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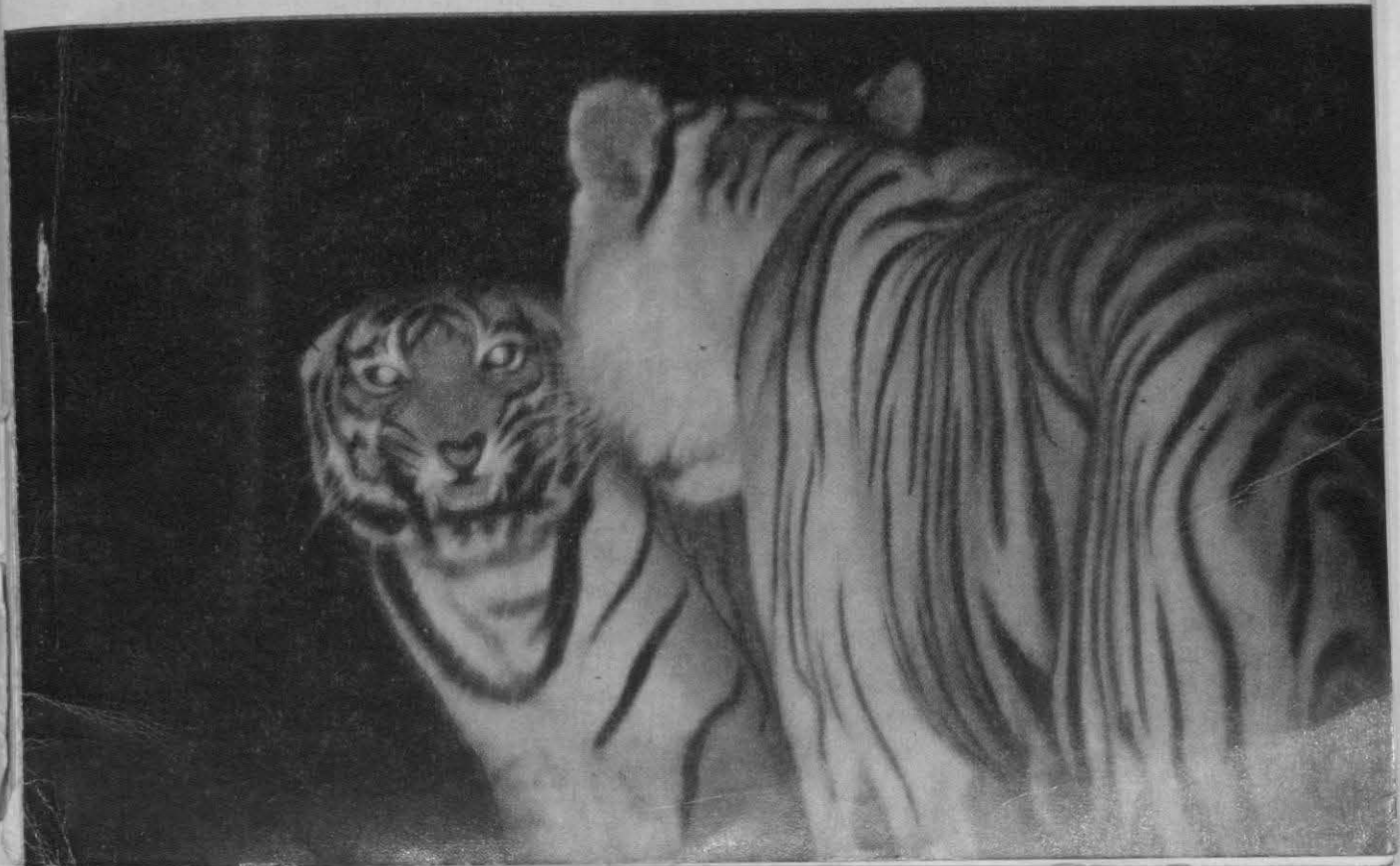
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Tiger Census in India

(SUMMER 1972)

By

SAROJ RAJ CHOUDHURY

PART I

The Need for a Tiger Census

The tiger population in India has been steadily decreasing during the last two decades. This is apparent from the increasing rarity of the signs and symptoms in the forest that indicate the presence of a tiger.

There were in the recent past, many tigers in this country, but not 40,000 as claimed by some. That it could not be 40,000 would be evident to any one who would take the trouble to work out the biotic pyramid that sustains a tiger along with its competitors—the panther, the wild dog, the human being and the sneaking lesser carnivores—and the consequent useable land surface available in its habitat to produce the surplus in prey animals required to sustain the tiger during each animal year. And again, what would be the productivity of such a high population with its equally high biotic potential, an average of two to three cubs per litter, and the tigress with different age-grouped cubs at heel. 40,000 does not stand patient reasoning.

