

REPORT:

**PROCEEDINGS OF THE CONFERENCE ON RAPTOR CONSERVATION
TECHNIQUES, FORT COLLINS, COLORADO, 22-24 MARCH 1973**

Part 5. REHABILITATION AND PATHOLOGY

edited by
Byron E. Harrell

This session of the Conference on Thursday evening, 22 March, 1973, consisting of seven papers, was organized and chaired by David Graham. Five papers were completed for publication in this issue of *Raptor Research*; one had previously been published and is reprinted here with permission, and an additional paper extending the research in that paper is included here. Dr. Graham also edited the papers for this issue. An additional abstract and a list of the papers as presented are included below.

With publication of Part 6, the Proceedings are complete. Of the 74 papers, 44 were published in the following parts.

Part 1. Introduction. *Raptor Research* 7(2):55-61, 1973.

Part 2. Raptor Ecology. *Raptor Research* 7(2):25-54, 62-69, 1973 (papers 1-7, 44a).

Part 3. Raptor Research Techniques. *Raptor Research* 7(3/4):73-104, 114-118, 1974 (papers 65-73).

Part 4. Management of Raptors. *Raptor Research Report* No. 2, 146 pp., 1974 (papers 45-64).

Part 5. Rehabilitation and Pathology. *Raptor Research* 8(1/2):1-44, 1974 (papers 23-29).

Part 6. Population Status of Raptors. *Raptor Research Report* No. 3, over 200 pp., 1975 (papers 8-22, 30-44).

The papers presented in the Rehabilitation and Pathology Session are listed below. Addresses follow original program.

23. *J. E. Cooper*, Veterinary Research Laboratory, P. O. Kabete, Kenya.
Current Work on Raptor Diseases in Kenya, East Africa [read by David Graham; published in *Raptor Research* 8(1/2):1-5, 1974].

24. *James Wisecarver*, School of Natural Resources, California State University, Humboldt, Arcata, California 95521.

Rehabilitation and release of injured and orphaned predatory birds [published in *Raptor Research* 8(1/2):6-10, 1974, with Gary Bogue as junior author and a changed title].

25. *Roger Thacker*, Department of Animal Laboratories, Wiseman Hall, Ohio State University, Columbus, Ohio 43210.

Raptor Rehabilitation

ABSTRACT. Within the last few years there has been increasing interest in the field of raptor rehabilitation. Whereas up to very recently such work was being carried on mainly by private persons and groups, both regional federal and several state agencies are now moving into this area, some by themselves and others by cooperative agreements.

By means of a national survey a guide is presented on origins of injuries to raptors and the possible importance of these, if any, to the species. Figures are presented on rehabilitation work being carried out in the United States and the success being obtained by those carrying out the work. Individual case histories of interest will be presented, and techniques which have proven successful and which have been pioneered very recently or are in experimental stages will be discussed.

26. *Mark R. Fuller*, Department of Ecology and Behavioral Biology, University of Minnesota, Minneapolis, Minnesota 55455, *Patrick T. Redig*, and *Gary E. Duke*.

Raptor rehabilitation and conservation in Minnesota [published in *Raptor Research* 8(1/2):11-19, 1974].

27. *J. E. Cooper* and *Laurence Frank*, 101 Reservoir Road, Hillsborough, California 94010.

A rapid acting injectable anesthetic for raptors [reprinted from *Veterinary Record* 92:474-479, 1973, in *Raptor Research* 8(1/2):20-28, 1974; further information is in another paper by L. G. Frank and J. E. Cooper, *Raptor Research* 8(1/2):29-32, 1974].

28. *Laurence Frank* and *J. E. Cooper*.

A report on the use of a pectoral muscle biopsy in the field for organochlorine analysis [published in *Raptor Research* 8(1/2):33-36, 1974].

29. *David Graham*, Department of Veterinary Pathology, College of Veterinary Medicine, Iowa State University, Ames, Iowa 50010.

A discussion of current pathological findings relevant to raptorial birds.

The following transcription of the Rehabilitation and Pathology Session discussion period was edited for clarity and redundancy and irrelevancy and was

reorganized in sequence. Two additional informal sessions on this topic were held but no recording was available.

Biopsy Incision Technique

DAVID GRAHAM. Did I understand you correctly, Mr. Frank, that the incision is made parallel to the keel?

LAURENCE FRANK. Right.

GRAHAM. Well, in muscle biopsies for whatever purpose they are taken, one technique that I have used in birds as well as mammals and is widely used in human biopsies is to perform the incision parallel with the lines of muscle fiber formation. In this manner you reduce the damage to a rather small bundle of muscles rather than cutting across a rather large number of bundles. Now I don't know if in fact in doing it this way I'm giving this bird a better chance to survive with maximal muscle effect. I don't know, but it seems to be a bit more physiological than cutting across a rather large number of muscle fibers. I am saying, make the incision in the superficial pectoral muscle perpendicular or actually at a slight angle parallel to the muscle fibers. The muscle fibers tend to go off at a slight off perpendicular from the keel toward the base of the wing, going just through the superficial pectoral; if the incision is made parallel to those fibers rather than across it, I think we're probably causing somewhat less damage. Fran, how have you been taking yours?

