Summary

On the start of primary-moult in Gulls and its release

The Gulls do not belong to the category of birds which have developed a firm relation between cycle of reproduction and beginning of moult. Just as in the Pigeons (*Columbae*) the ten primaries are renewed at fairly long intervals (INGOLFSSON 1970, tab. 2). Consequently, no stage of their moult interferes with flight, not even if reproduction coincides from beginning to end with the moult cycle.

The seasonal start of primary moult rather depends on an inherited „time-program", frequently modified by a variety of proximate factors, which bring about an adaptation to the given internal or external situation. Only after considerable increase of our knowledge and understanding may this vague allusion be replaced by some definite statements.

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Clever gulls and dumb ethologists — or: The trackers tracked

By Niko Tinbergen, University of Oxford

Two years ago the Herring Gulls of the large, mixed *argentatus-fuscus* colony on Walney Island near Barrow-in-Furness, North-Lancashire, taught us a sharp lesson by proving themselves to be far better observers than we were, and we were forced to admit once more how dead right GOETHE (WOLFGANG VON) was when he said (in „Xenien"): Was ist das Schwerste von allem? Was dir das Leichteste dünket, mit den Augen zu sehn, was vor den Augen dir liegt.

As our good friend, and much admired fellow-Larologist GOETHE (FRIEDRICH) knows of course as well as we, Herring Gulls often eat crabs. And we were therefore not really astonished to find, already years ago, that the nests of some of the thousands of Herring Gulls breeding here were surrounded, in April and May, by dozens of crab carapaces, even though the species, *Cancer pagurus*, seemed to be rather unusual. Many were also of a surprisingly large size, measuring up to some 16 cm across. Knowing that the gulls habitually follow fishing boats, and pick up what returning fishermen contemptuously throw overboard, we rashly concluded that such „crab specialists" must have the habit of picking up these sub-adult *Cancer* as they were discarded by the coastal fishing boats of nearby Fleetwood, some 10 km away as the gull flies. Being usually occupied in the gulleries on the sand dunes, we had rarely made a thorough study of the gulls' feeding habits. That is now being remedied by one of my research graduates, LARY SHAFFER of Plattsburgh, New York State, and while it would be improper for me to relate his extremely interesting findings, I can report on the initial chance discovery that made us look into this whole issue more closely, and, as a consequence, made us regard the gulls with more respect than before.

Amusingly, and as I already indicated embarassingly (for people calling themselves ethologists) it was a non-professional, namely my wife, who made the discovery

Fig. 1: Crab carapaces surrounding the nest of a Herring Gull (*Larus argentatus*). Walney Island, May 1970.
Abb. 1: Das Nest eines „Krabbenspezialisten" (Silbermöwe). Walney Island, Mai 1970.

that started it all, and who also insisted that we follow up what later turned out to be a fascinating, and in parts still puzzling story.

Being barred (as often happens to wives when the superior sex does not need them as assistants) from straying through our observation areas in the gulleries proper — scanned at all times of the day by hide-bound observers — she often went on

leisurery beachcombing walks on the low-tide seashore, feasting her eyes on the ever changing patterns of sand, water, and skies, and (having acquired her husband's taste for looking at animal tracks) on the numerous signs of animal activity engraved in the sand.

Time after time she came home with reports on gull tracks surrounded by demolished remains of large *Cancer*, and she urged us to now and then forget our hides for a while and join her on one of her beach walks. And how right she turned out to be!

On our very first walk we found the tracks she had been telling us about. Yes, there were the *Cancer* remains. At first glance they looked like any other sign of crab predation: legs, claws and carapaces scattered round patches of gull prints. But what did distinguish them from similar remains of Shore Crabs (*Carcinus maenas*) or Spider Crabs (*Hyas araneus*) was the presence, never far from the *Cancer* remains, of a deep hole in the sand, from which it seemed that the gulls must have extracted the crab. That made us wonder — what on earth were Edible Crabs doing here, dug in on the bare, sterile and exposed sandy shore, literally "sitting targets" for the keen-eyed gulls? W e r e the holes really revealing the places where the crabs had been hiding, or had they perhaps been made by the gulls' bills when they hammered them to pieces? We had never watched closely enough the few Herring Gulls who — always at a safe distance from us —, could daily be seen to patrol the water line as it receded, when the tide was falling. But this „hammering" idea did not tally with the fact that the carapaces of the crabs, while expertly cleaned out, were never broken; even those found round the gulls' nests, half a kilometre or more away, were beautifully intact, and neither claws nor legs had been opened up; the gulls always simply discarded them.

