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SOME OBSERVATIONS ON THE BREEDING OF CROWNED PLOVERS (1977)

by Brian Ade

THE premise which precipitated this study was the observation in Wankie National Park of a pair of Crowned Plovers, *Stephanibyx coronatus*, and their offspring. It seemed that the one parent had custody of the one chick, while the other chick remained under the guardianship of the other parent. If this was the case, what were the factors governing such a situation, and to what extent, and by what arrangement were parental responsibilities divided?

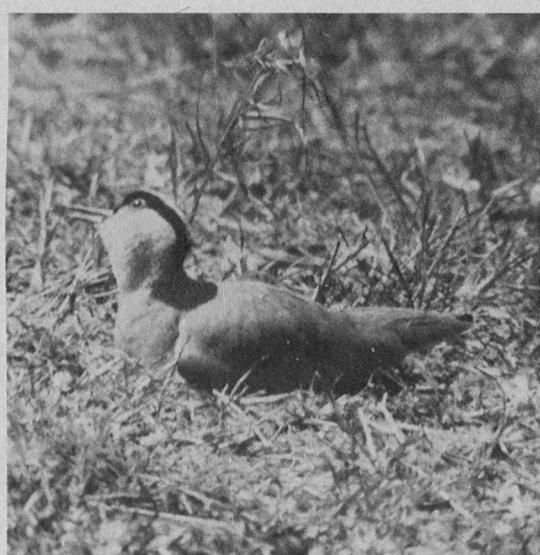
It is apparent that persons with an insatiable curiosity should not throw stones, for — the first ripple is far from the last. So it was in this instance: I learned a great deal more about the breeding of Crowned Plovers than I had first intended.

Just outside of Salisbury, there is an area of mixed savannah (predominantly acacia), where a local farmer grazes his cattle. Between 29th July 1977 and 19th November 1977 he burnt off three separate patches, in order to provide his beasts with fresh green grass. The sequence of these burnings created the prerequisites for the breeding of a large number of Plovers over an extended period, within a relatively confined space — approximately one kilometre square.

The first "nest" discovered on a fireguard at "A" (nests were labelled alphabetically in order of discovery for the sake of convenience during note-taking), as well as that subsequently discovered at "C" settled the question of parental responsibilities. Observations of the three chicks from scrape "A" on the evening of Monday 22nd August, within hours of their hatching, showed that when danger threatened there was a determined effort to split the family group. Whilst I was photographing the chicks from my car (which I always used as a hide) one of the parents approached and two of the chicks scrambled beneath her in response to a muted call. As the third chick approached this parent, it was dissuaded from taking shelter there by the more urgent call of the other parent, which was a further 7 m distant. The chick immediately changed direction but after experiencing some difficulty in negotiating the stubble-covered ground separating it from its proposed destination it returned to the first parent. It is assumed in this case, because of the extreme youth of the chicks, and their consequent difficulty with the terrain, their immediate concealment gained priority over the

necessity to divide the family. Although the chicks are somewhat languid in their movements on the day of their hatching, their gangling legs appearing disproportionate to their tiny bodies — by the second day they are able to move to places of refuge with amazing expedition.

Shortly after 12.40 pm on Tuesday 20th September, the Plover family from scrape "C" was studied for a while. These chicks, which were by now at least ten days old, wandered at random between their two parents, but when the one parent signalled the discovery of some food item, all three chicks rushed over to it. However, it was observed on many subsequent occasions, that whenever danger threatened, it only required an alarm call from either parent to cause a division of the family group: On Friday 14th October, shortly after 9.30 am, the parents and three chicks from "scrape" "E" were standing on the car-track close to their



Incubating bird at scrape "A" searches sky for airborne predators

favourite shade tree (the chicks were by now at least five days old). When I approached in my car, the one parent moved to the left of the track with two chicks while the other moved about 50 m to the right of the track with one chick, which escaped notice for some time because it was moving constantly in the shadow of its parent. The family group ultimately re-united some 75 m to the right of the track, when it seemed the danger was past; on Thursday 20th October, after 9.50 am, the three chicks from scrape "N", which were between two and three days old, were seen about a 125 m to the north-east of their "scrape." Two chicks were with one parent and the third was

midway between the two parents. When I approached in the car, the third chick, without hesitation, moved towards the unaccompanied parent, and the two groups moved well away from one another. There were many other instances noted of this deliberate family splitting, which would appear to be the safest way of ensuring that the entire clutch is not taken in "one fell swoop" by any predator — bird, beast or human.

