

Nest No. 1:

- Day 1 — hen sitting on 5 eggs.
2 — 7 eggs, with 3 hens in close attendance.
3 — 9 eggs, with 3 hens in attendance.
4 — cock sitting on 9 eggs.
10 — cock sitting on 13 eggs.
14 am. — hen sitting on 17 eggs, with a hyaena lying 400 yards away apparently watching the nest.
14 pm. — a few broken egg-shells remained. The hyaena may have watched until the hen left the nest, or may have driven her off; he is most unlikely to have managed to drive the hen away if the cock had been present.

Nest No. 2:

- Day 1 — cock sitting on 23 eggs.
5 — cock and hen sitting at nest, the hen with 5 chicks under her wings and the cock on the remaining eggs.
7 — cock and hen in the same position, the hen with 15 chicks and the cock on 8 eggs.

In this case the hatching was spread over at least a week and during this time the birds had to remain in constant attendance without moving off to feed. I saw one other hen nearby and it is possible that she relieved the sitting pair, although I saw no evidence of it. On one occasion there were two tawny eagles, a bateleur eagle and two jackals nearby, no doubt waiting to seize a chick should the opportunity occur.

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A census of game in Ngorongoro Crater

On the 18th-19th February, 1964, Park Warden Turner and Watson of the Serengeti Research Project counted the large game of Ngorongoro Crater. The count was made by aeroplane and during the count 4.40 hours were flown, and the total cost is estimated at Shs. 325/00.

Section I. Method.

A map of the Crater on a scale of $2\frac{1}{2}$ miles to the inch was used in this census. This map has been compiled from aerial photographs and shows all the significant physical features. As a first stage the Crater was divided into convenient counting blocks, each block being bounded by some easily recognisable physical feature (see Fig. I). A preliminary flight was made so that both pilot and observer were well acquainted with the block and its boundaries. Each block was then counted using a close flight pattern with parallel lines at a height of about 1,000 feet. On the first day all the blocks were counted, and since adjacent blocks were counted successively the chances of movements of animals interfering with the accuracy of the count were minimised. Most of the animals were counted by eye and entered by the observer onto a sheet having the headings "wildebeest", "zebra", "gazelle" and "others". Although it was possible from 1,000 feet to distinguish Grant's from Thomson's gazelle, it was nevertheless not possible to spend the necessary time in this discrimination, and hence gazelle are grouped together in this count. Some very large groups of wildebeest in Blocks D and F were counted from aerial photographs which were taken in overlapping oblique patterns — the same method which was used by Watson and Turner in the Serengeti for counting zebra and wildebeest. Block H, Lerai Forest, and the swamp block adjoining Block A, were counted at about 150 feet with an even closer flight pattern. This enabled the rhino and elephant in the Lerai Forest to be spotted, and the hippo in the swamp. On the second day a re-count of Block