One day LARY and I, always intent on building up our collection of photographs of animal tracks, were taking some careful shots of these remarkable signs of the gulls' feeding habits, and my wife simply had to wait. So she walked round, patiently looking for more signs in the sand. She saw what she thought was a flat pebble buried under the sand and — feeling slightly silly — bent down to dig it up and throw it out over the calm sea, so as to make it skid over the surface. The reason she felt silly was that she knew very well that she was not exactly an expert at this game. However, scraping away the thin layer of sand, she actually felt the stone. But when she dug under it in order to get it out, she had the surprise of her life: the stone had sharp, and slowly moving legs! She had found what we soon began to call a „crab dome", and so confirmed that at least one Edible Crab did live buried on the low tide beach.

By now our interest was of course thoroughly aroused. Judging by the number of crab remains left by the gulls at each low tide, there must be quite a few crabs concealed on the beach, and the gulls found many of them. Why had w e failed to spot such crabs?

Not to be outdone by the gulls, we set out to search for more crab domes. But although we found numerous signs of gull meals, it took us quite a while before we found what the gulls had obviously known all along. The breakthrough for us came when my wife (to our eternal shame not LARY or I) said: „Perhaps we miss the domes because we are looking down onto the sand from above — and those gulls don't fly; they just walk along the edge of the water." So down on all fours we went, crawling along the water line, now on dry sand, now washed over by the waves, and occasionally stopping to bring our eyes down to „gull level" and scanning the wet sand ahead. It did not look dignified, but it had to be done. And then it was unfair that it happened to be me who, after some fifteen minutes, saw, in the shiny wet sand left exposed by a receding wave, a very slight bulge, protruding no more than

one cm above the surface. And true enough, there, under the bulge, was a *Cancer*, quietly tucked away a few cm under the surface.

Once we knew what to look for, we soon found more crab domes, and we felt that we were no longer less observant than the gulls – like one of Wodehouse's characters we felt like walking up to them and whispering into their ears „we know your secret!". We soon found that, particularly in April and May, each tide left scores of *Cancer* crabs sitting out the low tide under such domes.

The form of the domes varied considerably, from barely perceptible, flat bulges, with the crab some 3–5 cm under the surface, to very clearly outlined ones. Their shape was always roughly elliptical; sometimes the outlines of the crab's claws could be seen as appendages to the dome proper, and often a crab had lifted its front, leaving a crack in front – perhaps to get air. We also found some crabs – presumably those that had started digging-in too late, or in too hard sand – whose carapaces showed: oval patches of the well known purplish-brown *Cancer* colour, visible from quite a distance. On quite a few occasions such crabs even had had second thoughts and had left their unsafe burrows to crawl over the sand to a wetter place, where digging was easier for them; some of them succeeded in reaching a safer hiding place, but they took a considerable risk by exposing themselves to sight while they were crawling about.

Soon we knew that this inshore migration of *Cancer* happened on a considerable scale; in the course of two seasons LARY SHAFFER found, on a stretch of shore of less than 10 km, some 10000 crabs and carapaces eaten by the gulls. In view of this we could not believe that the phenomenon would be confined to the beach of South Walney, and so we decided to check up on a beach a few km north of our base, and on the beach of the Ravenglass peninsula, some 25 km North of Walney, where we had spent many years and made numerous beachcombing trips, always on the look-out for tracks and signs. To our delight and, once more, embarassment, we found that crab domes were present on both beaches, and that gulls were preying on them there too, though on those other beaches, out of reach of large gulleries, it was the occasional Greater Blackback (*Larus marinus*) that hunted for them (and did so in a slightly different way, often cracking the carapaces with its strong bill).