That there were many more tigers than there are now is however true. This is evident from the high frequency and density of tiger-evidences that were seen in those days and their sporadic occurrence to-day. Such signs are indeed rare now, in some of the best tiger areas of yester years, the Chandaka Sanctuary in Orissa for example. There are equally other good areas—the Phublani district of my own State, Orissa, with 46 tigers in the 1966 census and 8 tigers in the present census—where tigers have perhaps been reduced to just lone stragglers,—I earnestly hope not. And yet, there remain a few areas—some of the Siwalik forests in U.P. for example—where the tiger virtually lives in saturation density. But on the whole, the population-trend in the country has been on the decline.

The main reasons for this decline are, indiscriminate killing of its prey animals and poaching of tigers for their highly priced pelts. The destruction of shelters—particularly for the cubs—due to indiscriminate human use of the tiger habitats has also contributed to its decline.

The greatest of all tiger-men, Jim Corbett, who is honoured even to-day as a demi-god in many parts of the Kumaon hills, stated three decades ago in the Author's Note to his *Man-eaters of Kumaon* "there is, however, one point on which I am convinced that all sportsmen will agree with me, and that is, that a tiger is a large-hearted gentleman with boundless courage and when he is exterminated—as exterminated he will be unless public opinion rallies to his support—India will be poorer by having lost the finest of her fauna." Corbett's apprehension appears to be taking concrete shape. If it does happen, it will certainly be very unfortunate for this country. But I am confident, we will not allow it to happen. Even with our growing problems of human population and the resultant increase in the material and social conflicts, we will continue to strive earnestly to locate areas to save the tiger where it can be saved and manage it the way it needs to be managed for posterity.

In order to be able to save and manage the tiger we must organise our approach methodically. In this, the important first step is to collect confident objective data about its past and the present status. It will only then be possible to plan its future. The approach involves four leading questions.

1. Where is the tiger?—Locate it as confidently as is practicable.
2. How is the tiger?—Evaluate its habitat factors and influences.
3. If it has vanished from any of its habitats, why has it vanished?—Collect reliable historical facts that focus on the factors and influences that led to its disappearance.
4. What is its future?—Project the values from questions No. 1 and 2 in the context of evidences from question 3.

The future of the tiger depends basically on the level of confidence in the answer to the first question, "Where is the tiger?" All other considerations and actions will follow only when we know the distribution and densities of the living tigers in our forests to-day. We must then, first locate and count them.

The method of tiger census

The wild tiger is an elusive animal. It has to be drawn by baits to particular spots for sophisticated tiger shooting. Of the 100 odd forest officers and honorary wild life wardens who were trained by me in tiger census methods, many had not seen the tiger in its natural state and others only occasionally during their long association with the tiger habitat. The tiger cannot be censused by sighting. Even if seen, it is difficult to remember each tiger individually without repeated clear and long duration sighting, so as to identify and differentiate specific physiognomic and other external characters of each individual animal.

Champion's method of automatic trip-photography—simple, single shot or sophisticated repeater shots—can be used to freeze on the celluloid, the details of each tiger and analyse the results from a large number of such gadgets set at every likely place of success in the

tiger habitats. This can be done in specific in-depth study areas only, but cannot be used as a census method for the whole country; the cost would be prohibitive.

Counting the tigers by artificially inducted kill-evidences—like the lion census in the Gir in 1968—is much of theory and more of expenditure without yielding reliable results.

The only practical method of counting tigers is first to learn to recognise the signs and symptoms of the tiger in the field, age them and interpret their meanings. The next step is to put many trained persons in the field simultaneously, each to collect in a small unit, the tiger-evidences in relation to space and time, and thus cover the total area of counting within a specified period. If all the participants follow a regimented pattern of methodology in the spatio-temporal recording of the signs and symptoms of tigers in the field, the integrated data can be compared and analysed to eliminate double counting in adjacent or over-lapping territories, and estimate as accurately as possible whether there are one or more tigers in the same territory. The outcome of such an integrated analysis is the estimate of the total tiger population in any particular region of contiguous forests. The tiger habitats in this country, however, spread not only across district boundaries but are also inter-states. Evidently, the counting in such areas has to be done together and co-ordinated in the concerned states.

This basic structure of the tiger census operation has been termed by me as "The Co-operation Tiger Census". It was first applied by me in Orissa in 1966. The methodology has been outlined in my publication 'Let Us Count Our Tigers', appearing in volume 12, No. 2 of the CHEETAL.

Of all the evidences that a tiger leaves in the field for later interpretation, its pugmarks are the most frequent, and numerous. It is one of the very confident parameters, not only for the general recognition of the species, but tells us a great deal about the particular individual tiger. The pad of the tiger's paw is not like a solid hoof. It is soft, and feels under pressure like an inflated foot-ball bladder or a wheel tube. With the weight of the tiger's body on it there is a periferal spread of the pad on the ground. This spread, under average conditions of the soil and the tiger's gait, is of definite size and shape, which to a very large extent is individualistic. In adults, the shape and size of the pugmark also indicate the sex. True tracings of tiger pugmarks taken from comparable soil conditions can on comparison, pinpoint and sex each individual with a high degree of accuracy. This is the main principle applied in the field technique of collection of true tracings of tiger pugmarks. The details of the field technique and the results of its application in the field appear in my publications 'The Tiger-Tracer' and 'With The Tiger-Tracer' in volume 13, Nos. 1 & 2 of the CHEETAL.

