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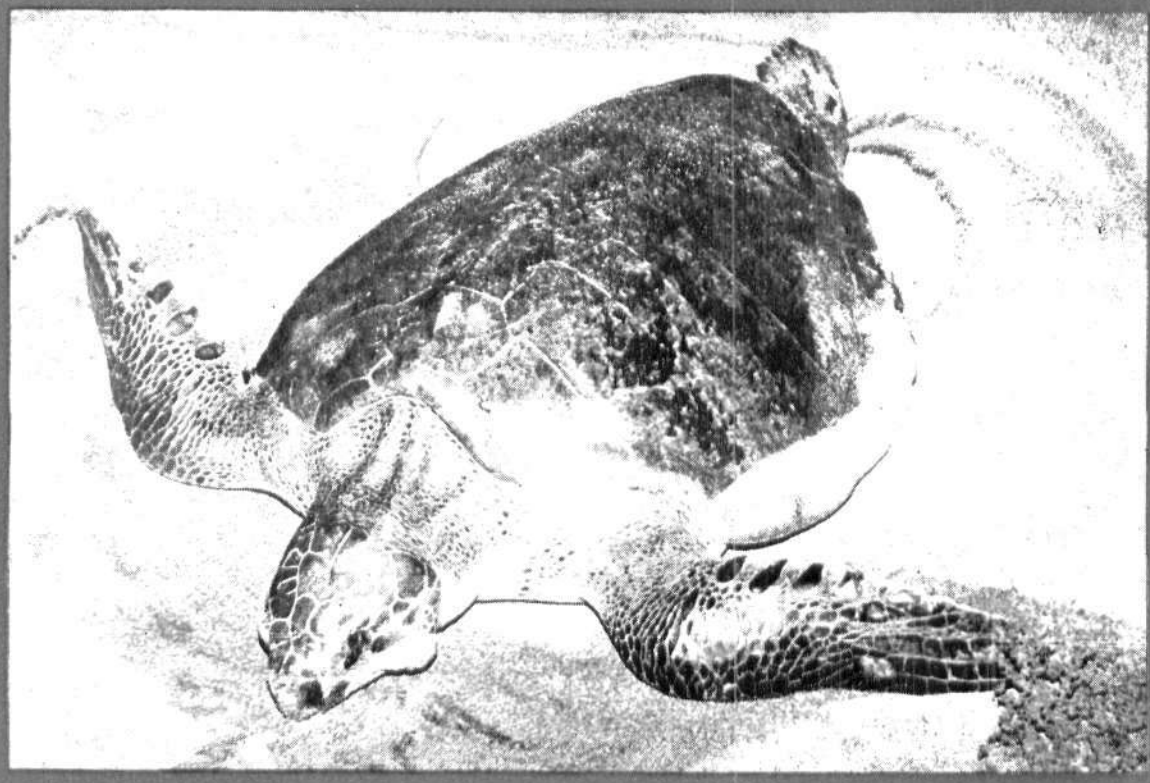

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ON THE LARGE AND MINI ARRIBADAS OF THE OLIVE RIDLEY *LEPIDOCHELYS OLIVACEA* AT GAHIRMATHA, ORISSA DURING THE 1985 SEASON

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Introduction

Our studies of the olive ridley along the east coast, particularly along the Gahirmatha coast (Silas *et al.*, 1983, 1984 and 1985) and those conducted by other workers (Bustard, 1976; Davis and Bedi, 1978; Kar, 1980, 1982; Bustard and Kar, 1981; Kar and Bhaskar, 1982; Kar and Biswas, 1982; Bhaskar, 1982; Kar and Dash, 1984; Whitaker, 1984 and Whitaker and Kar, 1984) indicate that there is a good amount of variation in the nature and intensity of arribadas from year to year (Table 1). While to some extent the time of occurrence of the first and second arribadas may be predictable within plus or minus a fortnight, the intensity and other aspects such as the extent of utilisation of beach areas; nesting during day time and so on differ greatly. We are documenting here our observations on the 1985 first and second arribadas of the olive ridley at Gahirmatha, which when critically examined deviate in many aspects from observations made on the arribadas during the earlier two years.

First arribada of the olive ridley from 13-28 January, 1985

The mass nesting in 1985 was protracted over a period of 16 days from 13-1-'85 to 28-1-'85 with the peak nesting occurring between 16th and 19th January, 1985 (Table 2).

The beach configuration was quite normal as in previous years but the nesting was restricted to a stretch of 7.5 km of the Gahirmatha beach with almost saturation nesting occurring in a 4.5 km stretch with Ekkula as centre point. In earlier years, mass nesting was reported south of Ekkula but during 1982-'83 and 1983-'84 it was north of Ekkula. In fact, during 1984 season the first mass nesting occurred in a 5 km stretch from Ekkula northwards to Ekkula Nasi.

Table 1. *Details of estimated number of nesting females during arribadas at Gahirmatha from* 1976 *to* 1985 *season*

Year	Estimated number of nesting females	Source
1976	1,50,000	Kar and Bhaskar, 1982
1977	1,50,000	,,
1978	2,00,000	,,
1979	1,30,000	,,
1980	No data	—
1981	No data	—
1982	No mass nesting	—
1983	2,00,000	Silas *et al.*, 1983
1984	5,00,000	Silas *et al.*, 1985
1985	2,87,000	Present paper

Similarly, unlike in the years prior to 1983, the first arribada of 1984 and 1985 was protracted occurring over a period of 15 and 16 days respectively. Normally the mass nesting activity is completed within a week. There is also some variability noticed in the total number of nesting females from year to year as seen from records by previous workers.

Except for a few straglers no large scale day nesting of olive ridley was noticed during the first arribada of 1985. This is quite different from 1984 season when on a single day as many as 45,000 olive ridely came ashore for nesting during day time on 26-3-1984 (Silas *et al.*, 1985).

As in previous years, a good amount of damage to nests of earlier batches was noticed by the waves of nesting influxes on subsequent days during the first arri-

Table 2. *Details of nesting females during first arribada at Gahirmatha in 1985 season*

Period of nesting	Estimated number of nesting females
13-1-1985	600
14-1-1985	1,000
15-1-1985	3,000
16-1-1985	50,000
17-1-1985	70,000
18-1-1985	80,000
19-1-1985	40,000
20-1-1985	16,000
21-1-1985	7,000
22-1-1985	1,500
23-1-1985	2,000
24-1-1985	2,500
25-1-1985	1,500
26-1-1985	1,000
27-1-1985	2,000
28-1-1985	1,500
Total	2,79,600

bada. This year also we found no decrease in the level of predation by wild animals (jackals, hyaenas, pigs, feral dogs and birds). The only effective stoppage has been the poaching of eggs by man.

Although no mechanised fishing operations were noticeable off the Gahirmatha coast, a number of carcasses of olive ridley were washed ashore. About 694 in different state of decomposition were counted in a stretch of 10 km of beach (Table 3). Numerically this was far fewer than those observed in earlier years (Silas *et al.*, 1983). These carcasses could have been the result of animals getting entangled and drowning in fishing operations conducted off Paradip and adjacent areas, the carcasses drifting northwards and ashore at Gahirmatha. A good and sustained extension campaign to educate the coastal fishermen in the conservation and management measures being adopted for olive ridley along the Gahirmatha-Konarak stretch, calling for their co-operation and involvement in the programme is the need of the day. It cannot be a one time effort, and ultimately the State will have to introduce some regulatory measures to make matters legally binding.

The details of the size and weight of eggs observed during the first arribada are indicated in Table 4. Details of nesting area, size of nesting females, depth of nest,

Table 3. *Details of number of nests destroyed by predators and successive nesters, freshly noticed tracks and carcasses observed in January, 1985 at Gahirmatha*

Place	Date	Km	Number of freshly noticed tracks	Number of carcasses	Number of destroyed nests
Ekkula Nasi	21-1-85	0-1	166	62	207
	-do-	1-2	289	48	310
	-do-	2-3	260	41	531
	-do-	3-4	404	42	664
	-do-	4-5	400	44	545
Ekkula	28-1-85	5-6	819	61	512
	-do-	6-7	381	106	286
	-do-	7-8	64	102	29
	-do-	8-9	—	86	9
	-do-	9-10	—	102	4
Total			2,783	694	3,097

clutch size, distance of pit from high water mark, duration of incubation hatching success, nest temperature and ambient atmospheric temperature at night during the nesting period are given in Table 5.