In a total of 43 visits to this area, 25 scrapes were discovered and observed, and, in addition, two other Plover families (the one containing two chicks and the other three) were encountered subsequent to the chicks having



Aerial photograph showing locations of scrapes. Photo with permission of Surveyor General of Rhodesia.

hatched. Of the total, 16 scrapes each contained three eggs, eight each contained two eggs and one scrape contained a solitary egg. Incubation, in all but one case, was partially or wholly successful. It is unfortunate that the "unsuccessful" scrape was the only one that was observed in the process of being developed. Thus, the survey did not produce any records on the duration of incubation.

On Thursday 22nd September, shortly after 9 am, two Plovers were seen immediately to the west of the track approaching "scrape" "H". One was sitting and drawing material towards itself, but later rose. They then mated and moved to a position approximately 40 m due east, where at 9.45, what is presumed to have been the female bird, was seen 7 m east of the exit track. She kept sitting then rising then sitting, shuffling and pressing her breast close to the ground. When she shuffled she raised dust and on one occasion scraped away earth with each foot in turn before sitting down again. During this time the male stood close by. When I moved closer the female moved away from the spot, without exiting the car, I could see that, although she had created a hollow in the ground there was no egg there. When I returned to the same spot at 10.15 am the female rose from the scrape she had been preparing ("scrape" "K") to reveal a single egg. At this stage there was no aggregated material surrounding the egg. This only became apparent later on and increased in amount as time progressed. The second egg was seen on Saturday 24th September and the third, on Monday 26th September. The site had been visited on Friday September 23rd but not on Sunday 25th September. Later observations at scrape "X" showed that in some instances it took at least two days between the hatching of the first and the last of the three eggs. This would suggest the possibility that incubation is commenced immediately the first egg is laid (there was one other observed instance — scrape "Z" where all the chicks did not hatch on the same day).

On Sunday 9th October scrape "K" was found to be abandoned. Only two out of the three eggs remained and these were lying side by side, approximately six inches from the scrape. On 12th October, although the Plovers from this scrape were in the vicinity they were obviously not incubating the eggs, which were therefore collected. If a predator had taken the one egg, it is logical to assume that it would have taken all three. I can, therefore, only guess that a curious cow must have broken one egg and nosed the other two out of the scrape, in which event the Plovers must have removed the

shells of the broken egg, but been too disturbed to return and incubate the remaining two displaced eggs.

Some scrapes were deliberately sited close to the droppings of cattle, wild hares or duiker, all of which helped camouflage the eggs whose background colour was similar. However, all-round visibility, which would enable the sitting bird to detect an approaching predator well in advance of itself being spotted, was a far more important criterion. Thus, most scrapers were located on open flat ground within 10 to 25 m of a shade tree, which could be made use of during the hottest times of the day, by the bird which was acting as sentinel. On more than one occasion scrapes were located within 25 m of one another. The juxtaposition of scrapes "K", "L" and "M" was such that the brooding pairs were able to adopt a communal "early warning" system which foiled the secret approach of a potential predator to any one of the scrapes from any direction. It required the alarm call of only one sentinel for all three sitting birds hastily to evacuate their "scrapes". This happened not only on the numerous occasions that I approached in my car, but also when a Secretary bird, *Sagittarius serpentarius*, moved through the area in search of a meal.