The Co-operation Tiger Census requires many participants to look for the tiger and its signs and symptoms in the field. The tiger-tracer confirms the recognition of an individual

tiger and clears up any confusion where more than one tiger occur in the same counting unit. It is best applied during the winter when tigers keep more to the open ground, and roads and foot paths provide many more readily identifiable pugmarks in the field than in the summer. Nevertheless, the first attempts to census tigers on a country-wide basis were made during the last summer (1972), to train the personnel conducting the census, and prepare them for the more efficient and authentic census during the coming winter.

Personnel and Jurisdiction Infra-Structure

1. Co-operator or participant—should invariably be the beat forest guard. The smallest unit of census is a Forest Guard beat or sub-beat (in the case of large beats, the area should not exceed more than 20 sq. kms. in forests under consumptive use and 15 sq. kms. in other areas).
2. Co-ordinator—the Section Forester to harmonise the field work of not more than 5 participants.
3. Organiser—the Range Forest Officer, for overall control of the census work in his Range.
4. Chief Organiser—the Divisional Forest Officer helped by an Assistant Conservator of Forests (Deputy Chief Organiser) for all the Ranges with tiger habitats in his Division.
5. Chief Co-ordinator—an officer selected by the State Govt., and trained in the Co-operation Tiger Census methodology—vested with full charge over the census operations in the state.
6. Zonal co-ordinators. The states having tiger habitats have been grouped into the following zones, each under a Zonal Co-ordinator.
 - (i) Northern Zones: Uttar Pradesh and Bihar.
 - (ii) Eastern Zones: Bengal, Assam, Arunachal, Maghalaya, Mizoram, Manipur and Tripura.
 - (iii) Central Zone: Madhya Pradesh and Orissa.
 - (iv) Western Zone: Maharashtra, Rajasthan, Goa and Gujarat.
 - (v) Southern Zone: Tamil Nadu, Andhra Pradesh, Kerala and Mysore.

The schedule of the census operation (Summer 1972)

1. Phase I: Training and pre-census preparations.
 - 1.1. Training of the Chief Co-ordinators—March 1 to 11 and April 5 to 11. Training imparted by S.R. Chodhury (the author) and attended also by a representative of the I.U.C.N/W.W.F.

- 1.2. The prescribed form to be used for counting was translated into the local languages by the Chief Co-ordinators and sufficient numbers of sets printed to supply them in triplicate to each participant.

A set of counting forms in triplicate, was given a serial number corresponding to its Counting Unit as allotted in the Census Register for the State. The Census Register had been carefully prepared by the Chief Co-ordinator after dividing each Range into suitable number of Counting Units. This work was completed well in advance before the actual census period in this schedule.

- 1.3. Collection of equipments—Tiger-tracer, 2 metres tape, haversack, water bottle, Plaster of Paris, polythene bags and field note books—for each participant was completed in good time before the census work.
- 1.4. Training of Chief Organisers, Deputy Chief Organisers and Organisers was imparted by the concerned Chief Co-ordinator.
- 1.5. The Co-ordinators and the Participants were trained by the Organisers.

2. Phase II. The census

2.1. Period of census.

- 2.1.1. Eastern Zone, April 22 to 28, because of expected early rains.
- 2.1.2. Rest of India, May 15 to 21.

- 2.2. Regime One—1st day through 5th day—work time according to convenience, dovetailed into the normal duties of the staff at least once a day in the morning as per the log-book in the counting sheet. Field work consists of the following:—

2.2.1. Field reconnaissance.

2.2.2. Collection of evidences.

A. Reliable local information.

B. Signs and symptoms in the field.

AA. Actual sighting.

BB. Kill—evidence.

CC. Fecal matter (sample to be collected with date and place of collection).

DD. Clawing marks.

EE. Vocalisation heard (roars, calls etc.)

FF. Pugmarks.

GG. Tiger den (evidence of use from shed peltage, pugmarks etc., place and date of investigation, type and size of den, terrain, general physiognomy of the neighbourhood and distance from the nearest watering place).

2.2.3. Tiger-tracer evidence: the tracing with the following details (with at least two representative left rear pugmarks).

- A. Serial number of Counting Sheet.
- B. Place (name the part of the Counting Unit (Central/North/West/South/East)).
- C. Date.
- D. Time.
- E. Nature of soil (coarse sand/fine sand/fine dust).
- F. Wet or dry ground.
- G. Normal stride (at least 5 measurements).
- H. Signature of Participant.