The beach had a gentle gradient upto the stretch of sand-dune and almost 90% of the nesting was noticed along the base of the sand-dune in a narrow band hardly five metres in width extending along the 4.5 km stretch. In some areas where the sand-dune had a gentle gradient the nesting turtles ascended the slope for excavating the nests still higher up. The portion of the sand-dune with a steep slope no doubt acted as an impediment for the turtles to move further inland, thereby restricting the nesting area to a narrow width along the base of the sand-dune. We feel that any study of the nesting intensity of olive ridley should not only take the entire stretch of beach but also this aspect of saturation nesting along narrow belts into account. Beach improvements for nesting turtles may be necessary by creating a gentle gradient to afford greater areas of nesting which may also minimise nest destruction by influxes on subsequent nights. This aspect needs consideration as a management measure. However, any plantation of casurina or other vegetation in such beach area may again cause impediments, though it will be difficult to keep off a sand binder such as *Ipomea* sp. from spreading wild in such areas.

Incubation period

Hatchlings of the first arribada of 1985 season were seen to emerge after 60 days (Table 5).

We have also carried out observations as to the number of nests at random from which hatchlings have emerged during the different nights to find out whether there was any particular trend of intensity of emergence.

Observations during different nights indicated that emergence took place 60 days after nesting and there was some amount of correlation between the peak mass nesting and emergence of hatchlings (Table 7).

Table 4. *Variation in the diameter in mm and weight in gm of eggs of olive ridley from 10 clutches (mean in parenthesis) at Gahirmatha examined by authors in 1985 season (Ten eggs were taken at random from each clutch)*

	First mass nesting January, 1985		Second mass nesting March, 1985	
	Diameter (mm)	Weight (gm)	Diameter (mm)	Weight (gm)
1.	37.1–39.8 (38.4)	29.0–33.2 (30.6)	36.5–38.1 (37.1)	28.5–31.8 (30.2)
2.	35.1–38.4 (36.4)	29.0–31.2 (29.8)	34.1–37.0 (35.7)	25.8–28.0 (26.8)
3.	33.4–36.9 (35.5)	29.0–32.0 (29.8)	36.3–39.6 (38.7)	28.5–33.5 (30.5)
4.	37.1–40.1 (37.8)	29.0–33.0 (31.2)	37.6–40.6 (39.1)	31.0–33.3 (31.9)
5.	33.2–39.7 (36.8)	30.0–35.0 (32.4)	35.6–38.7 (37.3)	29.1–34.2 (30.8)
6.	38.7–40.0 (39.2)	33.0–35.5 (34.6)	35.4–37.3 (36.1)	25.7–30.4 (28.3)
7.	37.0–38.4 (37.6)	31.0–33.0 (31.5)	36.5–39.1 (37.6)	29.5–31.7 (30.7)
8.	37.3–39.1 (37.7)	30.0–32.0 (31.2)	35.0–37.8 (36.5)	28.3–30.8 (29.2)
9.	37.1–35.8 (38.0)	30.0–32.5 (31.8)	38.2–40.7 (34.0)	32.3–35.1 (33.5)
10.	—	—	35.7–39.6 (37.8)	28.2–31.3 (29.2)
N = 90	90		100	100
R=33.4-40.1	29.0-35.5		34.1-40.7	25.7-35.1
M = 37.50	31.41		37.43	30.11

Quantitative analysis on hatching success for different clutches of the mass nesting are given in Table 8. A significant observation was the very low intensity of second arribada which did not damage or cause mortality of hatchlings and developing embryos of the first arribada unlike in earlier years. We feel that the success of hatchlings resulting from the first arribada was better in 1985 season than 1984 season when the second arribada of equal magnitude as the first, and along the same stretch of beach, resulted in mass destruction of developing eggs, eggs in pipping stage and heavy mortality of emerging hatchlings.

Second arribada of olive ridley at Gahirmatha in 1985

After an interval of 58 days of the completion of the first arribada, the second arribada commenced on 13–3–'85. In effect this was an anticlimax since unlike in previous years hardly 8,083 turtles came ashore for nesting over a period of 10 days. We have reservations whether this qualifies to be denoted even as a mini arribada. In 1984 the number was around 2,00,000. Detailed enumeration of date wise emergence for nesting for the 1985 second arribada is given in Table 9. The peak was on the nights of 17th and 18th March, 1985 when 3,000 and 3,500 turtles respectively came ashore for nesting. The reason for this very low intensity is not clearly understood. The conditions noticed at Gahirmatha during the second mass nesting need recording.

1. There was extensive erosion along the beach and the 10 km stretch of nesting beach was greatly reduced and in some places only a ledge existed on which turtles had to crawl over to nest. Due to the restricted width of the beach, nesting was seen even at high water mark level and very often this resulted in the nest being washed away and eggs exposed and lying free in the intertidal zone. On 21-3-'85 in a short stretch, as many as 25 nests were seen lying exposed along the edge of the ledge abuting on the high water mark due to wave action. During the early hours of dawn, sea birds were seen preying on the exposed eggs and many eggs had rolled down the beach.

The extent of exposed beach during the first and second mass nesting differed widely as indicated in Table 4.

2. There was no indication of intense second mass nesting in other beaches along the Orissa coast as monitoring was done at several points.

3. During the second arribada, there was strong sea-to-land wind for most part of the day which also resulted in heavy wave action.

Table 5. *Details of first and second arribadas of* 1985 *season at Gahirmatha*

Parameter	1985 First arribada	1985 Second arribada
1. Estimated number of nesting females	2,79,600	8,083
2. Area of nesting (km)	6.2	4.0
2a. Duration of nesting in days	16	11
3. Size of nesting females:		
a) Carapace length in cm	65–74 (72.9) N=108	68–74 (72.1) N = 10
b) Carapace width in cm	62–73 (71.6) N = 108	69–72 (70.6) N = 10
c) Weight in kg	32–48 (46.8) N = 108	37.5–46.5 (42.0) N = 14
4. Depth of nest in cm	43–63 (49.5) N = 9	38–56 (46.0) N = 9
5. Nest temperature in °C	25.5–27.8 (26.4) N = 1	29.2 – 32.0 (30.2) N = 10
6. Ambient atmospheric temperature at night in °C	21.7–23.8 (22.9) N = 9	25.9–26.9 (26.3) N = 9
7. Clutch size	97–128 (113) N=9	102–162 (136) N = 9
8. Distance of pit from high water mark in m	48–55 (50.7)N = 10	2–30 (12.7) N = 10
9. Incubation duration in days	60	—
10. Hatching success in per cent	89.0	—

Table 6. *Variation in the size in mm and weight in gm of olive ridley hatchlings from* 10 *clutches (mean in parenthesis) at Gahirmatha examined by the authors during the* 1985 *season*

Sl. No.	No. of turtles	Carapace length	Carapace width	Plastron length	Plastron width	Weight	No. of right lateral scutes 5	6	7	8
1.	N = 20	35.3–39.0 (37.38)	28.9–33.1 (31.19)	29.0–31.4 (29.96)	23.5–28.3 (26.18)	12.0–15.5 (13.60)	0	11	9	0
2.	–do–	38.7–42.9 (41.31)	31.2–37.2 (35.02)	31.9–34.3 (33.25)	26.9–31.2 (28.44)	16.0–19.5 (17.99)	0	11	6	3
3.	–do–	36.7–42.8 (40.38)	33.3–36.6 (35.06)	30.8–34.8 (32.94)	27.6–31.0 (29.76)	15.7–17.3 (16.58)	1	11	6	2
4.	–do–	37.9–41.5 (40.47)	32.7–35.8 (33.87)	30.4–34.1 (32.09)	27.0–30.3 (29.02)	16.0–18.2 (27.87)	0	17	2	1
5.	–do–	38.4–41.4 (39.67)	32.2–35.6 (33.87)	28.8–32.8 (31.07)	25.4–29.0 (27.79)	14.7–17.5 (16.12)	0	13	7	0
6.	–do–	38.8–42.2 (39.52)	32.1–36.3 (34.23)	29.6–32.9 (31.87)	27.6–30.8 (28.99)	17.0–18.5 (17.94)	0	11	7	2
7.	–do–	37.2–40.8 (39.86)	31.2–39.4 (33.06)	30.1–32.0 (31.13)	26.4–28.8 (27.72)	16.5–19.0 (17.20)	0	10	10	0
8.	–do–	38.1–41.8 (39.11)	31.5–35.3 (33.34)	29.5–32.5 (30.54)	25.7–29.3 (27.86)	15.5–18.0 (16.87)	1	9	8	2
9.	–do–	38.5–42.3 (40.18)	32.1–35.5 (33.37)	30.1–34.5 (32.39)	27.3–30.4 (28.59)	17.0–19.2 (18.49)	0	7	9	4
10.	–do–	34.7–39.4 (36.77)	30.1–34.7 (32.04)	30.2–34.2 (32.06)	27.3–30.2 (28.53)	13.6–17.0 (15.45)	2	10	8	0
							4	110	72	14
		N = 200	200	200	200	200				
		R = 34.7–42.9	28.9–39.4	28.8–34.8	23.5–31.2	12.0–19.5				
		M = 39.4	33.50	31.73	28.6	16.72				

Table 7. *Details of emergence of hatchlings from nests observed in March, 1985 at Gahirmatha*

Date	Number of nests from which hatchlings emerged
14–3–1985	400
15–3–1985	500
16–3–1985	2,300
17–3–1985	5,000
18–3–1985	25,000
19–3–1985	16,000
20–3–1985	12,000
21–3–1985	10,000
22–3–1985	1,000
Total	72,200

The details about the clutch size, size of individual eggs and their weights seen in the arribada are given in Tables 3 and 4.

