NATURE WATCH

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Featuring:

Little Tern Nesting in Singapore
Horseshoe Crabs
The Little Boy & the Moose
A Day's Worth of Butterflies
Remembering Sian

NATURE SOCIETY
(SINGAPORE)
MICA (P) 225/07/2009

Message from Editor

We have been hard at work at *Nature Watch* since the last volume, Vol. 16 No 4, came out in August 2009. Luckily our appeal to members and supporters for interesting articles bore some fruit. That fascinating story about horseshoe crabs in Singapore just came in, and I urge all readers to read it from beginning to end, it is so well written and informative and thought provoking. Please keep stories of that quality coming ....

Jonathan and Ashley have compiled a detailed study of the Little Tern's nesting habits in Singapore, one of only two species from the *Sternidae* family to call Singapore home. While nesting photography can be somewhat controversial, I felt it was important to publish these stunning and informative photographs in this case. However, now that the facts are out, I hope we can agree that we don't all need to photograph exactly the same motifs. There is lots of nature photography that needs to be done here, which does not involve repeating work already done by others and/or disturbing nesting birds. When you have an interesting new study and a new photo feature ready, please show it to us at *Nature Watch* first!

The Editor and the Little Boy.

While she was in charge, Faizah Jamal urged me to write a piece about our trip to northern Alaska last year. So, although I am now the editor, I decided to go ahead and publish the story I had already submitted, I hope the readers will enjoy it.

Simon and Gan prove that it is not only the birdwatching community that can have races for most species seen in a day. They were so helpful that they took their overseas friend and fellow butterfly enthusiast out to spot 84 butterfly species in one day; a remarkable achievement, a great gesture of friendship and a good story came out of it.

On a sad note, Goh Yue Yun recalls the last year of Ong Kiem Sian's life; even then she manages to turn a distressing event into a heart-warming and positive account.

Please keep in mind, that although the printed date of this issue is Jan-Mar 2009, we cannot pretend to live in the past, so all information throughout this magazine has been updated to current date.

Morten Strange
Editor-in-chief
August 2009

Share with us

Your stories, articles, surveys, observations and brilliant photographs and send them to the address on page 1. If you are not sure, please send an e-mail to contact@nss.org.sg with a proposal and we will get back to you. Articles can be e-mailed across as a simple Word document (no funny fonts or colours or inserts, please) or saved on a CD and mailed with the illustrations as separate high res. files. Digital pictures must be in 300 dpi, absolutely sharp and as large as possible, jpeg compression is OK. Do NOT crop, brighten or sharpen, we will do all that as necessary. Thank you very much.

Contents

Volume 17 No 1, Jan - Mar 2009

ON THE COVER A Little Tern *Sterna albifrons* feeds its almost mature chick near the breeding grounds at Kranji Reservoir.

NATURE WATCH

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Saving Horseshoe Crabs in Singapore

Text and Photos by **Lesley Cartwright-Taylor**

We are very lucky to have living along our shores a population of horseshoe crabs, an invertebrate that has hardly changed or evolved over several hundred million years, since the age of the dinosaurs. Horseshoe crabs are in a class of their own, Merostoma, because they are not closely related to anything. They are not even crabs but are grouped in the same subphylum as scorpions and spiders, their nearest relations, and they really don't look much like those either. They have survived several natural mass extinctions that changed the flora and fauna of the world, but they are now on the decline because of human activity. However, volunteers of the NSS have been doing their bit to save these quaint creatures from dying a nasty death.

It all started a few years ago when bird watchers up at the Mandai mud flats at Kranji spotted horseshoe crabs trapped and tangled up in old, abandoned fishing nets. They contacted the NSS to alert them to the plight of these creatures. Every two to three months since then, a group of volunteers would visit the mud flats at the low spring tide to search out any abandoned or deployed nets, cut free the horseshoe crabs trapped in them, and release them back into the sea. This was the beginning of the Horseshoe Crabs Rescue Programme that still continues.