FRAN HAMERSTROM. I go off to the sides on a Harrier, about $\frac{3}{4}$ inch in and I take it exactly as Dr. Graham suggested, trying to destroy as little muscle as possible. And I avoided any cutting up and down along the line of the keel; I take it along with the muscle and pick out my piece.

FRANK. You don't find that you get excessive bleeding when you take it lower down on the rib cage? The one time we did try it, the bird just about bled to death.

HAMERSTROM. We knew one slight bleeder, but it wasn't bad at all. Ordinarily we get essentially no blood.

FRANK. This is what I find when we took it up higher.

HAMERSTROM. We caught them again sometimes and we found excellent healing. We kept records and we impred colored feathers so that we could follow those individuals to see whether they were feeding their young properly, to see whether they are defending their nest properly. We have a whole crew out there watching to see how things are going. So, I'm really sold on this way of doing it, and getting them back fast; I wouldn't think of holding them, of course.

TOM DUNSTAN. I presented a paper at the Midwestern Wildlife Conference several years ago on this same technique and at that time we had worked with Great Horned Owls, Bald Eagles, Red-tails, and Rough-legs to get an idea of what effect it might have on flight. The technique was similar to yours. I found it better to take it up high; I found no bleeding problem. Another thing, when we worked with Kestrels, sometimes the muscle here isn't very well developed.

GRAHAM. It tends to be rather thin more posteriorly, and you do run the risk, in young birds, of actually incising through the rather thin, still cartilaginous portion of the sternum. In fact it is practically membranous at that point, actually invading the body cavity. It's minor surgery up to that point; getting into the abdominal cavity, we would have to call it major.

FRANK. The important thing in our work we decided that it might be less damaging. We didn't compare it with the parallel, we never did go parallel to the muscle fibers. We did think it would be less damaging if we took a wider but shallower cut.

FRANK (comment written later). It is true that an incision parallel to the grain will cut fewer fibers and may well be preferable to the method as described. We first used the technique exactly as described by Seidensticker, and since we encountered no difficulties, and the birds were to all appearances unaffected by the operation, we continued to use the anterior-posterior incision along the keel. Histological work on poultry comparing both methods is in progress at Kabeto and will provide information on wound healing following both types of incision.

I was surprised to learn from Dr. Hamerstrom that she can remove the biopsy so low on the thorax without encountering severe hemorrhage. As mentioned, when we tried this site on a Lanner Falcon, cutaneous bleeding was heavy and persistent.

Anesthesia and Biopsy Sampling

HAMERSTROM. I've been biopsying Harriers, I suppose 40 or 50. I do not anesthetize them when I'm taking muscle samples. I want to get those birds back on the wing as fast as I can. It takes me less than 10 minutes as a rule, and I can do it alone. I simply hold the bird's legs between my feet and get going, take out the sample and do suture; I let them go, and they go back to raising their young. They go back to stooping violently at Horned Owls which is my technique for trapping them, and I'd be afraid to use an anesthetic. I wouldn't like the extra five or ten minutes that would keep those birds out of the wild. I want to do it fast and get it over with and I certainly haven't had any feeling that I was causing the birds a lot of pain. I interrupt their lives very shortly. I've also done this with Prairie Chickens displaying at booming grounds and had them come right back and hold their territories; that's a good acid test. So, it's

just a wholly different background from where you've been working and how we've been doing things, but my method's been working.

FRANK. I personally find it a bit difficult to chop into a healthy unanesthetized bird.

GRAHAM. I may make a comment here that there are individuals who have been doing fat biopsies without using anesthesia. As a veterinarian it tears the hell out of my sensibilities to do this sort of thing, and I haven't yet, but I do know of people who have been getting away with it rather cleanly.

DUNSTAN. I was wondering if you people feel then that it is necessary to have this anesthetic or not?

FRANK. We used this CT 1341 for personal reasons, we didn't like to operate on an unanesthetized bird and we'd have it back on its feet in half an hour. These birds weren't breeding or on migration.

GRAHAM. I will admit that we have probably all seen birds that have been subject to acute trauma, such as this in fact is, that tend to appear none the less for wear, soon get over it, and get the hell out of there very quickly apparently unimpaired. Whether they are suffering in fact the pain we think they are in or we imagine that we would under the same circumstances I don't know. But I do think that as we have at our disposal an increasing number of anesthetic agents of increasing safety factors such as ketamine which is far better than anything we had up until it came out. There are a few other experimental drugs from Parke-Davis of the same general sort with which the bird is down, under good anesthesia, usually for at least 30 minutes or longer depending on the dose but usually recovering within a matter of hours, and now this preparation of which I was formerly ignorant, and now very interested in. I think that because of the safety of these agents, their speed of action shouldn't militate against their use. I think their use can be recommended, and probably with their use we can reduce shock to some extent, should it be occurring as a result of the trauma of handling and incisional surgery.