Apart from the animal droppings already mentioned, aggregated material more commonly consisted of earth flakes or pellets and short pieces of grass, all of which matched the background colour of the eggs, as well as short pieces of stick and dry leaf fragments, which correspond to the colouring of the blotches and spots. It was general practice for the sitting bird to draw material in towards itself for the few minutes after it had arrived at the nest, while it was making itself comfortable and just prior to leaving the nest. Thus aggregate accumulated with the passage of time and was procured from the immediate vicinity of the eggs. At no stage was material seen to be "imported", but, at best, was flicked towards the egg with a sideways movement of the bill, from a distance of no more than nine inches. The amount of aggregated material varied from one scrape to another, as did the depth of scrapes. Scrape "J" contained the largest amount of aggregate and was almost level with the surrounding terrain. The three eggs, which were partially embedded, were extremely well camouflaged (in no instance were eggs covered). Scrape "H", on the other hand, was a pronounced bowl with very little aggregate, and scrape "S" was hollowed out of the top of a red anthill, which rose only very slightly above the level of the surrounding ground.

Eggs from different scrapes varied in size (as the table shows) and colour. Some had a dull stone background while others were more mustard coloured. Some were so heavily blotched, as at scrape "S", that the rounder end of the eggs was almost completely matt black. There was the rare case of a single almost white egg at scrape "F". This egg was much smaller than any other, and was very conspicuous, even at a distance. No more than 40 m from this scrape was another (scrape "E") containing three eggs, surrounded by whitened burnt cow dung, which showed up as something of a "landmark" amongst the black grass stubble. The powdered dung must have formed a very comfortable bed; I cannot think otherwise why the bird would have laid in so conspicuous a spot. The irony of the situation is that if the contents of these adjacent scrapes had been switched, each would have been perfectly camouflaged.



The solitary egg at scrape "F" — incredibly conspicuous.

As the Plovers generally waited at least a week after burning before preparing their scrapes, the ground had by this time been partially cleared of black dust by the wind. Thus the eggs, when laid were similar in colour to the khaki coloured clay soil while the pieces of burnt grass stubble matched the blotching. The cryptic colouring of the eggs thus made them very difficult to see as they lay hidden against the earth. The chicks were equally well camouflaged and it only took a warning note from one of the parents, for them to lie low with chins pressed to the ground. In this position, their colouring so resembled that of the eggs, that where scrapes contained both, one could scarcely tell them apart. When the chicks stand up, however, they reveal a white collar and it is



Scrape "B," showing Duiker or Hare droppings.

by this, I would suggest, that the parents are able to "keep tabs" on the whereabouts of the chicks when they are wandering about feeding (newly-hatched chicks made a soft cheeping sound, and three-quarters grown juveniles made sounds similar to their parents, but those of an intermediate stage seemed not to make any sound at all).

No eggshells were ever discovered, and it would appear that the parents either consume them or remove them from the scrape immediately the chick has hatched, thus eliminating the "telltale" whiteness of the inside of the shell which might lead a predator to the scene. It would appear that both eggs and chicks are completely without scent: a pointer dog was being "WALKED" in the area and passed very close to scrapes containing eggs, and chicks that had "ducked", without scenting them. It is only because eggs cannot be left unprotected against the heat of the midday sun for too long that I was ultimately able to discover the whereabouts of 25 different scrapes. Upon spotting a plover which appeared to be "on guard duty", I would approach it in my car. When it gave the alarm cry, the other bird would appear as "out of nowhere". It was then just a matter of sitting in the stationary car and waiting for one or other of the birds to return to the scrape. It is hopeless attempting to discover the whereabouts of scrapes in the early morning or evening, for during these times, when the temperatures are fairly moderate, both Plovers take the opportunity of feeding and exercising. Neither are windy days conducive to successful searchers, for then, one is easily deceived by

Plovers which are only sitting on the ground to take shelter from the wind.