Fishing in the Strait of Johor is illegal, but there are some local fishermen who set out nets to catch fish for their own consumption. This fishing is not on a grand scale and probably has little effect on the fish population, but the nets often become damaged or break loose from their moorings during storms and are washed up on the mud flats. Some of the nets are still deployed, but the effect of all of them is to entangle the horseshoe crabs such that they cannot free themselves. Some of the nets are made of heavy rope while others are made of fine nylon which forms large tangles with a huge bundle of trapped crabs. The nylon becomes entwined among the legs of the animals so they cannot move or feed properly.

Once entangled in the nets the horseshoe crabs are exposed twice a day as the tide goes down. According to some studies on the American species, horseshoe crabs suffer from stress when taken out of water. Exposure has been found to lead to hypoxia with a concomitant drop in heart rate and blood pressure (deFur and Mangum, 1979; Redmond et al, 1982) We don't know how long the horseshoe crabs at Kranji may be entrapped, but they are surprisingly robust and seem to survive exposure for some time. However, they cannot feed properly, and they certainly cannot ever free themselves. So ultimately they are doomed.

Although the numbers rescued in some months are small, at other times we have rescued many horseshoe crabs from the nets. There is no discernable pattern in the numbers rescued, but the largest numbers have been in June for the past two years, with 264 in June 2008 rescued, and this year in June 440 were rescued from three different nets. About five were already dead but the rest were still alive. Almost all those rescued are adults, only three juveniles have been caught in the nets. Presumably the small ones can slip through the nets, while the adults cannot.

Photo Dr. Annie Christianus

Facing page, above: An adult horseshoe crabs showing its horseshoe and helmet shape and the two eyes along the ridges on the back.
Below: A juvenile horseshoe crab with a small red patch of marker.

There is also a large imbalance of males and females found trapped in the nets, with two to three times more males, probably because one trapped female attracts other males.

Entrapment in the nets is unlikely to affect the total numbers just now because the site supports a large and thriving population, but if numbers should decline the entrapment may become more critical. Nevertheless it is very satisfying to be able to save the trapped individuals and return them to freedom.

This rescue mission led to some data collection on the sizes and gender of the horseshoe crabs found on the mudflats, and this in turn led to a more scientifically designed project to learn more about these creatures on our shores. This became the Horseshoe Crab Project and together we call them the Horseshoe Crab Research and Rescue (R&R).

Structure of Horseshoe Crabs

Generally known for their blue blood which has found important medical uses, horseshoe crabs have other interesting aspects to their biology. Of all four species, the mangrove horseshoe crab is the smallest, the largest individual being about 15 cm across the width, compared with about 25 to 35 cm in the other species. Once you have seen a horseshoe crab, it cannot be mistaken for anything else, although someone seeing one for the first time did wonder if it was a stingray.

They are known in Malaysia as king crabs and in other parts of the world as helmet crabs. The forward section, or prosoma, is the fused head and thorax and is rounded at the front end, shaped like a horseshoe or a helmet, hence the names.

It as two compound eyes along ridges on the back other simple eyes which are not visible to the naked eye are located along the front while other sensory organs are along the sides.

The rear section is the abdomen and has movable spines along the sides. The male clasps on to these on the female during coupling, and often the pair stays together for a long time. They have a long rigid and pointed tail, known as a telson, which is not a weapon, but is used as a rudder when swimming and to right itself if it is turned on its back. On the underside horseshoe crabs have five pairs of walking legs and two pairs of appendages that are used to shovel food into the mouth. They feed on small worms, shrimps and other mud dwelling creatures. They have no pincers, are not poisonous, and they don't sting, bite or attack. In fact they are totally harmless, which is part of their charm. They have managed to survive hundreds of millions of years without resorting to violence.

In Singapore, both the mangrove and coastal horseshoe crabs were once common around the shores of the main and offshore islands, but land reclamation has taken its toll, and habitat loss has meant that the coastal species is probably no longer present as a breeding population, and the mangrove species is restricted to the few remaining mangrove areas.

