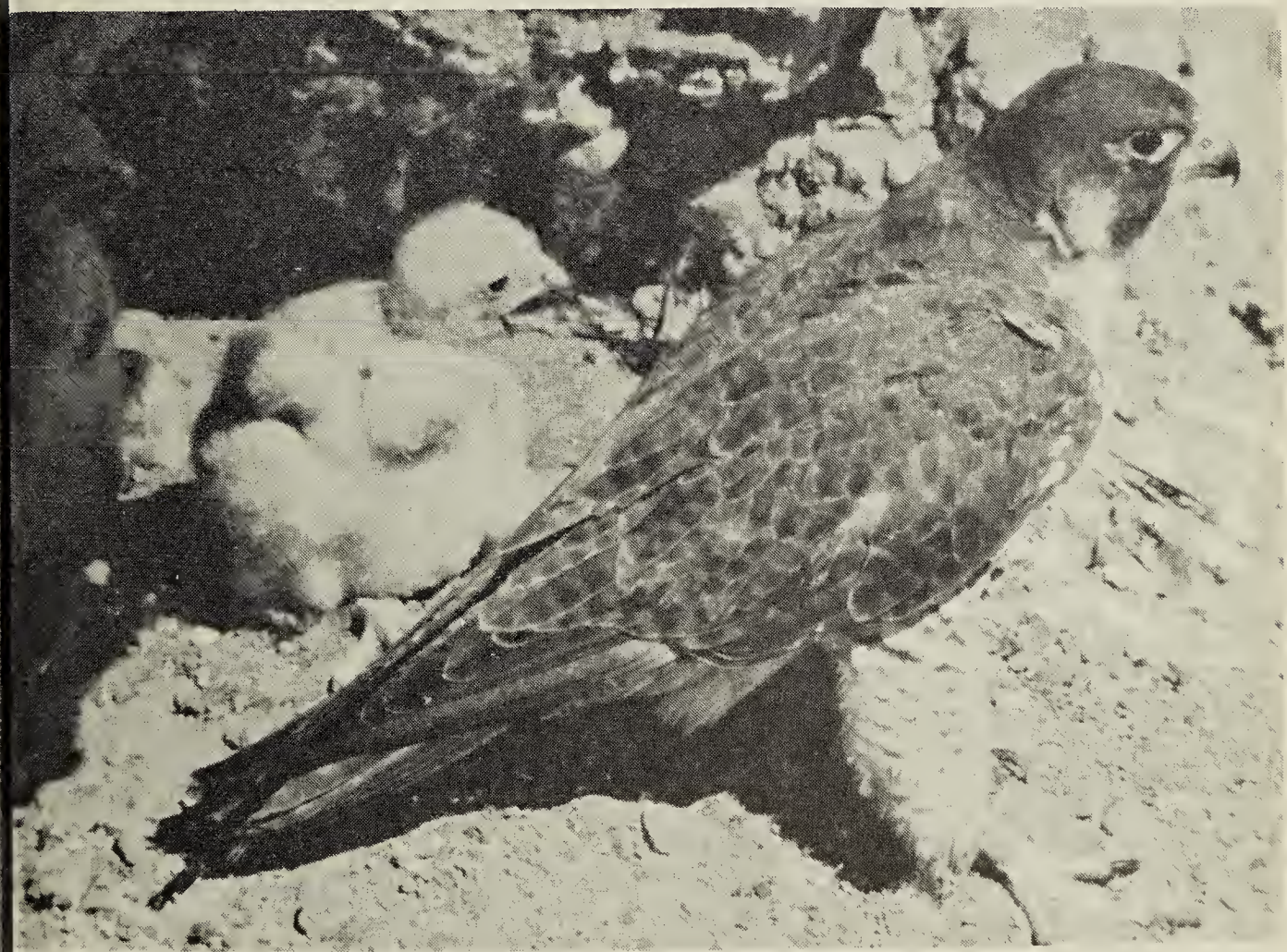
The number of Peregrines wintering n North Ameriea also may furnish aluable data. A total of 73 Peregrines ere reported in the United States on ne 1973 Christmas Bird Count. Par- eipants theoretieally eovered about -1/4% of the total area of the United tates during the eount. If an even istribution of wintering Peregrines is ssumed and *every* Peregrine within ne boundaries of the counts was seen nd eounted only onee, a projeeted *inimum* of 1,000 individuals is at- ained.[3] It should be remembered that ost of the aretie Peregrines probably inter south of the United States bor- er.[18]

Based on all available information it ppears likely that Peregrines in North Ameriea still number in the thousands. In spite of this, pestieide levels in many areas and evidence of local declines even in the far north are sueh that the continued existence of the Peregrine still appears to be threatened.