As has been indicated the eggs do not require constant incubation. Apart from the times when they are completely unattended, there are occasions on which the sitting bird will move off the eggs and allow them to incubate in the sun, while guarding them from a short distance away. It was such a situation that caused me almost to run over the eggs at scrape "Z" while attempting to locate them. In the area where I suspected the scrape to be I saw a bird sitting on the ground (24th October, 10.55 am). As I drove towards it, it moved away to my left, so I drove to the left of where it had been sitting, but could see no eggs there. I drove on, turned around and waited in the shade of a tree. From this position I could observe the bird and the area from which it had risen. It soon returned to the area and sat down once more. Taking much careful note of the position, I drove towards it and when the bird rose, I discovered three eggs there. My tyre tracks showed, that on my first run in, I had straddled the scrape, missing the eggs by only half a metre with my right tyres. The bird had obviously originally been sitting about 3 m to the right of the scrape, allowing the eggs to incubate in the sun. On Wednesday 9th November when I visited this scrape at 11 am the bird was sitting on the eggs, and crouched low, but would not move off them despite the fact that I remained within 2 m of the scrape for approximately five seconds with the car's engine running. When I returned at 12.15 pm the bird was not sitting on, but close to the eggs. This scrape had been photographed on Sunday 30th October. During the time that the eggs were exposed to the sun (it was a hot day) they must have reached a fairly high temperature, for, when the bird returned to sit on them, it gave a distress call and rose from the eggs, thereafter crouching over them rather than sitting on them. It also ruffled its feathers and began to pant in an attempt to keep cool. All of these eggs hatched. In fact the only eggs that did not hatch, were those from scrape "K", two out of three from scrape "D" (later found to be addled), one out of two from scrape "S" and one (which was accidentally cracked during measuring) out of three at scrape "U". So out of a total of 65 eggs laid, 57 hatched and where eggs did not hatch it was not due to disturbance on my part (except for the one egg accidentally cracked).

Observation at scrape "A" between 8.14 am and 5.30 pm on Wednesday 17th August showed that the incubating pair changed over



Parent approaching two eggs and chick at scrape "X."

four times (10.12 am, 11.18 am, 12.37 pm and 3.20 pm). The incubating bird did not sit continuously but would occasionally move off the eggs to preen or feed for as long as 21 minutes before returning to the eggs. These intervals decreased in time towards the hottest part of the day, as did the time taken for a change over in incubating duties. The normal procedure in this instance, was for either the Sentinel or the sitting bird to give a soft single call ("kruit"). As the one bird moved towards the nest, the other would move away, passing one another at a distance of not less than 2 m from the eggs. Both birds adopted a head-held low posture, and moved slowly and cautiously while close to the eggs, whether approaching or departing. The approaching bird would often tilt its head before reaching the scrape to check the sky for airborne predators, as would a sitting bird, from time to time.

As the time for the eggs to hatch drew closer, the time spent away from the nest by a disturbed bird decreased and the birds became altogether more protective and at times quite aggressive. The only means of knowing that the hatching of the eggs was imminent, was discovered by chance at scrape "A1" on Thursday 27 October at 5 pm. While the two eggs were being held for measuring, there was a noticeable movement within. When next visited on Sunday 30th October, the scrape was empty but it is probable that the eggs had hatched on Friday.

The most aggressive birds were those at scrape "P". On 12th October when we went to measure the two eggs, the birds, apart from protesting loudly, performed the most fantastic

broken wing display yet seen, and also performed a mimic brooding posture — in an attempt to draw the intruder away from the locality of the scrape the bird pretended to be sitting on eggs at another position and thus, invited investigation. This performance was previously witnessed at scrape "A" on Wednesday 17th August at 11.10 am when a Kite (species unidentified) flew over, the sitting bird moved very quickly about a metre away from the nest while the sentinel which was standing about 20 m to the north of the scrape, immediately sat on the ground pretending that that was where the eggs were. Once the kite was out of sight, the incubating bird returned to sit on the eggs and the other rose from the ground.

Another form of distraction was encountered on the afternoon of Tuesday 6th September near scrape "A". The chicks from this scrape were nowhere to be seen, but there were six adult birds in the vicinity of the scrape. One pair staggered back and forth in a drunken manner, feigning injury or illness and sat on the ground from time to time. It is possible that the chicks from scrape "A" were in the area and this pair was attempting to draw attention away from them.