Under the abdomen they have flaps known as gill books which are for respiration, and their flapping action also helps propel them fast through the water. When we see the horseshoe crabs at low tide they are quiet on the surface of the mud or buried into the top few centimetres, and they seem slow moving and sedentary creatures, but this is misleading. Once in water they can swim fast. Their movement in water can be seen at the Fragile Forest exhibit at the Singapore Zoo. Unfortunately the sea at Kranji is too murky to see these creatures under water.

Like many other invertebrates, they have a hard exoskeleton, or carapace, which is their protection. They grow by splitting it open along the front edge, whereupon the new crab crawls out of the old carapace. The emergent animal takes in water and stretches until it is about 30% larger than the old shell.

When they are newly emerged the carapace is still soft, rather like leather, and at this time they are vulnerable to predation. The shell takes a few hours to harden. Young juveniles grow by moulting, but adults, once mature, seem to moult infrequently, possibly only once or twice in their adult life time, which may be as long as twenty years.

A pair of mangrove horseshoe crabs.

A young horseshoe crab at the end stage of moulting. The new soft crab crawls out and away from the old carapace.

Some adults carry a large population of other marine creatures that hitch a ride on their backs, indicating that they have not moulted in a long time. However, we have seen large adults with a very clean carapace, which suggests that even as adults they moult once in a while. Perhaps when their hitch-hikers become too much to bear the adults will shed them and start afresh.

Life Cycle

Horseshoe crabs have a tremendous following in America and the American horseshoe crab, *Limulus polyphemus*, has been well studied. Its seasonal mass spawning in the spring along the beaches of the east coast is a much-publicised phenomenon and a major tourist attraction. The spawning activity draws a huge number of shorebirds that feed on the eggs and the young. By contrast, much less is known about the species that occur in Singapore, the mangrove horseshoe crab and the coastal horseshoe crab. Local opinion is that they breed year round, and, certainly, we don't see the seasonal mass migration up the beach and spawning that occurs in USA. Instead individual females come up on the beach to the high tide zone, particularly during spring and neap tide periods, with a male attached. She digs a hole about 9" to 12" deep in the mud or sand where she lays her eggs. The male fertilises the eggs externally, and the female then buries them. The eggs of both the mangrove and coastal horseshoe crabs hatch after about 40 days and the tiny trilobite larvae emerge. In other species these are pale green, but in the mangrove horseshoe crabs these are reddish brown. They stay in the nest until another high tide swamps them and they can swim away and feed.

The mangrove horseshoe crabs are only about 2 to 3 mm when they hatch, then they go through four to five moults over a period of approximately five to six months to become a juvenile of 1 cm (Zadeh et al, 2009). The coastal horseshoe crab is about twice the size of the mangrove horseshoe crabs at all stages and takes longer at each moult. These are figures from laboratory-reared animals as there are no equivalent measurements from wild ones. At the Kranji site, we have seen tiny juveniles and moults of just less than 1 cm in width. The juveniles continue to moult, growing about 30 to 35 % each time, until they reach maturity at about 8 cm for males and 10 cm for females. The time between moults is not known, but we have recaptured marked juveniles after two months that still had the original mark on them. So it may take a couple of years or more to grow to maturity. The three larger species are thought to take much longer to mature (Carmichael et al, 2003).

Fun with Kids day — teaching the young and old about the horseshoe crabs.

For the past two years, NSS volunteers together with students and school children have been conducting an ongoing research project to monitor the population density and learn more about the breeding patterns and life cycle of the horseshoe crabs at Kranji to fill in the gaps in our knowledge about these creatures. Teaching and involving the public in our project has been an important part of the work, and we could not possibly have achieved so much without their contribution. We hope that with knowledge about these creatures they will become horseshoe crab devotees and part of the conservation mission.

Global Distribution

There are still four species of horseshoe crabs in the world, one, *Limulus polyphemus*, lives off the east coast of USA from Maine down to the Gulf of Mexico, and the other three species live in Asia with overlapping ranges. *Tachypleus tridentatus*, the Asian horseshoe crab, is mostly found in higher latitudes off Japan, Hong Kong. The Philippines and Thailand, while *Tridentatus gigas*, the coastal horseshoe crab and *Carcinosorpius rotundicauda*, the mangrove horseshoe crab, are found off Malaysia, Singapore, Indonesia, Borneo, and the east coast of India.