Mini arribadas have been known to occur at Gahirmatha during certain years although we do not have well documented information on the same. It will be interesting to see whether there are any cyclic occurrence of large and mini arribadas. Continuous monitoring over a period of time may give answers to this. The number of remigrants in the second arribada is also an unknown factor. There were a number of abnormal animals seen emerging for nesting in the mini arribada, some successfully completing the nesting operations.

As earlier indicated, the second arribada also coincided with the emergence of hatchlings of the first arribada but with no mortality to emerging hatchlings.

Table 8. *Details of live hatchlings emerged, live in pipping stage, dead hatchlings noticed in the pit, dead in pipping stage and spoilt and unfertilized eggs observed (percentage in parenthesis) during March, 1985 based on the observations made by the authors at Gahirmatha*

Date	Clutch size	Live hatchlings emerged	Live hatchlings in pipping stage	Dead hatchlings in pit	Dead hatchlings in pipping stage	Spoilt and unfertilized eggs
16–3–1985	166	157 (94.57)	1 (0.60)	1 (0.60)	—	7 (4.21)
–do–	133	117 (87.97)	10 (7.52)	2 (1.50)	1 (0.75)	3 (2.25)
–do–	83	71 (85.54)	1 (1.20)	1 (1.20)	8 (9.63)	2 (2.40)
–do–	114	105 (92.10)	2 (1.75)	2 (1.75)	1 (0.87)	4 (3.50)
–do–	133	119 (89.47)	—	1 (0.75)	5 (3.76)	8 (6.01)
–do–	96	69 (71.87)	—	3 (3.12)	19 (19.79)	5 (5.20)
–do–	125	115 (92.00)	5 (4.00)	1 (0.80)	3 (2.40)	1 (0.80)
–do–	142	116 (81.69)	5 (3.52)	6 (4.22)	10 (7.04)	5 (3.52)
–do–	117	105 (89.74)	—	—	3 (2.56)	9 (7.69)
18–3–1985	108	92 (85.18)	7 (6.48)	—	2 (1.85)	7 (6.48)
–do–	73	68 (93.15)	—	—	1 (1.37)	4 (5.48)
–do–	118	98 (83.05)	8 (6.78)	1 (0.84)	6 (5.08)	5 (4.23)
–do–	121	109 (90.08)	2 (1.65)	2 (1.65)	1 (0.82)	7 (5.78)
–do–	155	145 (93.54)	1 (0.64)	2 (1.29)	—	7 (4.51)
–do–	122	117 (95.90)	2 (1.63)	2 (1.63)	—	1 (0.81)
–do–	161	159 (98.75)	—	—	—	2 (1.24)
–do–	151	139 (92.05)	5 (3.31)	—	—	7 (4.63)
–do–	165	159 (96.36)	—	2 (1.21)	2 (1.21)	2 (1.21)
–do–	108	93 (86.11)	1 (0.92)	1 (0.92)	10 (9.25)	3 (2.77)
–do–	127	120 (94.48)	—	—	4 (3.14)	3 (2.36)
–do–	142	111 (78.17)	1 (0.70)	2 (1.40)	2 (1.40)	26 (18.30)
–do–	127	109 (85.82)	7 (5.51)	1 (0.78)	6 (4.72)	4 (3.14)
–do–	100	95 (95.00)	1 (1.00)	2 (2.00)	—	2 (2.00)
Total	2,887	2,588 (89.7)	59 (2.0)	32 (1.1)	84 (2.9)	124 (4.3)

Table 9. *Details of nesting females during the mini arribada at Gahirmatha in March*, 1985

Period of nesting	Estimated number of nesting females
13-3-1985	40
14-3-1985	35
15-3-1985	85
16-3-1985	300
17-3-1985	3,000
18-3-1985	3,500
19-3-1985	900
20-3-1985	150
21-3-1985	25
22-3-1985	48
Total	8,083

A dead sea gull lying on the beach was examined and remains of soft parts of hatchlings were seen in the stomach. Gulls were also seen picking up hatchlings from and beyond the surf. Actual feeding in flight was not noticed. Crows were seen pecking at the live hatchlings as they were crawling towards the sea in the early hours of the day. This year we have also seen dogs preying on hatchlings. Unlike the 1984 season, only very few dead hatchlings were seen along the beach, mostly remains of those killed by birds.

Emergence of hatchlings

Some observations were made on the emergence of hatchlings and sequence of events thereafter. The series of photos given in Plates II-V indicate the sequence. It was invariably seen that all hatchlings headed towards the sea, the crawl marks falling within 110° to 140° on the seaward side of the nest (Plate V).

Due to intense erosion, once the hatchlings reached the edge of exposed beach ledge, they tumbled down over a metre of height to the intertidal area and thence entered the water.

Hundreds of hatchlings were also seen swimming in the adjacent estuarine area. They would have got there from the sea through tidal action. Such occurrence of hatchlings in the estuary has also been noticed earlier by us (Silas *et al.*, 1985).

Estimation of hatching success

In view of the second arribada being a mini arribada, it was reasonably possible to estimate the number of first arribada nests from which hatchlings emerged. Our observations on successive nights corraborated with that of the Forest Department give the figures indicated in Table 6. Thus it would appear that only 26% of the nests resulted in giving rise to successful emergence of hatchlings. As indicated earlier, larger number of nests were destroyed by the influx of fresh batches of turtles coming for nesting over a protracted period of time during the first arribada itself.

We have also studied in detail the hatching success for 23 clutches which is shown in Table 7. This would give an average of 115 hatchlings as successfully emerging from a clutch. On this basis it is estimated that about 8.3 million hatchlings would have emerged successfully from the first arribada where 2,79,600 turtles were estimated to have nested over a 16 day period in January, 1985. Since the observations of the emerging hatchlings were carried out only on nine days, it is felt that the estimate of 8.3 million may be an underestimate. However, we are presenting this figure as indicative of what had happened at Gahirmatha and not as absolute figures. We have no quantified data on the amount of predation by mammals and birds on hatchlings. A proper statistically designed sampling method may have to be evolved for the estimation of egg mortality and hatching success of the olive ridley at Gahirmatha.

We hope that the points raised in this paper will help focus more attention on the olive ridley problem at Gahirmatha.

Is the time of commencement of an arribada predictable?

The CMFRI team visited the Bhitarkanika Wild Life Sanctuary and specifically Gahirmatha and collected data on the occurrence of arribada during the years 1983, 1984 and 1985 (Fig. 1). During the 1983 season from 3rd to 9th February about 2,00,000 olive ridleys nested in the first arribada. The arribada commenced on the 5th day after the full moon in January, 1985. We have no information about the second arribada.

During the 1984 season the first arribada started on 25th January and lasted upto 6th February and about 3,00,000 olive ridleys nested and the arribada started on the 7th day after the full moon and the second arribada of the 1984 season also started on the 7th day