2.3. Regime Two—for the 6th and 7th days.

2.3.1. Longest possible traverse in the Counting Unit between dawn and 9.30 A.M.—a must for every Participant—to cover those routes where there is high probability of getting the pugmarks as evinced during Regime One (2.2).

2.3.2. Tiger-tracer evidence as in 2.2.3.

2.3.3. Data of 2.3.1. and 2.3.2. to be recorded separately for each day.

Note:—Comparison of the data from Regimes One and Two will focus attention on individual tigers. It will also reveal the level of probability in getting, in different range conditions, the pugmarks of most of the tigers covered by the census, in a short time of one to two days.

3. Phase III. Collection, screening and compilation of data.

3.1. Screening at each Organiser and Co-ordinator's levels—3 days.

3.2. Collection and despatch of data (counting sheets) by the Chief Organisers, with their remarks—one week.

3.3. Verification, final screening and compilation by the Chief Co-ordinators and preparation of the abstracts in the prescribed forms—4 weeks.

3.4. Despatch of the abstract by the Chief Co-ordinators along with their reports to N.S. Adkoli, Asst. Inspector General of Forests for Wild Life, Ministry of Agriculture, New Delhi.

- 3.5. Copies of the state maps showing the habitat zones and serial number of the Counting Units will be sent in quadruplicate by all Chief Co-ordinators to N.S. Adkoli by July 31.
- 3.6. Copies of abstracts and maps in 3.4. and 3.5. will also be sent to the Zonal Co-ordinators.
- 3.7. The final compilation and confirmation of the census results will be done by M.K. Ranjitsingh, Dy. Secretary, Ministry of Agriculture, and N.S. Adkoli in consultation with the author.

Note:— Co-ordination and screening at all stages will be done with reference to the spatiotemporal field evidences during the census work and the maps showing the terrain and the disposition of the related Counting Units.

The Counting Sheet

The specimen of the counting sheet appears at page 47 (face) and 43 (reverse) of Volume 12, No. 2 of the CHEETAL and is reproduced on pages 75 & 76 of this issue.

The face of the counting sheet provides for the following:—

1. Serial number of the Counting Sheet.
2. Names of Beat, Section, Range and Division.
3. Names of Participant and Co-ordinator.
4. Overall location of the area covered by the census in the unit.
5. Broad natures of terrain, cover, factors and influences.
6. Reliable historical facts about tigers in the counting unit.
7. Reliable information about any periferal tiger outside the counting unit.
8. Remarks of the Co-ordinator and other supervising personnel.

The reverse page contains the form of the daily log of field census, morning, afternoon and evening (after dusk). The form provides specifically for,

- (i) actual sighting of tiger, sexed or unsexed adult and cubs,
- (ii) pugmarks, sexed or unsexed adult and cubs, and
- (iii) notes on other tiger-evidences found in the field.

It will be seen from the above that the counting sheets besides the census details, collect useful information about the habitat and the environmental conditions of the tiger in the Counting Units, to provide a reasonable overall view on the future of the tiger in different parts of the states censused.

PROFORMA FOR THE ABSTRACT OF TIGER CENSUS FOR EACH STATE

Serial Number	Name of Forest Division and District	Name of Range	Area statement in hectares		Total of columns No. 4 & 5	Tiger-tracer data for the 6th day, Regime II			
			Under Forest Deptt. in the range	Other forest areas in the range		dult male	Adult female	Sex unknown	Cubs
1	2	3	4	5	6	7	8	9	10

Tiger-tracer data for the 7th day Regime II for any new tiger pugmarks other than those recorded on the 6th day				Rangewise census data for Regime I (1st to 5th day) being the record of tigers which came to notice in the course of Regime I but which definitely escaped the Tiger-tracer count during Regime II			
Adult male	Adult female	Sex unknown	Cubs	Adult male	Adult female	Sex unknown	Cubs
11	12	13	14	15	16	17	18

Total tigers in the range	Total tigers in the Division	Number of tigers shot on licence in the Range 1960-70	Number of tigers killed illicitly or found dead in the Range 1960-70	Remarks
19	20	21	22	23

LET US COUNT OUR TIGERS

COUNTING SHEET NO.....

Species—TIGER (*Panthera tigris*)

Period of Count—

..... Division Name of participant.....
 Range Address.....
 Section
 Beat Co-ordinator.....

Overall location of
the area covered
during the week.