Abundance

All three South-east Asian horseshoe crabs are in decline, both locally and regionally. There are no reliable figures on abundance of either the coastal or mangrove horseshoe crab in the whole region.

In Singapore, both the mangrove and coastal horseshoe crabs were once common around the shores of the main and offshore islands, but land reclamation has taken its toll, and habitat loss has meant that the coastal species is probably no longer present as a breeding population, and the mangrove species is restricted to the few remaining mangrove areas. The larger coastal horseshoe crab used to inhabit sandy shores, and prefers sandy beaches for egg-laying, but most of the remaining sandy beaches around Singapore are now man-made and too deeply shelving for the coastal horseshoe crab. This species has all but disappeared from our shores, and is probably restricted to just one or two

sites at offshore islands or it lives in deeper waters. Occasionally adults are seen on a beach at low tide, but such sightings are sporadic and uncommon.

It seems horseshoe crabs are not eaten in Singapore. Mangrove horseshoe crabs are thought to be poisonous, but the larger species are still eaten in other countries of the region regardless of their endangered status. Fishermen here do see them or catch them in their nets as by-catch once in a while, and usually throw them back into the sea. These same fishermen talk of the numbers they used to see when they were children but these numbers are no more. Indeed abundance and distribution are now unknown, and the coastal species is classified in the recently published Singapore Red Data book (Davidson et al, 2008) as endangered, based primarily on loss of habitat but also from very few sightings.

The mangrove horseshoe crab can still be found in the few remaining mangrove areas, but it, too, is losing its living space. Mangrove forest is now only 0.5% of Singapore's total land area, down from 13% in the 1820s (Ng and Sivasothi, 2002a) and with it many of the mangrove species, including the mangrove horseshoe crab, are now in decline. Some researchers at the University Putra Malaysia have just lost to land reclamation one of the breeding grounds of the mangrove horseshoe crabs along the Johor coast, that was an area of study for them. They returned to the site after some months and it was no more. It was new land. This species is listed as vulnerable in the Singapore Red Data book of 2008, and protection of all horseshoe crabs is now an urgent matter for the whole region.

In March 2009, the NSS volunteers conducted a survey of likely and accessible sites to determine where horseshoe crabs could still be found around Singapore's main island. The findings were published in Nature News (May-June, 2009). The coastal horseshoe crab is restricted to the north-eastern shore. Only at Changi Point were any of this species found and you could count them on the fingers of one hand. It is to be hoped that this species may still be living in seclusion off the offshore islands that have not had much coastal interference.

Mangrove horseshoe crabs can be found around the north-west of Singapore. A few mangrove horseshoe crabs were also seen at the Lower Seletar Dam but, there, more were seen dead than alive. This site probably does not support a breeding population. In addition the estuary around the Sungei Pandan is an area of mud flat, and a few were found there, but densities are not known. The mud is very deep and movement through it very difficult, but the habitat looks as though it would support this species. The main area for the mangrove horseshoe crab is from the restricted area north from the Tuas second link, the Sarimbun area, Sungei Buloh Wetlands Reserve and east along the Mandai mud-flats to the causeway. Here there is a thriving population, and this whole area together with the corresponding Johor coast should be considered as one contiguous habitat and managed as such.

Nylon nets trap the horseshoe crabs in tight bundles, and the nylon becomes caught in the leg.

The mud flats are strewn with debris, large and small.

The Mandai mud flats are the largest remaining mud flats in Singapore and are treeless with only isolated mangroves at the highest part of the shore. All other species of horseshoe crab have chosen to occupy clean, pleasant, sandy beaches that make field work appealing, but *C. rotundicauda* has chosen a habitat that is thick, sticky, sometimes smelly mud strewn with debris.

The Mandai mud flats are the largest remaining mud flats in Singapore and are treeless with only isolated mangroves at the highest part of the shore. All other species of horseshoe crab have chosen to occupy clean, pleasant, sandy beaches that make field work appealing, but *C. rotundicauda* has chosen a habitat that is thick, sticky, sometimes smelly mud strewn with debris. The causeway just to the east of the site restricts the flow of water and there is consequently only limited flushing of the Straits. The associated lack of wave action provides some protection for this site.