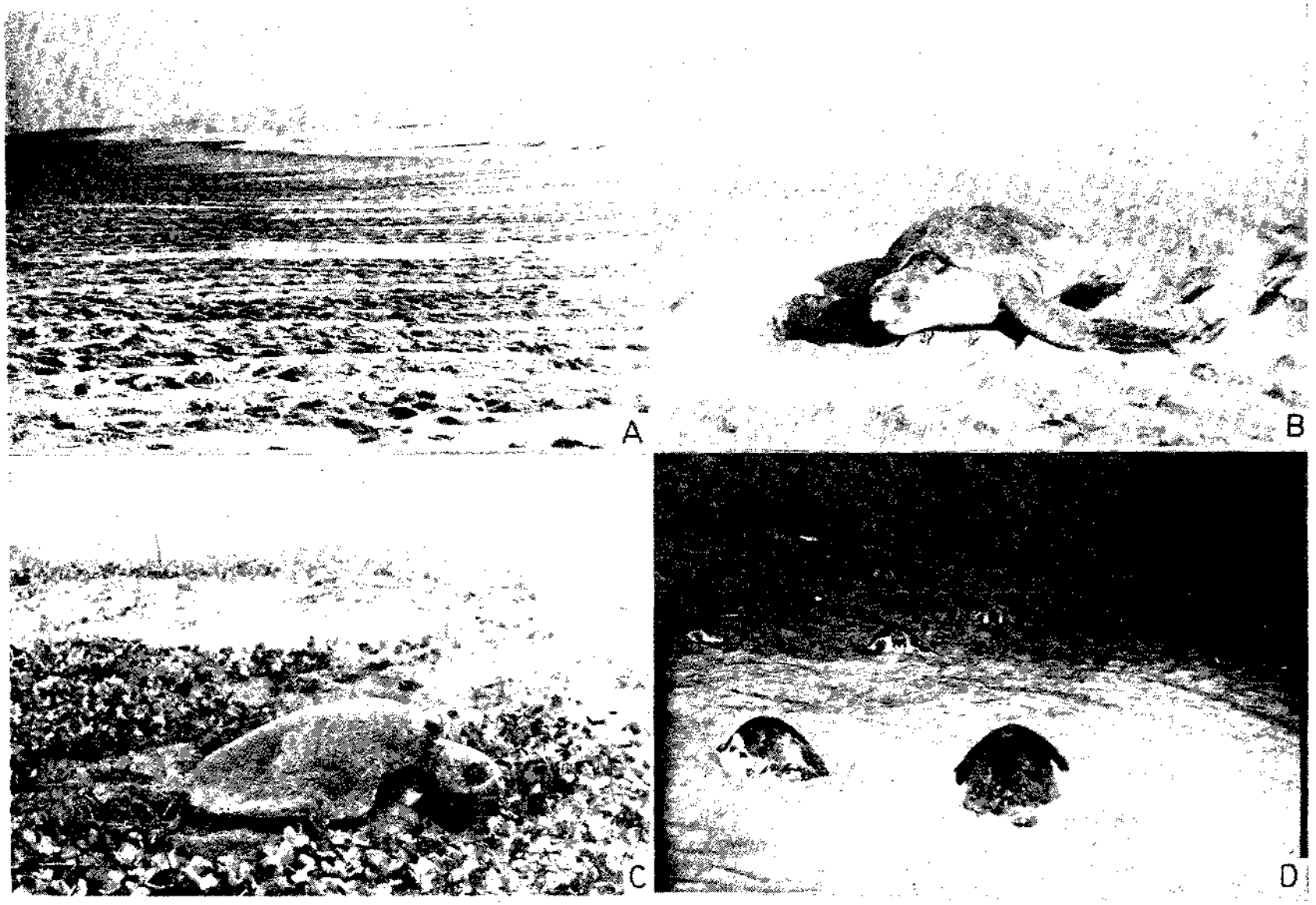


PLATE I. A. Tracks of olive ridleys during first mass nesting at Gahirmatha; B. Olive ridley nesting in sandy beach; C. Olive ridley nesting in an elevated beach among plants and D. A group of olive ridleys nesting on sandy beach during the first arribada at Gahirmatha.

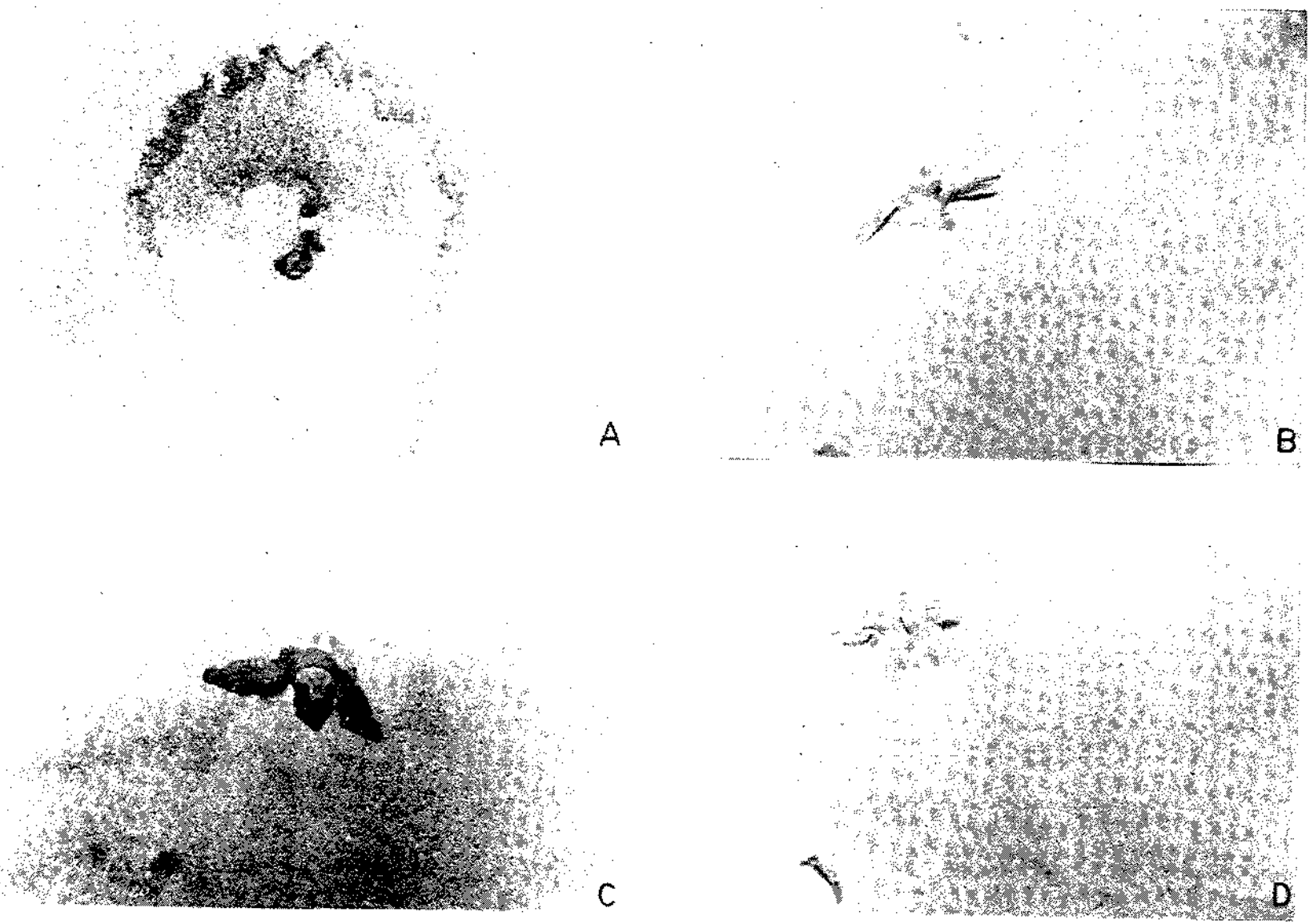


PLATE II. A. 'Caving in' of sand is an indication before the emergence of hatchling from the nest; B. Emergence of hatchling from nest even without 'caving in'; C–D. Emerging hatchling from nests.