Terrain : % of — hill () / hill-plain () / plain ()
 % of — ravinous () / broken () / unbroken ()
 Cover : % of — dense trees () / open trees () / open bush () /
 open grass () / barren land ()
 Concern : a) — Natural preys — abundant/normal/bare subsistence/none left
 b) — Human competition — heavy/rational/negligible
 c) — Cattle competition — heavy/normal/negligible
 d) — Nature of protection — good/fair/bad/worse
 e) — Local co-operation — good/fair/nil

Special information from participant

1. If you have not seen a tiger or its pugmark during the week, do you reliably know of any tiger in your area?

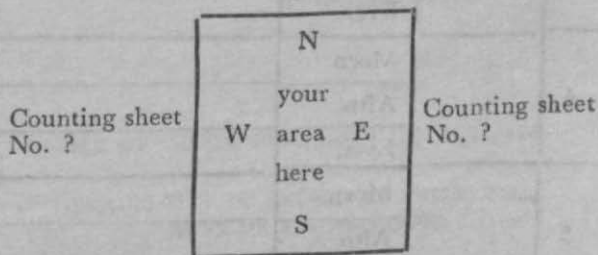
2. Which side was it during counting?

3. When was the last man-eating/cattle-lifting?

4. When was the last tiger seen if none exist now?

Remarks of the co-ordinator and other supervising personnel.

Do you reliably know of any tiger in the following layout around your counting unit?
 Counting sheet No. ?



Counting sheet No. ?

Give details for the above layout as below:

- How far is the tiger from your area?
 N) E) S) W)
- What sex?
 N) E) S) W)
- Has the tiger ever come to your area of count?
 If so when, and how often?
 N) E)
 S) W)
- Longest distance covered by you during the week of count, in your area, from the centre.
 N) E) S) W)
- Any other useful information.

THE WEEK'S LOG-BOOK

Date	Particular area visited	Time	Tiger seen				Pugmarks seen				Remarks including sl. No. of plaster cast, tracing etc. of pugmark.
			Male	Female	Cubs	Unknown	Male	Female	Cubs	Unknown	
1		Morn									
		Aftn									
		Even									
2		Morn									
		Aftn									
		Even									
3		Morn									
		Aftn									
		Even									
4		Morn									
		Aftn									
		Even									
5		Morn									
		Aftn									
		Even									
6		Morn									
		Aftn									
		Even									
7		Morn									
		Aftn									
		Even									

Date—May 19, 1972.

Time—1500 hrs.

Place—Nekedakacha bridge on Bhanjabasa Road, Similipal.

Soil—Fine dry road dust.

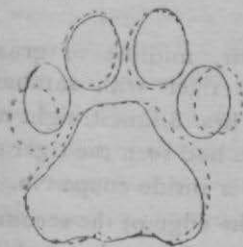
Stride—Not all front and back paws superimposed. Average stride from consecutive superimposed pugmarks—71 cm.

Front paw - - - -

Back paw ————

From separate pugmarks.

Left side.



An adult male tiger.

Date—May 19, 1972.

Time—1800 hrs.

Place—Between 19 and 20 km— on Bhanjabasa—Banjikusum Road, Similipal.

Soil—Fine dry road dust.

Stride—38 pugmarks seen. All completely superimposed. 9 strides exactly 53.5 cm. Two front paws only at the place she descended on the road.

Front paw - - - -

Back paw ————

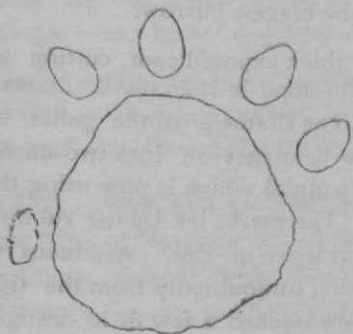
Tiger-traced from separate marks and superimposed for comparison.
Left side.



An adult female tiger.

SIZE OF THESE FIGURES $\frac{1}{4}$ OF ACTUALS

DETAILS IN THE EXCERPTS FROM THE
AUTHOR'S LOG-BOOK.



An adult female tiger.

Date—May 20, 1972.

Time—0600 hrs

Place—Deulahuhi, Satkosia F.S. XIX/2, Karanjia Divn., Orissa.

Soil—Loose patch on hand hill slope where the tigress opened out her toes to break skid — — Right front.
Side hairs found in her den up the hill.

Tiger Census in India

By

S.R. GHOUDHARY

EXCERPTS FROM THE AUTHOR'S LOG BOOK OF THE CENSUS WEEK
IN THE SIMILIPAL HILLS IN ORISSA

PART II

May 15, 1972. 0600 hrs to 1000 hrs. Bachhurichara open valley—23 kms straight south from Nawana the centre of Similipal.

Sampled in 10 parallel strips—road towards Mohubhandar, midline of grassland to the edge—1500 steps (1 km) each. Found the recent excreta of tiger with sambar (*Cervus unicolor*) hair—bore 3.5 centrimetre diameter at 1030 hrs to 1300 hrs. 3 kms straight north-east of the sampled area this morning. The local tribal labourer who had seen the tiger cave took us across two steep near-ravinous well-wooded areas. The cave is inside coupe No. XIX, lot No. 8 of Tinadina Felling Series now under working. At the edge of the second nala he located the three burrows—one sizeably deep—which the tiger is said to be making intermittent use of. This coupe labourer had met the tiger a week back—hardly five metres from him at the head of the largest burrow. He felt, it was a male because of the bushy wide head and face, and the size.