Naturally we were not only interested in finding out how the gulls managed to recognise crab domes and to find crabs in such large numbers, but also in the behaviour of the crabs themselves: how did this obviously risky upshore migration fit into the life history of this marine animal, normally living at quite a considerable depth? And why did our crabs range from some 50–160 mm carapace width, which is smaller than that of fully mature *Cancer*? To our surprise we found, through correspondence with marine biologists, among them crab specialists, that the habit is completely unknown. We have not found the explanation yet, but SHAFFER is busy finding out, and he has some quite plausible ideas, but we will leave it to him to report when he has tested them.

Nor can I say more about the Herring Gulls than what little my wife and I found out before SHAFFER took over. We know that among the thousands of Herring Gulls breeding in this colony no more than a few dozen of animals go in for *Cancer* on this scale. And we know – very gratifying to us, dedicated track readers – that the gulls are themselves expert „sign readers" H o w they learn to recognise even very slight domes which cover a crab completely, and do not leave a single part of them exposed to view, we do not know, but t h a t they respond to the sand bulges themselves is now certain. It so happens that our beach consists only in part of sand, and in part of large fields of pebbles and boulders, up to some 50 cm in diameter. Where these boulder-and-pebble fields are covered by a layer of sand, a large volume of air is sucked down into them each time the tide goes down. Most of this air

Fig. 2: A particularly clear „crab dome" pecked at but not dug up by a gull. Walney Island, May 1970.

Abb. 2: Eine besonders deutliche „Krabbenkuppel", von einer Möwe angepickt, jedoch nicht aufgegraben. Walney Island, Mai 1970.

escapes again when the waves surge in again (making the water of the first waves „boil" as they roll in) but some air pockets remain trapped throughout high tide, and do not begin to make their way back to the surface until the tide recedes again. On some stretches of the shore dozens of such air bubbles just fail to break through when the tide falls, and get stuck just below the surface. Such trapped air bubbles push up the sand a little, and so create bulges which, to us, can look deceptively like crab domes, and we have often dug them up, only to find nothing but such a "pocket" of air. By following the tracks of gulls that patrol these areas we found that some of them fall into the same trap, and peck at the „air-domes" — so conducting natural „dummy tests" which allowed us to conclude that those gulls must have been responding to the domes.

This of course made us realise that here was a beautiful opportunity for analysing the powers of shape discrimination of birds under natural conditions. Consequently, SHAFFER has started a series of experiments. At falling tide he lays out numerous dummy domes of a great variety of shapes. He then swims or wades out to a raft, which is anchored off the coast in the intertidal zone, bobbing about on the waves when the tide is in, and getting stranded just about in the „crab zone" when the tide runs out. On the raft is a hide, from which he can, once he is on firm ground and his seasickness has been forgotten, observe and even film the gulls at work. Just before the tide comes in, he takes down the hide, abandons his raft, and then quickly checks up on his rows of dummy domes, recording the numbers of pecks each has received. The results obtained so far are most interesting, but again I must not steal SHAFFER's thunder; he will publish his results in due course, and will also release his fascinating film that ist approaching completion.

While this work is being further developed, we are naturally anxious to know whether *Cancer pagurus* has a similar habit in other parts of its range, and if so, whether gulls do prey on them as they do here. I end this little story therefore with an appeal, and a challenge: could fellow-beachcombers and fellow-Larologists please have another good look at the sandy parts of the German North Sea coast? Since we ourselves have obviously overlooked the crab domes for years and years, we feel that it is quite possible that our colleagues have likewise failed to spot this fascinating phenomenon — failed to see „was vor den Augen ihnen lag" I have written round to my Dutch colleagues as well, but so far nobody has reported anything about crab domes along the Dutch North Sea coast. It seems quite possible that the North Sea is simply too cold for *Cancer* to lave the deeper waters which are their optimal habitat — *Cancer* (so my friend Dr. JAN VERWEY tells me) is quite sensitive to low temperatures. But if anyone were to spot *Cancer* domes, and/or *Cancer* eaten by the large gulls, we would by very grateful for information, including measurements of the width of the crab carapaces, and the species of gulls involved; any such information will of course be duly acknowledged. While under the circumstances it will be very difficult to be certain that negative information would really mean that the North Sea *Cancer* does n o t migrate upshore, it is true that the Irish Sea is much warmer than even the Southern North Sea, and that we may therefore well have to do with regional differences — which in itself would raise a number of interesting questions about possible differences between populations, and about the reasons for such differences.