Although the aggressive pair from scrape "P" came very close to the car and to my assistant while she was measuring the eggs, they did not make contact with either. However, one of the pair at scrape "Z" actually pecked my assistant on the foot on Friday 18th November while she was crouched over the scrape, photographing the recently hatched chick. On this particular occasion the sitting bird had refused to leave the scrape until I drove the car right alongside it and opened the door over its head. This habit of "sitting tight" was characteristic of only this pair (the one bird more so than the other) and the pair disturbed at scrape "K". Because of this, as well as the proximity of the scrape "K" to scrape "Z" and the interval between the abandonment of the eggs at the one and the laying at the other, I am led to believe that this was one and the same pair of birds which had re-laid. On Thursday 17th November scrape "Z" was approached at about 9 am. When the car was approximately 3 m from the scrape, the sitting bird moved off, giving an alarm cry (there were two eggs and one chick in the scrape). Upon hearing the alarm cry, the other bird, which had been standing 30 m to the north-west, rushed to the rescue and sat over the chick and eggs, despite the proximity of the car.

In contrast to this pair, the pair at scrape "W" would run from the eggs before the



Two eggs and chick at scrape "Z," showing similarity in appearance — apart from chick's white collar and crown.

approaching car was within 45 m. This habit is probably attributable to the fact that a tractor and trailer frequently passed along the track which ran within 4 m of the scrape.

All pairs of birds, apart from that at scrape "K", stuck faithfully to their task of incubating their eggs and unless they were unduly disturbed during incubating or after the chicks hatched, the entire family would remain within the vicinity of the scrape until the immature had reached adult size. The only way of telling them apart at this stage, was by the fact that the immature birds had less pronounced crowns, paler bills and legs, and a slight barring across their backs. Their alarm cry was also less strident than that of the parents. When the young were able to fly, there was no noticeable division of the family group when approached. It was also noticeable, at this stage, that the eye of the parent had changed from a bright lemon-yellow to a brownish-orange.

Ringing or colour marking of birds would in many instances have helped to avoid confusion. It was discovered, however, that because of the disturbance it caused, it was not a profitable exercise. By the end of the afternoon on Monday 22nd August, all three chicks from scrape "A" had hatched. On Tuesday 23rd August at 5.35 pm, two of these chicks were seen with their parents approximately 100 m to the north of the scrape. It was intended that both should be colour marked, but when the chicks "ducked" after the parents had given the alarm cry, only one could be found. Part of its white collar was marked with magenta non-toxic dye and it was released where it had been picked up. This family was searched for but not

seen until Friday 2nd September, when one chick (not the colour marked one) was seen with six adults approximately 30 m to the west of scrape "A". This chick was caught at 12.25 pm and ringed with a red plastic ring and then returned to the position from which it was collected. Neither of these chicks attempted to



Freshly-hatched chick and older sibling at scrape "R."

flee when picked up, they made no sound nor attempted to escape from captivity, and when returned to their places of discovery, remained sitting, chins pressed to the ground until their parents returned and signalled for them to rise from the ground by giving a soft reassurance call. These marking exercises caused such trauma, however, that this family was not seen again until the morning of Friday 14th October, when the two parents and a sub-adult almost their size and with a red plastic ring on its leg, were seen 50 m to the north-east of where scrape "A" had been. By contrast the scrape "C" family, which had been disturbed as little as possible, remained within the vicinity of their scrape, where they were frequently seen, the last time being on the morning of Friday 14th October — all three chicks (which were only slightly smaller than their parents) had survived.

Where chicks did not survive to adulthood they could have been taken by any of a number of predators seen within the area. On the afternoon of 17th August when a Pied crow (*Corvus albus*) flew close to scrape "A" the sentinel attacked it. The crow evaded the attacks and was reluctant to leave the area, but when it flew over the scrape at a height of approximately 15 m, the bird which had been sitting joined in the attack and the two Plovers chased off this, plus three other crows which joined it. A Secretary bird was frequently seen on the second burnt patch especially in the

vicinity of scrapes "K", "L" and "M" where it was on one occasion furiously "dive-bombed" by the birds from scrape "M" after their chicks had hatched. One of the two chicks, seemed later, to have disappeared. Slender mongooses, were seen on all three burnt patches. On Monday 26th September, on the third burnt patch, two Plovers "dive-bombed" a slender mongoose, which took cover in an anthill. When the mongoose made a 60 m dash for another anthill, three Plovers attacked it, one almost striking it. On the other hand, on the evening of Thursday 27th October, a slender mongoose wandered amongst a group of Crowned guinea fowl (*Numida meleagris*) and four Crowned Plovers, but, despite the birds' loud protests and the fact that one Plover ran at it, the mongoose remained completely unperturbed.