These 3 burrows are of different sizes, made earlier by porcupines. No fresh evidence of porcupines was found, except a few old quills near the biggest burrow.

At the entrance of the biggest burrow there was a thick exposed root, cutting across the mouth at a height of 32 cm. The mouth, flush with the slope is 102 cms in diameter. The gullet is 35 cms from the exposed root at the mouth. The diameter of the gullet is 85 cms. belly is over 2.5 metres long, and beyond it the burrow branches off into two narrow lateral holes evidently used formerly by the porcupines. The animal which is now using this burrow steps in and out over the barrier of the exposed root. The marks left by the rubbing of the ventral surface of its body on the exposed root bears evidence of this. Assiduous search by Nihar resulted in us finding a number of soft white hairs, undoubtedly from the tiger's chest and belly. Similar search at the shallow second burrow fetched a few of its orange coloured side hairs. The tiger must be lying on its side in this shallow burrow.

Even if no pugmarks are seen in this area during the census week, the presence of a tiger—male—is confirmed

1700 hrs to 1900 hrs. (Same day) Dhudruchampa—Burabalang area—Meradi hill—8 kms straight south-southeast of Nawana.

A big lime-stone cave, supposed to be a tiger's—5 years back a tiger had been seen entering it. Fresh signs of many porcupines in the cave. Porcupines are high in the palatable level for the tiger. Evidently, at present no tiger uses this cave. The local Forester (co-ordinator) had seen the pugmarks of a tigress and her cub two months back near the village Burabalang about 4 kms straight from this cave. The mother and her cub were also seen by the forest labourers in the neighbourhood of West-Dhuruduchampa. Further confirmation should be attempted during this census week.

May 16. 0600 hrs to 0930 hrs. Badmakabadi area 5 kms NE of Dhuruduchampa and 8 kms straight SE of Nawana.

Got strong smell of tiger, halfway on the road from Dhuruduchampa to Badmakabadi. However, no pugmark was found in the search. A little further ahead some tribal labourers coming from the opposite direction informed us of signs of predation upon a barking deer which they had found on the road. The signs, they said, were not there the previous evening. On the inner side of the surface of this hill-road we found, at the place pointed out by the labourers, a short and shallow—45 cm—depression on the road, lined on both sides with a few tufts of soil and a thin spray of barking deer hairs. The barking deer had apparently been grabbed with open claws, taken into the jaws and lifted clean off the ground. This explains the clawed-out tufts of soil and the spray of hairs, and, the small depression by the hoof which ceased when the quarry was lifted off the road and carried away. The hard surface of the ground held no other readily discernable sign. This could only be done by a tiger—a panther would have killed and dragged. It must be a big tiger to do this with the barking deer, the way a panther would with a hare or a monkey. A fortnight back a male tiger was reported to have been seen in this area by the coupe labourers.

The integrated evidence—the reliable local information, the smell and the method of predation (kill-evidence)—confirm the presence of the tiger in this territory although no pugmarks were seen during the census week.

May 17, 1972. 0600 hrs to 1000 hrs. Could not make it to the head of the Joranda falls, 6 kms NNE of Nawana, where there was a report of a tigress den, currently in use by her. The Coupe Mohurir (supervisor) who had seen her on a few occasions, had gone home. None else among the labourers present, knew the location.

May 18, 1972. 0530 hrs to 1100 hrs. Kachudahan area, 16 kms straight east of Nawana. Saw the plaster-cast of the pugmark of a tigress taken by the Participant (Forest Guard of Kachudahan) from the only pugmark found by him on the right bank of Palpala, opposite

the Forest Rest House. The plaster-cast is convincing. Also saw the pugmark from which he took it.

One of the kharia women saw a tiger cross the Palpala some 15 days back; should be this tigress.

1300 hrs to 1700 hrs. Chahala area, 1+ kms straight NW of Nawana.

1½ kms NE of Chahala Forest Rest House the Participant (F.G. Goura Mahanto) and his helper B.C. Sama Dehury showed me the pugmark which they had preserved. It is an impression on the soil earlier loosened by a porcupine. The pad of a tiger is faintly seen. The toe pads were not clear. About 1 km north of Chahala the F.G. showed me the second tiger pugmark preserved by him on the berm of the Chahala—Talabandh road. This is a clear one, of a female, the same which we had earlier seen this afternoon inside the forest.

There is the report of a big male tige, to the south of Chahala in the Brundaban block. More stress should be paid to the confirmation of this information during this census week.

On the way to Kadalikacha we saw two kharias looking for hill-mynas. One of them told me that his wife had seen the pugmarks—saucer size—of a tiger in the forest near the village Nuagaon-Narua about 15 days earlier. The location is 10 kms NW of Chahala.

May 19, 1972. 0530 hrs to 1000 hrs and 1430 hrs. to 1930 hrs. Bhanjabasa area 30 kms straight south of Nawana.