Walney Island, March 1971.

Z u s a m m e n f a s s u n g : Dieser kleine Beitrag beschreibt das bisher anscheinend unbekannte Verhalten halbwüchsiger Nordseekrabben (*Cancer pagurus*), die sich an der Westküste Nord-Englands jedes Frühjahr massenhaft in der Gezeitenzone des Sandstrandes eingraben und unter einer nur wenige Zentimeter dicken Sandschicht bewegungslos verharren, bis sie wieder von der Flut überspült werden. Man kann die „Verstecke" als (oft

kaum sichtbare) Sandkuppeln erkennen. Das tun auch einige Dutzend der Tausende örtlich brütender Silbermöwen (*Larus argentatus*), und einfache Attrappenversuche (noch im Gange) haben schon ergeben, daß die Möwen dazu die Krabben selbst nicht zu sehen brauchen, denn sie picken auch „natürliche Attrappen" an, unter denen sich nur Lufträume und keine Krabben befinden. Deutsche Kollegen, „Strandläufer" wie „Larologen", werden gebeten, zu prüfen, ob Nordseekrabben sich an der deutschen Nordseeküste, vielleicht stellenweise, ähnlich benehmen, und wenn ja, ob deutsche Möwen sie ebenfalls auffinden und fressen.

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Nahrungsökologische Untersuchungen an Frühjahrsdurchzüglern der Amsel *(Turdus merula)* auf der Insel Helgoland

Von Gottfried Vauk und Eva Wittig

1. Einleitung

Über die Nahrung der Amsel finden sich in der Literatur meist nur allgemein gehaltene Angaben ohne Berücksichtigung der jeweils gegebenen ökologischen Bedingungen (vgl. HEYDER 1953). So besteht nach KLEINSCHMIDT (1951) die Nahrung deutscher Amseln aus Insekten, Würmern und Obst. NIETHAMMER (1937) nennt als bevorzugte Nahrung Regenwürmer und Gehäuseschnecken. Nach THIELCKE (1963) schlagen Amseln Gehäuseschnecken auf und verzehren dann den weichen Körper, wobei es sich nicht, wie bei der Singdrossel (*Turdus philomelos*) um eine angeborene Verhaltensweise, sondern um eine erlernte Verhaltensform handeln soll. LIEBE (1893) ist der Meinung, daß die Nahrung der Amsel im wesentlichen der anderer Drosselarten gleicht, die alle relativ wenig spezialisiert seien und die verschiedensten Dinge fräßen wie „Beeren und Früchte, Kot anderer Vögel, Würmer, Schnecken und Kerbtiere und das Aas letztgenannter Tiere, sie verzehren mit Behagen schon in Verwesung übergegangene Engerlinge und dergleichen. Sie nehmen durch das Futter der Futterplätze keine andere Lebensweise an als die, welche sie schon haben." Vom ausgestreuten Vogelfutter sollen sie besonders die ölhaltigen Samen bevorzugen. Selbst bei reichlich vorhandener Insektennahrung sollen sie dennoch Beeren und Sämereien aufnehmen, deren Reste ausgewürgt werden. REH (1931) behauptet sogar, daß die Nahrung der Amsel bis zu 70% aus Obst aller Art bestehe, vor allem aus Wildbeeren, wie Vogelbeeren, Beeren von Faulbaum, Stechpalme, Eibe, Wacholder, Efeu, Rose, Tollkirsche, Maulbeerbaum, Mistel, sowie Tomaten und Kohl, die angehackt werden. Diese Beobachtungen aus dem Herbst dürfen aber sicher nicht verallgemeinert werden.

Ziel unserer Untersuchungen ist es, die Zusammensetzung der Nahrung im Frühjahr auf Helgoland rastender Amseln durch systematische Magenanalysen zu ermitteln, was im Hinblick auf die ökologische Sonderstellung dieser Insel von besonderem Interesse sein dürfte. Damit soll gleichzeitig versucht werden, möglicherweise einen Beitrag zur Fauna Helgolands zu liefern.