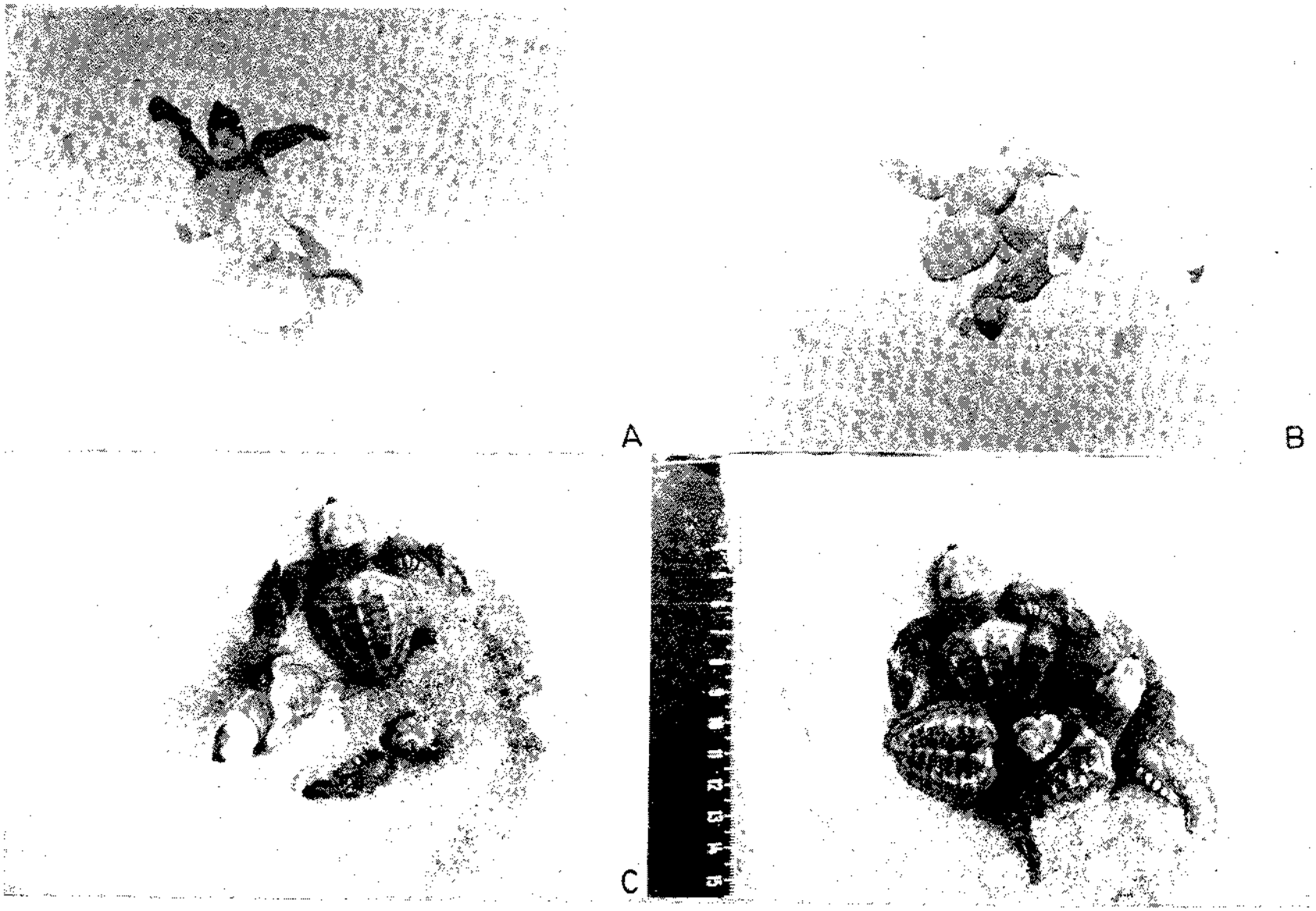


PLATE III. A–D. Different stages of emerging of hatchlings from the nest.

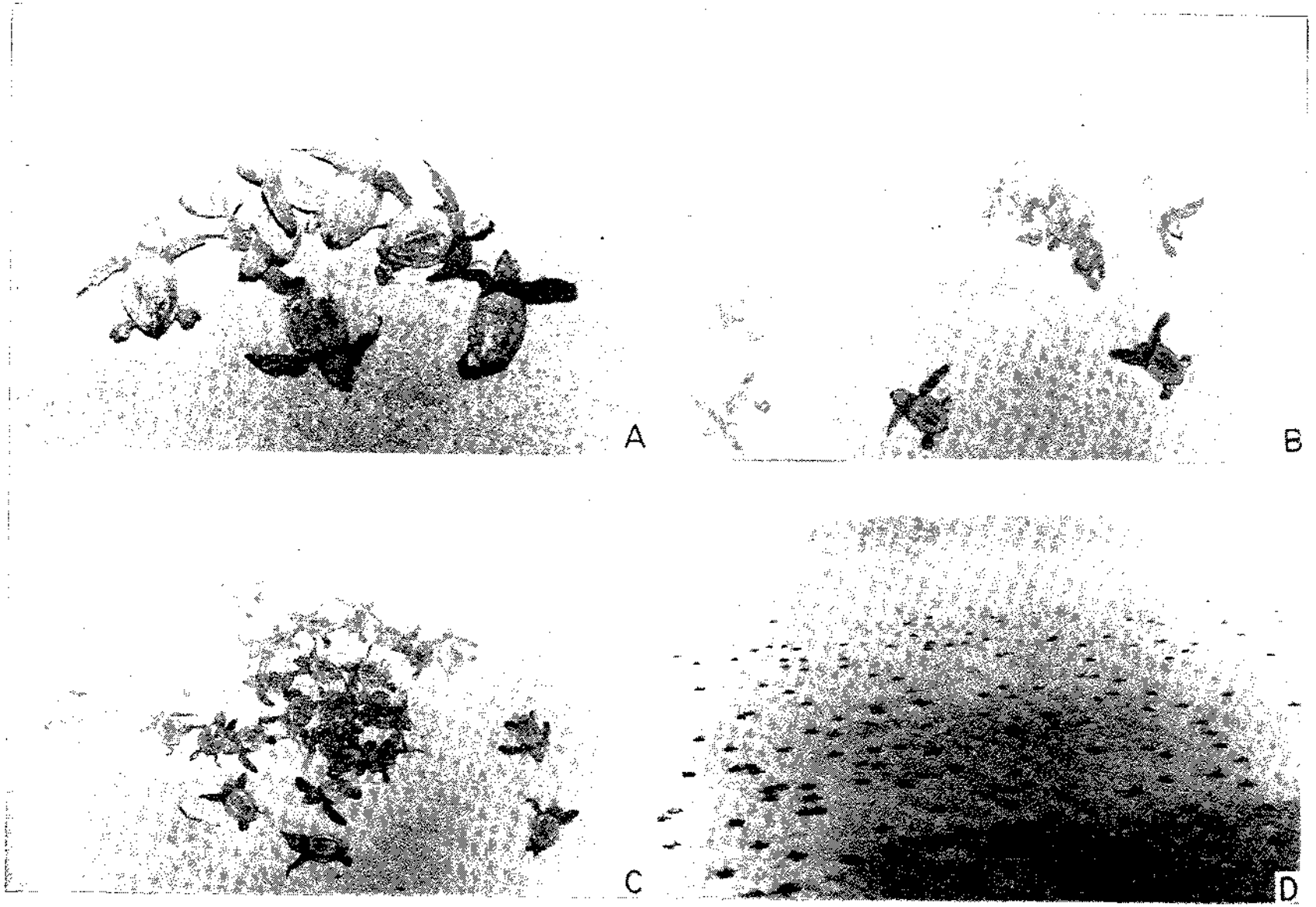
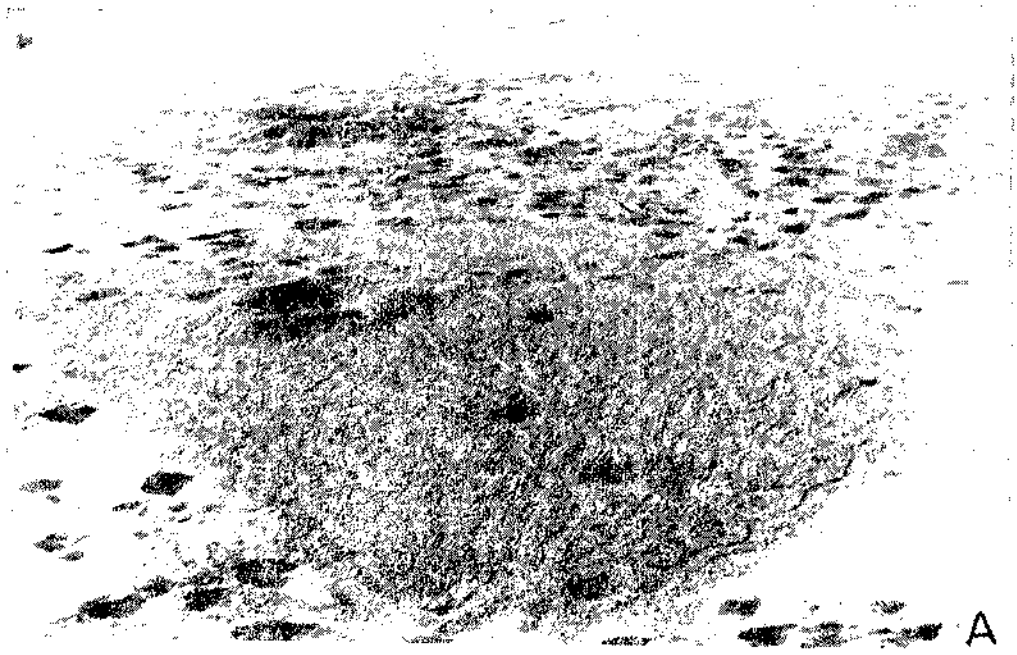


PLATE IV. A. Emergence of hatchlings from the nest; B C. Hatchlings heading towards the sea; D. Hatchlings entering the sea at Gahirmatha.