At 1500 hrs Nihar saw from the moving jeep, a line of pugmarks of a male tiger on her side of the road. The pugmarks were at the farthest edge, on the soft line dust lifted from the wheels of a truck, a clear line which was still fresh, moving down slope towards the Nekdakcha bridge at the 11 km-stone. The average stride between the complete or partially superimposed pugmarks was 71 cms.

At 1800 hrs Nihar again detected a line of pugmarks on her side of the road between the 19 and 20 km-stones. The tigress had come down the hill-side and jumped on to the inner edge of the road where she had left the marks of both her front feet. She then crossed over to the outer edge of the road and climbed up the U-bend to its head, after which she criss-crossed the road, leaving a few of her pugmarks on the central belt of the road which is not usually affected by the traffic. In all there were 38 pugmarks in the line, all superimposed, rear paw exactly over the front. Of the 15 strides measured, 9 were exactly 53.5 cms.

May 20, 1972. 0430 hrs to 0930 hrs. Satkosia F.S. Coupe No. XIX, lot No. 2—corridor to the Similipal hills—50 kms straight SW of Nawana.

The two supposed pugmarks preserved by the Forest Guard were, one of a front-pressed human foot and the other a hyena (right back foot) partially overlapping a cattle hoof mark.



The missing chest bones (sternum portion or ribs) indicate it was a panther kill.



Tiger walking fast.
Back paw in front of front paw.



← Tree near Pradeep's enclosure clawed by Kananan (tiger) when she was free.



Hairs searched out from the steel trap pit indicate the poaching of the big cat.



Tiger pugmarks.



Tiger pugmarks seen through and traced on the 'Tiger Tracer.'

The Forest Guard is a new entrant, the soil fluffy and the tracks old; hence the confusion. The former forest guard of the area, Biranchi Narayan Behera who is experienced and was with us, made no mistake.

This was at the toe of the Deulahudi hill to the east. Opposite Deulahudi is a parallel ridge on the other side of which there was a report of a case of cattle-lifting two months ago. Both the Forest Guards told me about tiger caves in all these hills. We checked Deulahudi thoroughly. While doing so, Biranchi called me from his contour-belt to show me a mark which, to him, looked like a distorted tiger pugmark. It was that of a tigress coming down from a cave up the hill. She must have walked down fairly fast, over the hard bouldery surface. At this particular spot where there was a small patch of loose soil on an incline, her front right foot slipped, and to break the skid she spread out her toes to their widest—the Tiger-tracer copy shows the resultant shape of the mark left at the spot. The mark of the dew claw is clear; it was her right front foot.

Up the hill, we investigated her cave. It was Nihar again who picked up the scattered bits of orange coloured peltage dropped when the tigress had been lying on her side.

The measurements of this rocky den were 190 cms long, 146 cms \times 155 cms at the entrance and 91 cms \times 150 cms half-way in.

The coupe agents confirmed having heard the tigress from this and the opposite hill.

Analysis of the log-book:

1. Number of days spent in survey and tracking—6
2. Total number of hours of survey and tracking—31—42
3. Total distance travelled by jeep inside the forests—428 kms.
4. Total length of tracking on foot in the forests—33 kilometres.
5. Tiger evidences. All different tigers, male and female.
 - 5.1. Found in the field during the survey and tracking on foot.
 - 5.1.1. From the jeep, on road side—two lines of pugmarks in Bhanjabasa area, one tiger, and the other a tigress 8 kms away—on May 19.
 - 5.1.2. Found during tracking on foot—three different areas
 - A. Excreta and tiger den with tiger hairs; one male tiger; confirmed by local people. Bachhurichara area on May 15.
 - B. Kill—evidence, method of predation; one male tiger. Confirmed by local people. Badmakabadi area, May 16.
 - C. Tigress cave with her hair and her pugmarks. One tigress confirmed by local people. Deulahudi, May 20.

- 5.1.3. Found earlier by the Participants.
 - A. One tigress from one pugmark plaster-cast. Kachudahan area, May 18.
 - B. One tigress from two pugmarks preserved. Chahala area, May 18.
- 5.2. Tigers or their pugmarks seen recently, before the census, but not located during the census. Dates indicate the collection of relevant information by the author.
 - 5.2.1. Tigress with one cub in Burabalang-Dhuruduchampa area—May 15.
 - 5.2.2. Head of Joranda falls—one tigress—May 17.
 - 5.2.3. Tiger in Chahala South—May 18.
 - 5.2.4. Tiger in Nuagaon-Nalua—May 18.
6. Total number of tigers—male and female—existing and located, and type of evidence as basis.
 - 6.1. Line of many pugmarks of the same animal—one tiger and one tigress—total, 2.
 - 6.2. One or two pugmarks plus other supporting evidence—all tigresses, 3.
 - 6.3. No pugmarks seen but other convincing evidence confirm—tigers, 2.
 - 6.4. Grand Total—7.
7. Total number of tigers—male, female and cub—reliably reported to be existing but not confirmed.
 - 7.1. Tigers—2.
 - 7.2. Tigresses—2.
 - 7.3. Cub—1.
 - 7.4. Total—5.