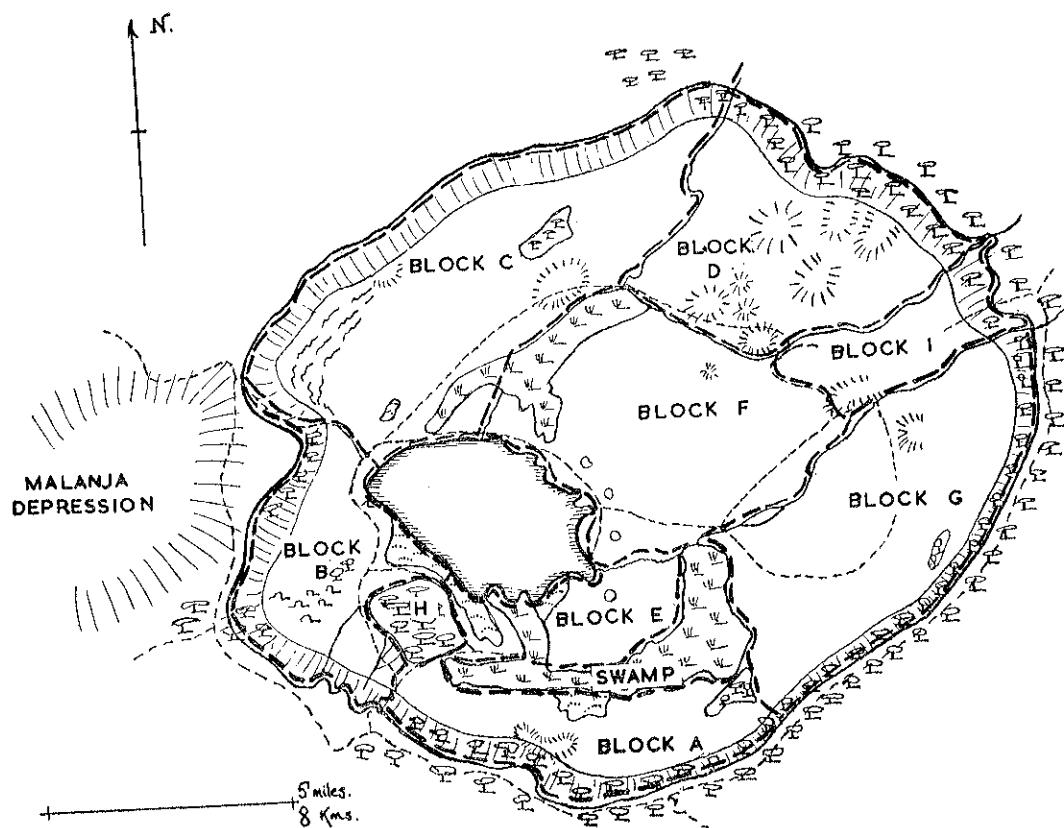


Fig. 1: Ngorongoro Crater showing counting blocks.

C was made to check the previous day's record.

Section II. Results.

Since the blocks were not chosen for any criterion other than for convenience, little ecological significance can be drawn from the number of animals in each block.

Block A:

Wildebeest	...	...	29
Zebra	...	...	465
Gazelle	...	...	88
Eland	...	...	13
Elephant	...	...	3
Rhino	...	...	1
Waterbuck	...	...	5
Ostrich	...	...	2

Swamp Block adjoining Block A:	
Gazelle	...
Hippo	...
Rhino	...

Waterbuck	...	...	9
Hartebeest	...	...	3
(Comments: The gazelle, hartebeest and waterbuck were counted on a small island of dry land surrounded by swamp).			

Block B:

Wildebeest	...	...	707
Zebra	...	...	253
Gazelle	...	...	177
Eland	...	...	29
Hartebeest	...	...	1
Waterbuck	...	...	10

Block C: — first count 18th

February:

Wildebeest	...	...	1,924
Zebra	...	...	444
Gazelle	...	...	590
Eland	...	...	28
Rhino	...	...	3
Ostrich	...	...	19

— re-count 19th February:			
Wildebeest	...	...	1,897
Zebra	...	...	478
Gazelle	...	...	1,159
Eland	...	...	2
Rhino	...	...	4
Hartebeest	...	...	16
Ostrich	...	...	18

(Comments: There is a very satisfactory agreement between the numbers of wildebeest, zebra, and ostrich. The large difference between the numbers of gazelle on the two counts can be attributed to the fact that gazelle, unless reflecting light, are virtually invisible from 1,000 feet. In the second count, counting was performed only away from the sun so that reflected light was being used for the whole count. Obviously in the first count, since counting was performed on both sides of the aeroplane, only half the area was counted using reflected light. Therefore it is perfectly reasonable that the second count should be double the first. The appearance of 16 hartebeest on the second count is accounted for by an error in the first count in which these hartebeest were probably included in the total for eland. These two species in certain light conditions are very difficult to distinguish).

Block D — visual:

Wildebeest	...	...	1,106
Zebra	...	...	291
Gazelle	...	...	118
Eland	...	...	110
Elephant	...	...	15
Rhino	...	...	4
Waterbuck	...	...	9

Block D — photographic:

Wildebeest	...	...	3,737
Zebra	...	...	68

Block E:

Wildebeest	...	...	—
Zebra	...	...	665
Gazelle	...	...	77
Eland	...	...	20
Rhino	...	...	2

Block F — visual:

Wildebeest	...	...	1,458
Zebra	...	...	1,025
Gazelle	...	...	438
Eland	...	...	2

Rhino	...	...	4
Ostrich	...	...	7

— photographic:

Wildebeest	...	...	3,308
Zebra	...	...	570

(Comments: 37 of these wildebeest were grazing on a small island created by the encroachment of lake water).

Block G:

Wildebeest	...	...	498
Zebra	...	...	1,050
Gazelle	...	...	156
Eland	...	...	127

Block H, Lerai Forest:

Elephant	...	...	8
Rhino	...	...	6

(Comments: The distribution of trees in Lerai Forest was strikingly visible from the air. Much of the interior of the Forest was flooded and this may account for the lack of young trees).

Block I:

Wildebeest	...	...	1,455
Zebra	...	...	777
Gazelle	...	...	77
Eland	...	...	13
Rhino	...	...	3
Hartebeest	...	...	29
Waterbuck	...	...	2
Ostrich	...	...	9

TOTALS:

Wildebeest	...	...	14,222
Zebra	...	...	5,038
Gazelle	...	...	2,310
Eland	...	...	342
Hippo	...	...	23
Elephant	...	...	28
Rhino	...	...	27
Hartebeest	...	...	49
Waterbuck	...	...	35
Ostrich	...	...	37

10 lion and 11 buffalo were counted.

Section III. Comments.

i) *Wildebeest*. The count was made after most of the calving for 1964 had taken place and calves are easily counted. Therefore an estimated 28% of the total is made up of 1964 calves.

ii) *Zebra*. The figure is somewhat above that estimated by Dr. Klingel who considered 4,500 to be the number of zebra in the Crater.

iii) *Gazelle*. The difficulty in seeing gazelle demonstrated by the two counts