MANAGEMENT OF THE PEREGRINE

The future of the Peregrine depends upon enlightened management. Four basie strategies have been suggested: 1) inereased legal protection, 2) preservation of an adequate environment, 3) management of wild populations, and 4) eaptive propagation and subsequent release.[6]

Enforeed legal proteetion aeeompanied by public edueation are neeessary to prevent losses due to "sport" shooting, predator eontrol and unmanaged harvest for faleonry. Another important aspeet of legal proteetion is the preservation of nesting sites free from disturbanee.



emale Peregrine with 2-week-old young, Alberta. Richard Fyfe

Five-week-old young flapping, Alberta.
Richard Fyfe

Cade[6] has proposed that restrieted zones be established around historie eyrie sites. This is espeeially important where remnant populations are in easily aeeessible areas and will be important when reintroduetion begins in areas which have lost wild nesting Peregrines.

It is evident, however, that proteetion alone is a meaningless gesture. The preservation of an adequate environment is essential for the eontinued survival of the Peregrine. Ensuring a ehemieally noneontaminated environment is most important as well as being the most diffieult to implement.

Several management teehniques have been proposed as a means of inereasing wild Peregrine populations.[6] Produetivity at the nest ean be inereased by "double elutehing." This involves the early removal of the firs set of eggs to a foster parent or in eubator for hateh ing. The wild pai ean then lay and rear a seeond elute and the young from artifieially in eubated eggs ean be returned to th wild, effeetively doubling the produc tion of the wild pair. In 1974 th Canadian Wildlife Serviee did just thi at two Peregrine eyres (R. W. Fyf personal eommunieation).

Beeause natural mortality of youn Peregrines is very high, their surviva rate eould be inereased by holdin them in eaptivity for the first 2 years They eould be eared for and flown b master faleoners and "haeked baek (gradually aequainting young with th wild until independent) to the wild a the time of spring migration. The num ber surviving eould probably be a least doubled by this teehnique wit the additional advantage of being abl to insure little or no eontamination o their food in eaptivity with pestieides Sueh a program would of eours require eareful eoordination and ad ministration.

A major program presently und way is the eaptive breeding of th Peregrine for eventual reintroduetio Many projeets, both institutional an private, are eurrently involved in eap tive propagation. Cornell University Laboratory of Ornithology establishe a Peregrine breeding projeet in 197 In 1973, they produeed 20 young fro 3 adult pairs. In 1974, they produe 23 young from 5 pair of adults. So f Cornell has aehieved the greatest su eess in eaptive breeding of th Peregrine and their enthusiasm exemplified by this quote from the 1974 Newsletter:

> "A new era in man's relations wi the faleons has beeome possible - an era in whieh faleoner avieulturists, eonservationists an nature lovers ean join hands in eommon effort to preserve an manage birds of prey for human e joyment and enlightenment."

e Canadian Wildlife Service ablished a projeet in Alberta in 70 for the captive breeding of eral species of faleons. They have ieved considerable sueeess with the irie Faleon and in 1974 were sue- sful in producing Peregrines.

Private breeding projeets have neered many of the techniques in tive breeding beeause they are able foeus their entire effort on one or pair of falcons. The first captive- d Peregrines in North America e produeed in Oregon by Larry ramm's Peale's Peregrines whieh lged one young in 1968 and two ng in 1969. Heinz Meng, in New rk State, raised one young Peale's in 1 and seven in 1972. In 1973, his lt pair went to Cornell's breeding ject. John Campbell of Alberta had cess with a pair of northern atums in 1973 (3 young) and in 74 (2 young). An important elight of this particular breeding ject has been the excellent haviour al information that has been hered by Wayne Nelson, University Calgary and John Campbell.[13] [14] eral other private projects have duced young Peregrines in both nada and the United States sinee 70.

The Prairie Falcon is a eommon eding falcon in parts of the west is similar in many ways to the egrine. It is, therefore, useful as an erimental species for trying various eding and release techniques that ght be perfected sueeessfully enough apply to later releases of captive duced Peregrines. In Alberta, hard Fyfe is carrying out extensive earch into methods of reintroduc- n using Prairie Falcons for ex- imental trials.

n 1974, there were some releases of tive produced Peregrines to the d. Heinz Meng released a pair of ng falcons from the Faculty Tower of the State University at New Paltz, New York, hoping they would establish territory there. Unfortunately, shortly after they beeame independent they were killed by an unknown person.[12]

Cornell researehers placed two young Peregrines from their projeet into an eyrie in Colorado whieh had a long history of nesting failure. The young fledged normally and were observed some time later flying about their foster home.

THE FUTURE OF THE PEREGRINE

In some ways the future of the Peregine looks bright. The halting of the deeline in parts of Great Britain and the partial recovery of the Peregrine population there is encouraging. Legislation reducing the use of some persistent pesticides has been enaeted in many eountries including Canada and the United States. The reeent advaneement in eaptive breeding suceess and the eontinued development of other management teehniques is also heartening.