FRANK (comments written later). Dr. Hamerstrom was very emphatic about the deleterious effects of anesthetizing the birds prior to surgery, which she said was more disorienting and stressful to the bird than surgery alone. This is a difficult criticism to answer because her situation was different from ours in several respects.

(1) The anesthetic we used, CT 1341, is unique in its speed of action and its very short recovery time, which is so brief and uneventful that the bird is subject to minimal distressing side effects. Moreover, this steroid provides excellent muscle relaxation, facilitating surgery and dispensing with the need for an assis-

tant to restrain the bird.

(2) In many countries, including Great Britain and Kenya, it is necessary to obtain a permit to conduct animal experimentation unless the proposed work is for the therapeutic benefit of the subject. Such a license would be very difficult to get for work involving surgery on unanesthetized animals.

(3) In Dr. Hamerstrom's research, she was biopsying nesting birds and obviously wanted to keep them away from eggs or young for as short a time as possible. In our case, this was not a consideration, as we avoided breeding raptors because we were not dead certain that the biopsy would not interfere in a small way with their hunting ability, and chose to err on the side of safety by feeding the hawks for one to three days rather than releasing them right away.

(4) That the biopsy surgery does cause pain is evident from the reaction of an unanesthetized bird, or one recovering from the anesthetic before suturing is completed. Personal feelings of the investigator aside, it is clear from one of the papers read at the conference that there are people who would like to see all raptor research stopped, and who delight in examples of "cruelty" or mishandling on the part of legitimate researchers. Avoiding this sort of bad publicity alone is sufficient grounds to warrant the use of an anesthetic in any work requiring potentially painful manipulations of an animal, particularly when there is as much public interest and controversy as there has been recently on many phases of raptor research.

Finally, Dr. Hamerstrom's report that her harriers were completely capable of defending the nest and vigorously stooping at intruders soon after surgery is further evidence that the pectoral muscle biopsy is a safe method for obtaining tissue samples and does not hamper a bird's flying abilities. Data of this sort on falcons and accipiters released immediately following surgery would clear any doubts about the technique's over-all applicability in pollution ecology.

Anesthesia in Owls

TOM RICHARDS. Did you use any of these anesthetics on owls?

FRANK. Yes, we did.

RICHARDS. Was there any difference?

FRANK. They are essentially the same.

RICHARDS. They seem to be a little bit slow.

FRANK. We used CP 1341 in Barn Owls and an African Eagle Owl and it took slightly longer perhaps. I put 8 mg into an Eagle Owl and got 11 minutes, and at 6.7 mg got 13 minutes, that's a little longer than any diurnal raptors. And the Barn Owl was about the same, 7.2 mg and down 13½ minutes.

Use of Tranquilizers

CATHY ELLIS. Of those that died not because of their injuries but because of the trauma, I was wondering whether tranquilizers have been used in any of these cases?

GRAHAM. There are some tranquilizers that are coming to be used now, in fact some that have been used in man, for a number of years but have only recently been investigated in birds. One particularly is Valium; the effects are not particularly evident with regard to the bird becoming drowsy or droopy but definitely less responsive to external stimuli. I do think that they have an advantage in the shipment of raptors, particularly the more excitable types and accipiters certainly fit in that class. They have been used in various ways in raptors for a number of purposes and these should be looked at in contrast to some of the more commonly used tranquilizers. Thorazine is a very commonly used one, also Stellazine; these are chlorochromazine type tranquilizers, chromazine derivatives. They tend to have a longer lasting effect or rather an irregular effect that is not predictable.

Rehabilitation Philosophy

JOHN SMITH. I am from Texas Fish and Wildlife. I agree with specific rehabilitation but, except for research, shouldn't we be giving ourselves some standard now on limiting the volume of rehabilitation on common species. I can see in some states this thing really gets out of hand, with 80-90% of the volume real common stuff that is destroyed every day naturally, and 10-20% of the volume is stuff that really needs the attention or support. I would like to hear some opinion on that subject.

BRUCE WOLHUTER. You are trying to say you think there should be a limit on it, for certain species?

SMITH. Yes, I mean some day we really do a good education program, somebody comes across any kind of sick or wounded raptor, they will turn them in and so like our old folks with homes today, we will be extending the older raptors. I'm not talking about rare stuff or endangered species.

WOLHUTER. The point I want to make is that if you are getting birds in that large a volume you had better start doing more work in the education line. With the center that we have here in Colorado, and I'm speaking just for two areas, we haven't had any volumes where it really became that great of a problem with any particular species.

SMITH. It's a brand new thing, but in four or five years who knows?

WOLHUTER. That's why I feel education is really most important. For instance, I'm going to try to get a news release put out in Colorado. We hope that most of the papers will carry it, giving people the idea, reminding them that it's illegal to take birds and in this way providing them with information of which they are not even aware. A lot of these people don't even have access to raptor statutes and the only way they find out about laws is when they are taken into court. I think again education in the news media is going to cut down on a lot of these birds that we shouldn't have to see. It is an alternative to rehabilitation or a preventative perhaps.