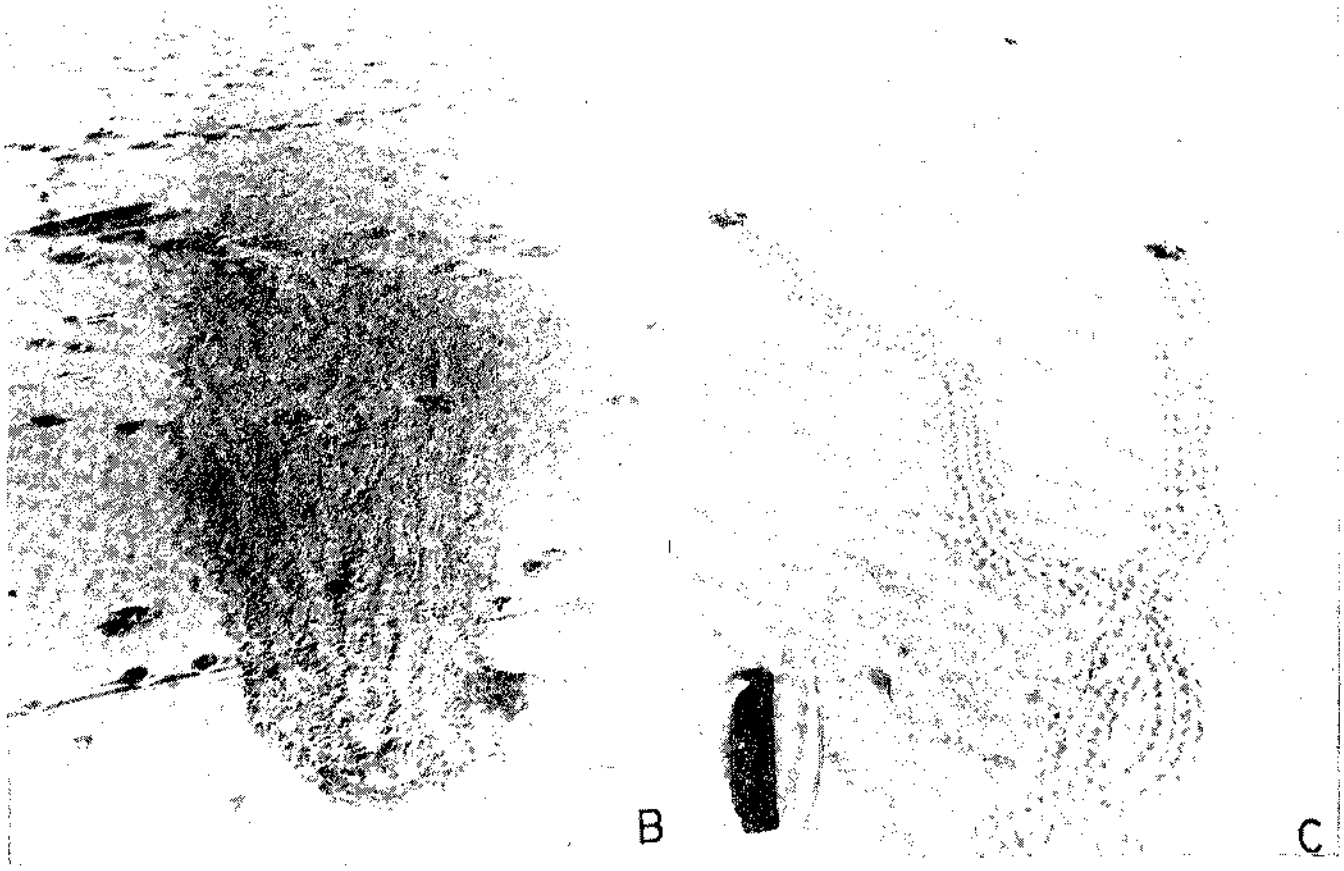


PLATE V. A and B. Tracks of olive ridley hatchlings falling 140° and 110° with the nest as the base point and, C. Track of olive ridley hatchling heading towards the sea.

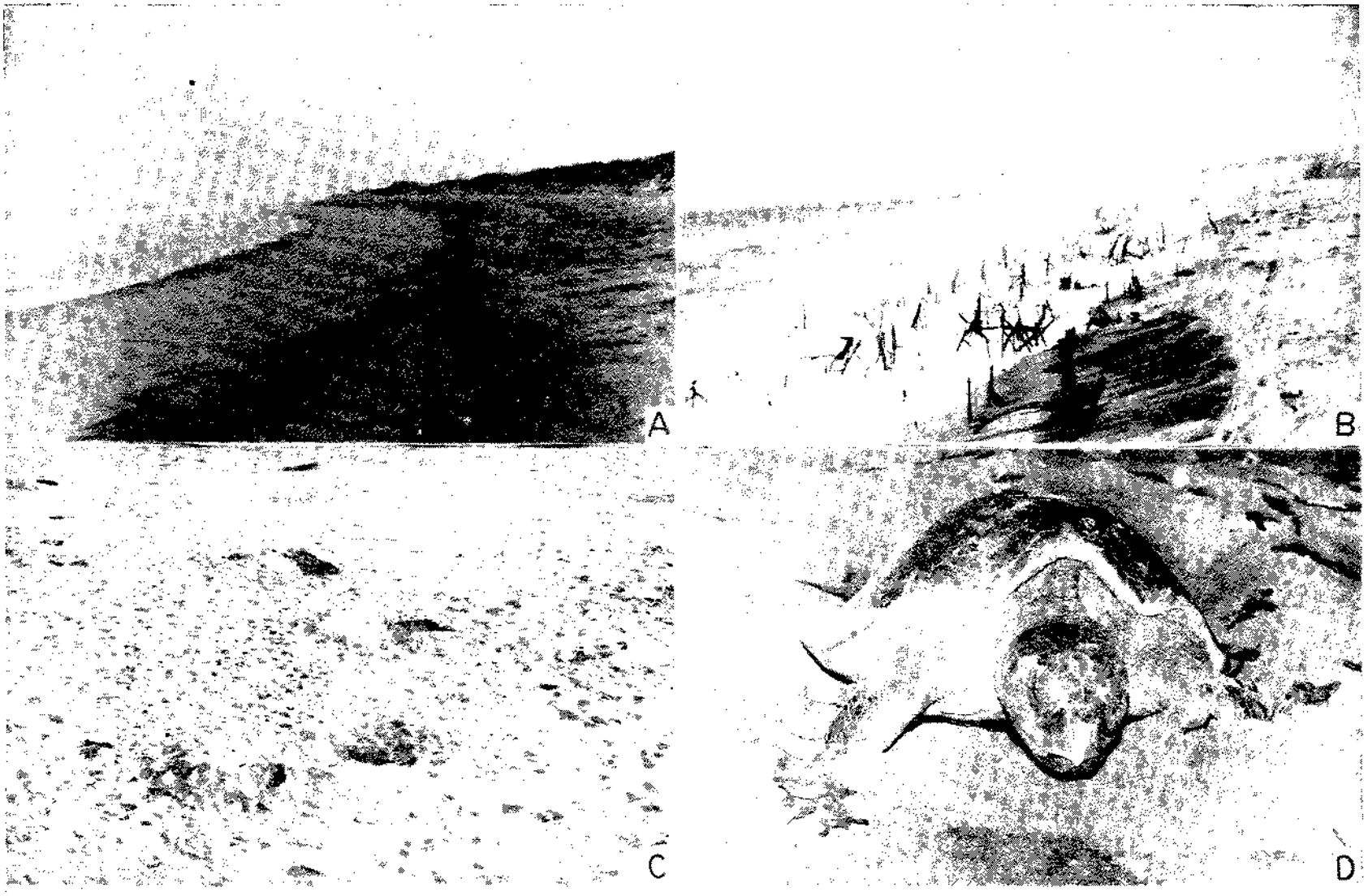


PLATE VI. A. Beach configuration at Gahirmatha during the second arribada; B. Remnants of mangrove at Gahirmatha beach; C. Predation of eggs at Gahirmatha by animals and D. Nesting olive ridley in the midst of emerging hatchlings during the second arribada.

PLATE VII. A. Carcasses of olive ridley washed ashore along Gahirmatha beach noticed in January, 1985; B. Crows feeding on the hatchlings at Gahirmatha; C. Sea gulls predating on the hatchlings; D. Dog feeding on olive ridely eggs at Gahirmatha.

PLATE VIII. Olive ridley returing to sea after nesting at Gahirmatha.

after full moon in March. The first and second arribadas of 1985 season also showed the same trend of occurrence of arribada on the 7th day after the full moon.

The occurrence of arribada can be correlated with the phases of the moon and this has been reported by Marquez *et al.* (1976). Marquez and Van Dissel (1982) and Kar and Dash (1984). From our observations it is clearly evident that there is need to critically examine whether a correlation exists between the occurrence of an arribada and the lunar phases. What we have given here is only indicative. Corroboration of this from past data as well as studies on sea conditions and other environmental and oceanographic parameters are now needed.