Use of the data:

1. Seven tigers—3 males and 4 females—are confirmed beyond doubt and will be included in the census figures.
2. Five tigers—2 males, 2 females and one cub—reliably reported but not confirmed in the field. These will be searched for, with increased vigour and additional co-operators during the remaining period of census. Further evidence will be obtained and weighed for screening, before final acceptance and inclusion in the census figures.

In this first summer census, however, none of the doubtful estimates will be included if no further tiger evidence as listed in the schedule of census, is found in the field, unless the concerned Organiser is absolutely certain from further truthful confirmation of specific local informations in each case, which he will record in convincing details for the final screening by the Chief Co-ordinator.
3. The Counting Units of the Cooperation—Tiger—Census are now permanently located and defined in the field in all the tiger habitats in the country. These units have been serially numbered in each state and registered with the Chief Co-ordinator. These will

now form the smallest permanent management units for tigers, similar to the compartments in our forestry management. Let us call them Tiger-Units, giving them the same serial number as the corresponding Counting Unit. The Tiger-Unit histories will now be maintained just as we do with the Compartment histories. I propose we do it this way.

- 3.1. The Tiger-Unit histories will be kept in separate guard files for each unit with the Organisers only. All basic data—location, area, terrain, cover, concern and past history—as collected during this census will be entered on one page in the same proforma as on the face page of the counting sheet. Results of the census will also be recorded with brief details of evidences. The Tiger-tracer copy will be kept below this page.
- 3.2. All Beat—Guards and Foresters will be supplied with pocket size Tiger—note books having alternate pages perforated at the top so that these pages could easily be torn out.

Any information about tiger in any Tiger—Unit will be recorded in this note book in duplicate (carbon) stating the serial number of the Tiger—Unit, date and place (Central/North/West/South/East).

A separate page will be used for each unit. At the time of submitting their monthly diaries, the Foresters and Forest Guards will detach the perforated carbon copies of their Tiger-note book and send them to the Range Officers with their diaries. The Organisers will put these copies in the respective Tiger-Unit histories.

- 3.3. The Organisers will send brief abstracts of the Tiger-Unit histories quarterly to their Chief Organisers, marking at the same time a copy to the Chief Co-ordinator.
- 3.4. These will provide the basic background for successive future census and a continuous pooling of data for objective management of the tiger.

REMINISCENCES

February 17, 1969. 5 P.M.—I was leisurely walking towards the carnivora enclosure to look up Kanan, “..... the only wild tigress in the world who had successfully broken into a zoo,” as Bart Mc Dowell put it in the National Geographic of October 1970.

“Ah! we were looking for you.” It was my friend Gani (S.M. Gani) coming from the opposite direction. “Meet Mr. Mc Dowell of the Senior Editorial staff of the

National Geographic. He has been keen to see you ever since he landed at the Bhubaneswar air port. In Delhi he read your article on Tiger Census in the 1968 December issue of the Orissa Review".

I took Mr. Bart Mc Dowell round the zoo. In half an hour we were back at the Forest Rest House, with Mc Dowell keen to know all about the 1966 tiger census in Orissa—and I equally as keen to tell him all about it. With a few bites from the famous Nandankanan 'pakodas' and 'ladoos' and a cup of tea served by Nihar, Mr. Mc Dowell preferred to miss his dinner scheduled 17 miles away at 7.30 P.M. We talked of many things, all rambling back ultimately to the tiger and its future.

Late in the night when Bart finally stood up to go he told me "There appears to be no other practical method of counting tigers. Your Co-operation Census method has done a more important thing. It has focused the attention of the cooperator, the keeper of the tiger in our forest, to his valuable charge. He will try to look for the tiger in his area which perhaps he did not do earlier. You have stimulated his interest. He will naturally keep an eye on his tigers. And that is a great thing for the future of the tiger".

May 18, 1972. Deep inside the Similipal Hills, Nihar and I were tracking along the course of the Palpala, meandering through the dense folds of Kachudaban Felling Series.

"See there? Looks like some animals". Nihar pointed towards some movements ahead in the thicket. We slowly approached and on drawing nearer, saw clearly, two men. When we met them, the Forest Guard gave a smart salute, his helper standing behind, his Tiger-tracer in a sling on his left shoulder.

"I went to see you at Dhuruduchampa sir "he said," You had left. Back in the mid-fifties I was one of your forest guards in Baripada".

"What are you doing here? I asked.

He pointed to the Tiger-tracer "Deputed from the plains and now searching for the pugmarks. This is the local man helping me".

I remembered Mc Dowell's words. If this is the enthusiasm elsewhere in the tiger lands of my country, the Co-operation—Tiger—Census has amply served its objective.