However, the site can be polluted and high counts of gram-negative bacteria have been found in this habitat (Ding et al., 2005). Research at NUS has shown that *C. rotundicauda* has a powerful innate immune system that is of great interest in medical applications (Zhu et al., 2005; Ng et al, 2007), and this may have allowed the species to survive in dirty, muddy habitats (Tan, 2005).

C. rotundicauda is increasingly being used for biochemical and genetic research on its immune system. Attempts have been made but without success to breed this species in captivity in Singapore, although some individuals have been maintained for some months at Singapore Zoo for exhibits. Researchers are having to take individuals from the wild for research purposes, and although most return them after bleeding them, this constitutes yet another threat to the species. Indeed, a recent report from India by Patti (Marine News web site, 2008) indicates that the two species, *C. rotundicauda* and *Tachypleus giga*, are being poached in their thousands by children engaged by local fishermen to collect the animals that are then sold to pharmaceutical companies.

Conservation

The total local extinction across a wide range of species of plants and animals in Singapore has been calculated as being possibly as high as 73% due to habitat loss (Brooks et al, 2003). It may seem that we have only a tiny area that is habitat to the horseshoe crabs, that it contributes little to the global population and is therefore not worth saving, but every global population is made up of just such individual patches of local habitat, and all are in need of protection.

Our small patch may be the nursery grounds and source of colonies elsewhere. Global extinctions only arise when all local populations have been extirpated. Already about a quarter of Singapore's decapod crustaceans have been lost forever (Brooks et al, 2003), and horseshoe crabs share very similar habitats as some of this group of animals. Things are not looking good for the remaining populations, so we must make efforts to protect what is left.

We need to devise ways of continuing Singapore's prosperity without encroaching any further on its few remaining wild areas. When those areas are gone or if for some reason they were suddenly made unavailable to us we would think of ways to do this. Man's ingenuity is boundless, and it is surely not beyond our creativity or vision to continue developing without taking more land or sea from the wild creatures. That is the challenge for developers and urban planners.

We need to think of the whole north-west coastline as part of the same habitat, and be sure it is left undisturbed. Not everywhere needs to be beautified. Consideration should be giving to working with the Malaysian Nature Society to protect the habitat on both sides of the Strait. Like a diamond in the rough, the Mandai mud flats are precious even though they don't look beautiful. The horseshoe crabs have survived everything nature has thrown at them over a few hundred million years. We must not be the ones responsible for extirpating them in the next few decades.

Lesley Cartwright-Taylor *did her first degree in Biology, hence her long-term interest in all things to do with nature. She is from the UK but spent many years in East Africa before coming to Singapore, where she has now been living for five years and is a PR. She joined the NSS in 2007, and when she is not involved in the NSS horseshoe crabs rescue and research project, she works on clinical research in the pharmaceutical industry.*

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Above: Flowers along the Koyukuk River.

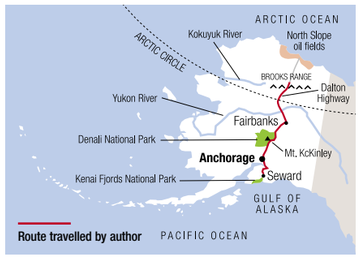
Right: And here it is, the State Mammal of Alaska and the largest deer in the world, *Alces alces*.

The Little Boy & the Moose

Text by **Morten Strange** Photos by **Ng Bee Choo**

Morten Strange retraces his steps back to northern Alaska, and this time he brings his 5-year-old son.

Sometimes life is funny. Impromptu events might affect your destiny. In 1974 I was hitch-hiking on the Alaska Highway running from Dawson Creek in Canada to Fairbanks in Alaska, USA; it was February and 24 degrees below zero. A man stopped his pick-up truck in the snow. He didn't really have room for me, the truck was full of supplies, but he made space and ended up taking me along to his gold mine in the Brooks Range. I was 21 then, and after a year in Canada and Alaska I never went back to my university economics studies, and my life would never be quite 'normal' after that.