Illegal exploitation of sea turtles

Despite the protection accorded to sea turtles under Schedule I of the Indian Wildlife (Protection) Act 1972, the illegal exploitation of sea turtles was still in existence as late as 1984–85 seasons along the West Bengal and Orissa coasts. Earlier instances have already been reported by several workers [Biswas (1982). Bobb (1982), Davis and Bedi (1978), Kar (1982), Shekar Dattatri (1984) Silas *et al.* (1983 a, b), Ganguly (1980) and Raut and Nandi (1985)].

In this account we are reporting about some of the illegal trade which had come to our notice during the 1984 85 season. In view of the stern action taken by the officials of Forest Department, Government of West Bengal, the organised fishing for turtles which

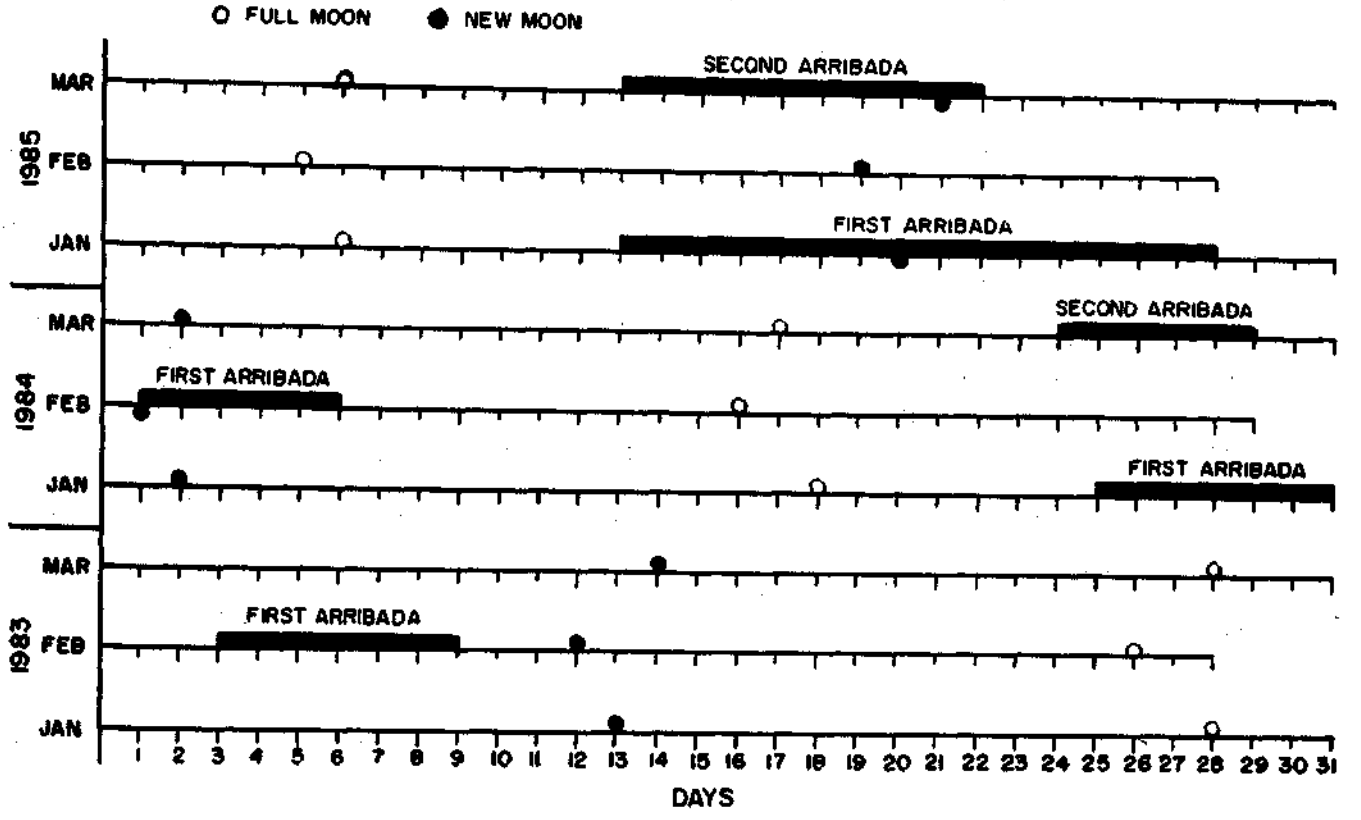


Fig. 1. Occurrence of arribadas at Gahirmatha, Orissa in relation to the phases of the moon.

existed prior to 1983 season has been completely stopped. However, the incidental catch of sea turtles in the gill nets operated by West Bengal fishermen are brought ashore and transported to interior markets.

At Digha

During 1984-85 season from the middle of October, 1984 to November, 1984 on an average 10 to 15 olive ridleys were landed at Digha and Digha Muhana.

The numbers came down to five or six per day during December, 1984. Due to the vigilance of forest officials, the turtles were transported from Digha and Digha Muhana fish landing centres to interior markets under cover. In view of the risk involved the price of the turtles at these landing centres varied from about Rs. 20 to 25 per turtle. The number of turtles noticed by us is given below:

Date	Place	Number of live ridleys noticed
8-11-1984	Digha	10
10-11-1984	Digha	2
10-11-1984	Digha Muhana	10

On 10-11-1984 we have noticed about 70 carcasses of olive ridley at the Digha and Digha Muhana fish landing centres.

At Diamond Harbour

From mid-October to end of November, 1984 on an average eight to 10 turtles were noticed at the Diamond Harbour whole sale fish market and these were from the incidental catches in the gill nets. At Diamond Harbour the turtles were sold around Rs. 60 to 80 a turtle. Unlike at Digha, the sale of turtles was openly carried out at the fish landing centre and in the fish market. Those noticed by the CMFRI team at the landings centres and market are given in Table 10.

Other centres

Other than Digha and Diamond Harbour, sale of turtles was noticed at Sagar Island, Frazergunj, Namkhana, Jetty Ghat and Dasmile in 24 Parganas District, West Bengal. We have seen on 22-11-1984 three olive ridleys being carried openly in a cycle rickshaw to Kali Bazar in Sagar Island. On 7-12-1984 one olive ridley was loaded at Frazergunj on the roof of a passenger bus but on the timely intervention by the Additional Divisional Forest Officer, 24 Parganas, the turtle was carried back and released near Namkhana.

Table 10. *Number of olive ridleys noticed at the landing centres and markets*

Date	Place	Number of olive ridleys
21-10-1984	Diamond Harbour fish market	4
22-10-1984	,,	6
25-10-1984	Diamond Harbour fish landing centre	3
28-10-1984	Diamond Harbour fish market	12
19-11-1984	Diamond Harbour fish landing centre	5
22-11-1984	Diamond Harbour fish market	10
22-11-1984	Diamond Harbour fish landing centre	3
24-11-1984	Diamond Harbour fish market	8
25-11-1984	,,	18
26-11-1984	,,	16
27-11-1984	,,	16
6-12-1984	,,	27
7-12-1984	,,	29
8-12-1984	,,	44

Following are a few of the press reports of happening which we felt should be recorded (Appendices I–III).

Conclusion

It is quite obvious that implementing the Wildlife (Protection) Act is still a problem. While efforts should not slacken, it is also appropriate to see whether a part of the 'doomed eggs' of the large arribadas could be collected for use as food. How much of removal will be permissible is an open question. Management advise will be needed on this and decisions can be made in the field only on the basis of the intensity of an arribada. If this is feasible, and the beaches are well protected from poaching, a well regulated controlled harvesting of the 'doomed eggs' and marketing the same through only Government channel may be thought of. This question has earlier been raised by Silas (1984: *CMFRI Bull.* 34) and also discussed at the 'Workshop on Sea Turtle Conservation' held in Madras in February, 1984 *(CMFRI Special Publ. No.* 18: 1-119, 1984). This appears more logical than harvesting adult turtles. The time has come when we should bestow more serious attention to this as a measure in the conservation and management of this resource.

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Appendix I

'DAINIK CHETNA' dated 14-1-1985

(Bengali daily published from Contai)

Lorry load sea turtles seized

Dated 13th January, 1985

Today at about nine in the night rickshaw labourers seized a truck at 'Caltex More'. The number plate of the lorry was not clear. The truck driver attempted to run away with the truck but the public and rickshaw labourers prevented it. Basisthamuni Kunar, the driver was taken to the police station and the truck was kept under the custody of the police. According to the driver there were more than 54 sea turtles in the truck. The driver confessed to the police that two persons from Tekhali village named Mahim Patra and Baneswar have purchased the turtles at Digha and were transporting them to Calcutta. It is legally prohibited to capture and sell sea turtles. Sea turtles are reducing fast in number and on way to extinction and hence sea turtles are declared as protected animals.

