

noculars. The advantage of this method is that it is very safe and has no visible disturbing effect on the oxpeckers. Nine different colours being available, a vast number of colour combinations were possible. But these rings were suitable to overseas climatic conditions and after a short period of about 4 months of use colour fading was already visible. A total of 120 oxpeckers were marked by this method and after a period of 14 months no loss of rings or evidence of leg mutilation were found.

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COMPUTERISATION AT NUBRA

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Introduction

It may be of some consolation to ringers to know that NUBRA's "computer consultant" is a ringer. Although I doubt if he remembers it, I was introduced to the gentle art of bird-ringing by Mr. Peter Mendelsohn. This was at the Pretoria sewage works. A few years later, on a Statistics Association Conference, I visited those same reed beds - from the other side - where a water purification plant had displaced the reeds, and, I presume, the swallows.

The highlights of my ringing career have been, I suppose, catching a Belgian Knot at Langebaan before I got my full ringing permit, and catching 7 foreign swallows - 1 Polish, 4 British and 2 Russian - on three successive ringing trips. Five of these came on one night!

Currently I participate in the activities of the Western Cape Wader Study Group and in the mass-ringing of Hartlaub's Gull chicks on Robben Island.

So much for my ringing bona fides, - what of the computer. Of great advantage to NUBRA, is the fact that the University's Computer Centre is only at the other end of the same corridor. The Centre houses its central unit, the UNIVAC 1106 Computer, which is classified as "medium to large". The Central Processor Unit (C.P.U.) includes a set of 128 integrated-circuit control registers with a cycle time of 166 nano-seconds per 36-bit word. (A nano-second is 1/1000 millionth of a second.) Main storage (memory) on the computer

consists of 131 072 words (36 bits) with two auxiliary systems on drum (2 097 152 words) and discs (25 million words). All of this should and deserves to sound impressive. The University's computer is a powerful piece of machinery. The photograph shows the central Computer Room with the main control board in the foreground. Only technical staff are allowed in this room.



I suppose the message I'd really like to get through to each and every ringer connected with NUBRA is that the whole ringing scheme is only as good as the primary data you feed in at your end.

We think that our systems, and the trouble we take to prevent errors creeping in at our end, are pretty efficient. We do a tremendous amount of checking and rechecking - we do hope that you do the same.

We've adopted a philosophy of letting you do the final checking of our computer input yourselves. For the past two years we've been sending you a computer print-out of your annual ringing return. Very few errors have ever come back. They can usually be traced to poorly-written figures or figures entered into the wrong columns. Check the print-out you receive carefully. It is no inconvenience to make corrections at this stage. But to do so later on is a real hassle.

Incidentally on the annual ringing returns the Roberts' numbers are all important. We don't punch the names onto the cards - just the number. Also remember that we don't recognise sub-species - even in the cases where they had separate numbers in earlier editions of Roberts. The greatest culprits here are the Natal ringers who insist on numbering "their" White-eye as 778 which we consistently change to 775! We don't recognise the X, Y, Z numbers either. This makes the programming much easier, and saves a great deal of expensive computer time. The XYZ numbers have been given

numbers larger than 858. Extra-limital species that have been ringed with Zoo Pretoria rings have numbers in excess of 950. Clive Elliott has circulated a list of all these numbers, which are very seldom used, anyway.

Whenever we want to print the full name of the bird belonging to a given Roberts number, we go to a file which we keep in the computer called NUBRA*BIRDIEFILE. So if we want the name of number of 48, we pull out the 48th record in NUBRA*BIRDIEFILE. Although we only print the first 24 characters in the name, the full names are there, if ever we need them. (Should anyone need a copy of this file, i.e. English, Afrikaans and Latin names on computer cards or magnetic tape, they can obtain it from us. It was a big task getting it all in - and checking it!)

There are a few remarks I'd like to make about filling in Schedules i.e. the white, green and blue ones.

1. Never alter your figures. Cross them out and write the correction above.
2. Get into the habit of writing 14th July 1974 as 140774 and 4th February 1975 as 040275, etc. This will reduce the possibility of monstrosities like 1/47/74 and 0/42/75!
3. Remember that the decimal point occupies one column on a computer card. There are 4 columns for mass. This means that you can use up to 3 figures and a decimal point as 4 figures. Thus 22, 26,5, 3340, 9,5, 7,25, etc are acceptable masses. But 26,25 is not - it needs 5 columns!
4. Figures should always be what in computer jargon we call "right-justified" i.e. written as far to the right hand side as possible, one column per figure (or decimal point).

The Computer Programmes

So far we have not been very ambitious with our programmes. At the moment we are using the computer as a glorified adding, sorting and printing device.

At this stage we have developed two major sets of programmes - one set for the "totals" section of the annual ringing report and the other for the "recovery" section.

To do the totals section requires about 80 000 addition sums. A formidable task - which explains why the manually produced reports were getting so far behindhand! If all ringers returned their ringing reports by the 31 July, we could easily produce on the computer a first draft of the Annual Report by the end of August.

Both the "totals" and "recoveries" programmes work in 3 stages. Firstly, a checking stage - we read in the data and print it out. We get the computer to do some of the checking for us; e.g. it checks that the date of ringing is before the date of recovery!

Secondly, there's a processing stage. Totals are produced for each club, for each provincial administration, for the whole country. Recoveries get fed into the computer in the order in which they arrived. The computer undertakes the task of arranging them first in Roberts number order - so that the Penguins come out first - then by ringing locality and finally by ring number within each locality. To sort a whole year's recoveries takes about a minute of computer time. At R300 per hour, this costs R5. Which I think,

is real value for money! Into the bargain it also calculates Great Circle distances between ringing locality and recovery locality, the direction in which the bird flew, and the elapsed time.

Thirdly there is a printing stage. These programmes are the worst of all to write as it's not easy to get the headings and columns neatly lined up and acceptably laid out. The recovery print-out programme does some neat things - like it won't start a new species on a page unless there are enough lines left to make it worthwhile!

Something we are going to do soon is to build up a file of place names so that we can start printing more than just the coordinates in our recovery print-outs.

Soon we will have all the backlog recoveries on the computer - i.e. recoveries since 1948. We plan to sort these by ringer so that we can send you a print-out of your recoveries. We'd like you to give them a final check. The completion of this task will be a major milestone in the life of NUBRA. We will then be able to supply recovery information - on card, tape or print-out - on any species, on any place or over any period, quite readily to anyone who wants to do a detailed study.

NEW REGULATIONS FOR BIRD-MARKING

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At a recent meeting of the NUBRA Technical Subcommittee, the following regulations applying to bird-marking techniques were unanimously adopted. These new regulations come officially into force from the date of publication of this article. All ringers amateur and professional are requested to read them carefully and to comply with them from now on.

1. Ringers should wherever possible use marks in combination with numbered metal rings supplied by NUBRA.
2. Notification of any intended marking scheme must be made to NUBRA before the scheme is started.
3. No experimental marking scheme may be started without written agreement from NUBRA.

With reference to these regulations, ringers should note the following. When a ringer notifies the Unit of a marking programme, the Ringing Officer will make it clear if he regards the marking technique as experimental. Generally speaking, tarsal colour rings, wing-window marking in birds of prey and nasal saddles in duck can be regarded as sufficiently well-known in southern Africa not to be called experimental, provided that the particular ringer has experience of the technique. Ringers should also be very strict in filling in the colour-marking code on their schedules since colour-marks may influence recovery rate. If anyone has difficulty in finding an appropriate code, they should contact the Unit.