We should not, however, lose sight of the faet that even speeies with large populations ean become extinct in a very short period of time as shown by the disappearance of the Passenger Pigeon. The use of persistent pestieides is still very high in many developing countries and may be a source of contamination for our aretic migrant Peregrines. As world food production beeomes further outstripped by world population increases, there may also be increased pressure to revert to widespread use of these chemicals in North America.

Hopefully, the fact that a major effort has begun while there still are viable populations of Peregrines in North America will ensure that future generations will be able to see this magnifieent bird across the full extent of its former range.

The authors wish to thank R. Wayne Nelson and Richard Fyfe for many helpful suggestions about this paper.

[1]AUDUBON, J. J. *The birds of America.* 1967. Vol. 1, Dover Publ.

[2]BERGER, D. D., D. W. ANDERSON, J. D. WEAVER and R. W. RISEBROUGH. 1970. *Shell thinning in eggs of Ungava Peregrines.* Can. Field-Nat. 84: 265-267.

[3]BLAKEMAN, J. A. 1974. *How many raptors?* Hawk Chalk 13(3): 31-33.

[4]BLOOD, D. A. 1968. *Population status of Peregrine Falcons in the Queen Charlotte Islands, British Columbia.* Can. Field-Nat. 82: 169-176. 176.

[5]BROWN, L. and D. AMADON. 1968. *Eagles, hawks and falcons of the world.* Vol. 1, McGraw-Hill. 945 p.

[6]CADE, T. 1974. *Plans for managing the survival of the Peregrine Falcon.* Proc. of the Conf. on Raptor Conservation Techniques. Raptor Res. Foundation.

[7]CADE, T. and R. W. FYFE. 1970. *The North America Peregrine survey.* Can. Field-Nat. 84: 231-245.

[8]ENDERSON, J. H. and J. CRAIG. 1974. *Status of the Peregrine Falcon in the Rocky Mountain states.* Auk. 91(4): 727-736.

[9]HICKEY, J. 1969. *Peregrine Falcon populations: their biology and decline.* Univ. Wisconsin Press. 596 p.

[10]HUNT, G. and R. RODGERS. 1973. *Texas Peregrine Falcons.* Texas Ornith. Soc., December Newsletter.

[11]LINCER, J. L., T. J. CADE and J. DEVINE. 1970. *Organochlorine residues Alaskan Peregrine Falcons (Falco peregrinus t stall), Rough-legged Hawks (Buteo lagopus toppidan) and their prey.* Can. Field-Nat. 255-263.

[12]MENG, H. 1974. *Director's report.* Hawk C 13(3): 5-7.

[13]NELSON, R. W. and J. A. CAMPBELL. 19 *Breeding and behavior of arctic Peregrines in tivity.* Hawk Chalk 12(3): 39-54.

[14]NELSON, R. W. and J. A. CAMPBELL. 19 *Breeding and behaviour of captive ar Peregrines.* Hawk Chalk 13(3): 44-61.

[15]RATCLIFFE, D. A. 1970. *Changes attribut to pesticides in egg breakage frequency eggshell thickness in some British birds.* J. plied Ecology, 7: 67-115.

[16]WARD, F. P. and R. B. BERRY. 1972. *Au migrations of Peregrine Falcons on Assate Island, 1970-71.* J. Wildlife Man. 36: 484-

[17]THACKER, R. 1974. *The Peregrine II ference.* Hawk Chalk 13(1): 23-30.

[18]WHITE, C. 1968. *Diagnosis and relationshi North America tundra-inhabiting Pere Falcons.* Auk. 85: 179-191.

[19]WHITE, C. M., W. B. EMISON and F. WILLIAMSON. 1973. *DDE in a resi Aleutian Island Peregrine population.* Co 75: 306-311.

CALGARY BLUEBIRD TRAIL — 197

by HAROLD W. PINEL*
and CAROL J. ROBINSON**

Because of the success of the Calgary Bluebird Trail in its initial year, 1973, we decided to double the number of nesting boxes in 1974 from 191 to 382. First, all the boxes vandalized or missing from the 1973 trail were repaired or replaced. Then in early March of 1974, nest boxes used the previous year were cleaned out and sprayed with a creolin solution (1 creolin to 10 parts H_2O) to destroy and other insects. In late Marc 1974, the 191 new houses were ere in different areas as continuation the already existing trail (Fig bringing the trail to about 220 m

Every nesting box was checked the contents recorded four time tween the 3rd week in May and th week in August.

Of the 382 boxes, 42 were dalized before nesting began, 4 nesting started and 35 were

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