লরী বোঝাই সামুদ্রিক কচ্ছপ আটক

কাঁথি ১৩ জানু, আজ রাত ৯টা নাগাদ কাঁথি ক্যালটাক্স মোড়ে রিক্সা শ্রমিকরা একটি ট্রাক অবরোধ করে। ট্রাকটির নম্বর প্লেট অস্পষ্ট করে রাখা হয়েছে। ট্রাক চালক গাড়িটি না থামিয়ে দ্রুত বেরিয়ে যাওয়ার চেষ্টা করে কিন্তু বহু মানুষ ও রিক্সা শ্রমিকরা তা হতে দেননি। চালক বশিষ্ঠমুনি কুণ্ডরকে কাঁথি থানায় হাজির করা হয় এবং ট্রাকটি থানার হেপাজতে রাখা হয়। ঐ ট্রাকে চালকের কথামত চুয়ান্নটির বেশী সামুদ্রিক কচ্ছপ আছে। পুলিশের কাছে স্বীকারোক্তিতে ট্রাক চালক বলে যে তেখালি গ্রামের মহিমপাত্র এবং বানেশ্বর নামে দুইজন দীঘায় ঐ সামুদ্রিক কচ্ছপ কিনে কোলকাতা নিয়ে যাচ্ছে। ট্রাক চালকের কথামত ট্রাকটির নম্বর হল ডব্লু, বি, ওয়াই ৩৭৭০। সামুদ্রিক কচ্ছপ ধরা এবং বিক্রী করা নিষিদ্ধ। এইধরণের কচ্ছপের সংখ্যা দ্রুত কমে গিয়ে ধ্বংস হতে চলেছে এবং এরফলে প্রাকৃতিক ভারসাম্য ক্ষতিগ্রস্ত হচ্ছে। সেই কারণে সামুদ্রিক কচ্ছপ এখন সংরক্ষিত প্রাণী।

Appendix II

'DAINIK TEERBHUMI' dated 14-1-1985

(Bengali daily published from Contai)

Illegal trade of sea turtles

Staff Reporter: Despite the legal protection given to sea turtles the sea turtle trade is still in existence. Policemen of Contai police station seized a lorry loaded with sea turtles on Sunday. 55 sea turtles were transported from Digha to Calcutta by a lorry No. 3770. The sea turtles are regularly caught and transported from Digha, Junput, Jaldha and Satbhaia to interior markets eventhough forest department has declared it illegal to capture and sell turtles. Forest department has established check posts to prevent illegal trade of turtles. Despite the steps taken by police and forest officials the illegal trade is carried out under cover.

মেদিনীপুর জেলার প্রথম ও বহুল প্রচারিত

দৈনিক তীরভূমি

১৩৯১ ॥ সোমবার ॥ ১৪ জানুয়ারী ১৯৮৫ মূল্য : ২০ পয়সা

বে-আইনী সামুদ্রিক কচ্ছপ পাচার হচ্ছে

স্টাফ রিপোর্টার : সামুদ্রিক কচ্ছপ ধরা আইনত নিষিদ্ধ হলেও তার ফলাও কারবার চলছে। রবিবার কাঁথি থানার পুলিশ সামুদ্রিক কচ্ছপ ভর্ত্তি একটি লরি আটক করে। এতে ৫৫টি বড় মাপের কচ্ছপ ছিল। ডবলু বি আই ৩৭৭০নং লরিতে করে ওই কচ্ছপগুলি দীঘা থেকে কলকাতা চালান দেওয়া হচ্ছিল পুলিশ লরিটির গতিরোধ এবং আটক করে। বন দপ্তর সামুদ্রিক কচ্ছপ ধরা বেআইনী করলেও দীঘা জুনপুট জলধা বাকশালে এবং বর্ডারের সাত ভায়া ত্রলাকায় প্রায় নিয়মিত এগুলি ধরে চালান দেওয়া হচ্ছে। যাতে কচ্ছপ ধরে চালান দিতে কেউ না পারে সেজন্য বন বিভাগ বনরক্ষীদের চেক পোষ্টে নজর দারীর ব্যবস্থা করে। তা সত্ত্বে বনরক্ষী ও পুলিশকে নাকি নজরানা দিয়ে চালানদার এক চক্র উচ্চ মূল্যে কচ্ছপ চালান দিয়ে চলেছে। কোন কোন ক্ষেত্রে পুলিশ ও বনরক্ষীদের চোখ এড়িয়ে এই কারবার চলে।

ছুটী

আজ সোমবার মকর সংক্রান্তি উপলক্ষে পত্রিকা দপ্তর ছুটী। মংগলবার পত্রিকা প্রকাশিত হবে না

Appendix III

'DAINIK CHETNA' dated 16-1-1985

(Bengali daily published from Contai)

Live sea turtles released into the sea

Dated 15th January, 1985

Yesterday the police produced the accused Basisthamuni Kunar driver of lorry No. WBY 3770 and the trader Mahim Patra of Tekhali village before the court on the charge of smuggling sea turtles. The Judge Alok Kumar Mukhopadhyaya ordered to release 29 live turtles into the sea. The seized lorry, its driver and Mahim Patra were released on bail.

29 turtles were released into the sea on the holy 'Makar Sankranti' day in the presence of many bathers Sri Devasis Majumdar, member of Wildlife Protection Society, Sri Birendranath Biswas, Circle Inspector, Contai police station were present at the time of release.

The driver went away with the lorry and 21 dead turtles. Turtle flesh was sold at the rate of Rs. 10 per kg and approximate value of those 21 turtles will be around rupees eight thousand. Police is not able to trace Baneswar who is being considered to be the leader of the illegal trade.

Since 1982 so far 253 sea turtles including the present consignment have been caught by police while being smuggled. This is the second time that the police released sea turtles into the sea. Police seized 39 and 90 sea turtles on 17th and 21st December, 1982 respectively and 71 sea turtles on 31st January, 1984 and 50 sea turtles this time. On one previous occasion dead sea turtles were sold by auction.

জীবন্ত সামুদ্রিক কচ্ছপ সমুদ্রে ছাড়া হ'ল

১৫ জানুয়ারী, বে-আইনীভাবে সামুদ্রিক কচ্ছপ চালান করার অভিযোগে রবিবার ধরা অভিযুক্ত ডব্লু বি আই ৩৭৭০ লরির চালক বশিষ্ঠমুনি কুণ্ডর এবং সামুদ্রিক কচ্ছপ পাচারকারী তেখালি গ্রামের মহিম পাত্রকে কাঁথির পুলিশ গতকাল আদালতে হাজির করে। বিচারপতি অলোককুমার মুখোপাধ্যায় ২৯টি জীবন্ত কচ্ছপকে সমুদ্রে ছেড়ে দেওয়ার আদেশ দেন। আটক লরি ও তার চালক এবং মহিম পাত্রকে জামিনে মুক্ত থাকার আদেশ হয়।

পুণ্য মকর সংক্রান্তির দিন বহু স্নানর্থীর সামনে ২৯টি কচ্ছপকে সমুদ্রে ছেড়ে দেওয়া হয়। বন্য প্রাণী সংরক্ষণ সমিতির সদস্য দেবাশিস মজুমদার, কাঁথি পুলিশের সার্কেল ইন্সপেক্টর বীরেন্দ্র নাথ বিশ্বাস এই সময় উপস্থিত ছিলেন।

মৃত ২১টি কচ্ছপ নিয়ে অভিযুক্ত লরি ও তার চালক চলেযায়। ঐ লরিতে পুলিশের দু'জন সশস্ত্র প্রহরী ছিল। ঐ কচ্ছপের মাংস দশটাকা কেজি দরে বিক্রী হয়ে থাকে। ২১টি মৃত কচ্ছপের আনুমানিক মূল্য প্রায় আট হাজার টাকা। পাচারের ব্যাপারে পালের গোদা বলে যাকে মনে করা হচ্ছে সেই বানেশ্বরের হদিশ পুলিশ এখনও পায়নি।

এবার নিয়ে ১৯৮২ সালের ডিসেম্বর মাস থেকে ২৫৩টি সামুদ্রিক কচ্ছপ চোরাই ভাবে পাচার করতে গিয়ে পুলিশের হাতে ধরা পড়ে। পুলিশ এবার নিয়ে দু'বার জীবন্ত কচ্ছপগুলি সমুদ্রে ছাড়লো। ১৯৮২ সালে ১৭ ডিসেম্বর ৩৯টি ২১ ডিসেম্বর ৯০টি, ১৯৮৪ সালে ৩১ জানুয়ারী ৭৪টি এবং এবার ৫০টি সামুদ্রিক কচ্ছপকে পাচারকারীদের কাছ থেকে পুলিশ আটক করলো। ইতিপূর্বে একবার মৃত কচ্ছপগুলিকে নীলামে বিক্রী করা হয়।