At dusk on Thursday 6th October, a side striped jackal was seen foraging at the southern-end of the second burn with an adult Plover in close attendance (although the Plover did not actually attack it). On Thursday 20th October, the feathers of an adult or sub-adult Plover were discovered very close to this spot. It is probable that this was one of the progeny of scrape "G" and had been taken by a jackal, as only two of the original three remained hereafter. This family had earlier almost suffered a calamity when on the evening of 6th October, while the chicks were in the process of hatching, a grazing cow, which the Plovers failed to drive off, left its hoof mark in the scrape, right beside one chick and the other unhatched egg (the other chick having already left the scrape).

The one remaining question which I wished to settle was — what happened to the eggshells when the chicks hatched. It seemed there might be the opportunity of doing this at scrape "X" on Wednesday 2nd November. At about three o'clock in the afternoon, as I approached the scrape the sitting bird moved away but then rushed back to the scrape when I was within about 5 m. One of the three chicks had hatched and I hoped to witness the hatching of the others. The parent finally settled over the chick and two eggs. When the chick, which must have hatched earlier in the day, attempted to move away from her she called it back and it settled beneath her. However, when cloud shadow covered the area, the parent moved off the eggs and was followed by the chick. When the sun came out, she returned to the eggs and called the chick to her. However, on the second occasion that she left the eggs, the chick followed her and as she then seemed inclined to sit over the chick rather than return to the eggs,



Scrape "E" surrounded by white burnt cow dung (note disparity of one egg in tone and markings when compared with other two).

I left the area, hoping that with my disappearance she would return to incubate the remaining two eggs. The following morning when I visited this scrape, the one Plover was roaming about with one fairly active chick, while the other moved off the scrape to reveal that a second chick had just hatched. By the third day the scrape was empty and I presume that all three chicks had hatched, although I did not see them in the vicinity. So it seems, that when a clutch takes a couple of days to hatch, while one bird incubates, the other will "shepherd" the hatched chick or chicks, feeding together in the immediate vicinity. The parents probably exchange duties from time to time until the last chick has hatched and the family is able to move off together.

My mid-November, the green grass was well established on the burnt patches and after the second of the two chicks had hatched at scrape "R" on the 19th, there were no more scrapes left to watch and it seemed that conditions now precluded the development of any new scrapes. So after an interesting study, I left the Plovers in peace, having gained much useful information. One of the questions I have yet to answer is what happens to the eggshells immediately the chicks have hatched?

My thanks are due to Ingrid Weiersbye for many hours of assistance and to the Surveyor General's Department for allowing me to use their aerial photograph.

Egg measurements at various scrapes

H	S
38,52 × 29,41	38,00 × 26,43
37,65 × 29,10	other already hatched
38,85 × 29,37	
J	T
38,42 × 27,85	40,54 × 28,46
36,17 × 27,95	41,48 × 28,33
37,24 × 28,34	41,55 × 28,20
K	U
38,53 × 27,35	37,35 × 27,84
39,65 × 28,25	40,00 × 27,05
N	V
36,85 × 28,52	39,19 × 26,45
38,76 × 29,97	38,10 × 29,27
39,06 × 28,25	37,86 × 29,40
M	W
35,16 × 26,56	41,23 × 28,21
37,74 × 26,80	40,00 × 28,26
R	Z
40,44 × 28,10	40,04 × 26,90
39,05 × 27,24	
A1	
	38,25 × 27,68
	38,49 × 27,99
	A1
	38,90 × 27,74
	39,09 × 28,84
	38,86 × 28,40

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