34 years later I wanted to see Alaska again, and catch up with the man who changed my life, I think, for the better. I also wanted my wife Bee Choo and my son Mark to see the land and meet Bill. I wasn't sure if it was right to take Mark to the remote mountains in northern Alaska, but as it turned out that was the best thing I have done for years.

The international port of entry in the state of Alaska is the town of Anchorage in the south. From Singapore you can reach Anchorage on a direct flight via Taipei or by going down across San Francisco in California. The statistics of the state are staggering. The area is 1,477,277 km², i.e. almost three times the size of Thailand. In this vast wilderness less than 700,000 people live, half of those around Anchorage. America bought Alaska from the Russians in 1867; the price was 7.2 million US dollars. At the time some

Left: Mark finds his first Moose on a hillside in Denali National Park.

American senators thought that was a bit steep!

To get to Bill's camp we had to hire a car in Anchorage and drive up via Fairbanks on the Dalton Highway, an infamous stretch of mainly dirt road that services the oil fields on the North Slope, some 670 km north of Fairbanks.

Between Anchorage and Fairbanks we stopped at Denali National Park and spent a couple of nights to acclimatize and look at the wildlife. The park is enormous, 24,585 km², i.e. some 3 ½ times Singapore's size and it includes the highest mountain in North America, Mount McKinley at 6,194 meters.

However, as is often the case with large reserves like this, most of the visitor activity takes place around a relatively small section, a well-developed entry area, Park HQ and a few open access roads. Only a small number of fit and energetic hikers track into the back country or climb the higher hills.

So, we did the tourist trip on the park bus; but it was worth it. As always when you are in the States everything was well organized with pleasant and professional drivers and guides. We managed to see all the local Big Four on that trip alone. I.e. Dall Sheep, Caribou, Moose ... and yes, Grizzly Bear. We saw three bears, two in a river valley and another one running along the river, swimming across through it and later crossing the road.

Next to the salmon-fishing brown bears along the coast in southern Alaska, maybe, Denali must be the best place in the world to spot grizzlies. With great habitat and no hunting pressure, the mammals at Denali are plentiful and fairly approachable.

Mark loved the place, it was

With great habitat and no hunting pressure, the mammals at Denali are plentiful and fairly approachable.

I bet all travelers take this snapshot when they drive north along the Dalton Highway and cross the Arctic Circle north of the Yukon River, this imaginary line marks the southern limit for 24 hour sunlight in summer.

Mark's crossing of the Koyukuk River went smoothly.

him who spotted the Caribou which he didn't fail to remind us of. But his favorite was the Moose, Alaska's state mammal. We saw a few every day we were there and often with good views. Near the roads, smaller mammals like the Snowshoe Hare and the Arctic Ground Squirrel would emerge, easy for a child to enjoy. Mark even saw a glimpse of the Coyote that crossed in front of our car once. When we saw the Red Fox close by, he was napping, but you can't win them all.

We found a Beaver dam and sat up the scope, some beavers were out in the water. Whenever we stopped and mounted the scope, a small traffic jam of other vehicles would develop, and we would share our discovery and meet other travelers. People who are not familiar with telescopes would be amazed at the difference good optics make to a wildlife experience.

The 300 km drive from Fairbanks up into the Brooks Range was long and slow and fairly eventless, the spruce forest being generally in bad shape after widespread fires and attack from parasite. Last time I did this drive, we crossed the giant Yukon River on the ice, now there was a fancy new steel bridge across. Mark was pretty patient but occasionally he would ask from the back: "When will we get to the Koyukuk River?" He has seen a story on television about two men who capsized on the Koyukuk and spent five days starving in the bush before they were airlifted out. Now he was a bit concerned, but also excited, that we would soon cross the same river.

But our crossing went smoothly, Bill was there to help us across, and the water level is barely a meter in autumn. This surely must be one of the most beautiful spots on earth, especially in

One of the smallest of the mammals in Denali, the Arctic Ground Squirrel *Spermophilus parryii*.

Mark does his chores, stacking firewood for our cabin in Bill's camp.

the fall when the leaves on the hills turn red and yellow.

We didn't see many animals in this area, but they were there. There were tracks and marks among the willows along the river where the Grizzly Bears come down to dig for roots. Bill insisted that I carried his Winchester .356 rifle whenever we were out of camp. And since Bee Choo doesn't know how to shoot, she and Mark were encouraged to stay around camp while I helped Bill in the mine, a mile or so up the creek.

We did manage to birdwatch a bit and found some Boreal Tits and a flock of White-winged Crossbill in the trees, and a Rough-legged Buzzard soaring overhead, and of course the ever-present Gray Jay, Camp Robbers to the locals. In Denali the Gray Jays would steal food from the café tables, like White-vented Mynas do here in Singapore, but not in Bill's camp. Bill used to feed the jays and the Ravens, he even had a Timber Wolf coming into camp for leftovers some years back. But when the bears started giving him trouble he had to stop, now he was meticulously cleaning up any trace of food from around the area.

There were tracks and marks among the willows along the river where the Grizzly Bears come down to dig for roots. Bill insisted that I carried his Winchester .356 rifle whenever we were out of camp.

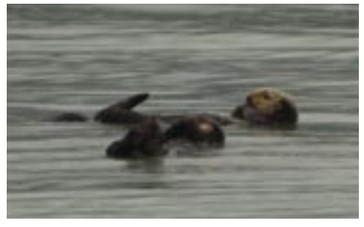
The Koyukuk country.

The Koyukuk country must be one of the most beautiful places on earth.

But Mark got the better of us. I was with him in camp when he said: "An animal just ran by". It wasn't a Red Squirrel, he assured me, they are numerous all over Alaska. "It was either a Caribou or a female Moose", he said. I went to check, and there were the fresh Moose tracks in the dirt. It must have run by while I looked elsewhere. To this day Mark will still occasionally ask, "Who has seen a Moose all by himself in Uncle Bill's camp, raise up their hands".

Maybe the greatest nature experience at the Koyukuk for Bee Choo was not the wildlife. I think it was the night I got her out of her bunk in the cabin. It was close to freezing outside, but I wanted her to see it: The Northern Lights, the aurora coming up over the mountains in the east, spreading across the sky and slowly changing colour and shape. It is a magical moment in the arctic.

I didn't feel the little old SUV I had was suitable for the long drive north all the way to the Arctic Ocean. I cancelled that plan, and instead on the way back I took Bee Choo and Mark on a one-day cruise out of Seward, that was on our last day before flying back out of nearby Anchorage.



One of the great marine mammals visible off Seward, the Sea Otter *Enhydra lutris*.

On the one-day cruise out of Seward, Mark was delighted to see Humpback Whales, Harbor Seals, Steller Sea Lions and maybe best of all, Sea Otters.

Mark happens to love marine mammals, he knows our copy of *Sea Mammals of the World* inside out, and he was delighted to see Humpback Whales, Harbor Seals, Steller Sea Lions and maybe best of all, Sea Otters from the ship.

He cried in desperation when some Dall's Porpoises emerged while he was on the wrong side of the vessel; luckily they came back and he got to see them playing in the surface on his side. But maybe best of all was when he was resting from the cold wind behind on the ship while we were approaching the largest of the glaciers in the Kenai Fjords.

I carried him across when we were close, and having never seen snow or ice before he couldn't believe his eyes when confronted with a 100+ meter wall of ice. "That is amazing!!!" he exclaimed, and ran across to one of the stewards on the ship and asked in bewilderment: "Where does all that ice come from???"

My stay in the Koyukuk country in 1974 advanced my life. I went back to see the country again in 2008, and to get re-acquainted with the toughest and the kindest man I have ever known, the best gold miner in Alaska. I think that by taking him along, I advanced Mark's life a little bit as well.

Morten Strange *is a long-time member of NSS, as well as a host of other nature conservation organizations. He is currently Editor-in-chief of* Nature Watch.

Little Tern Nesting in Singapore

Text by **Jonathan Cheah Weng Kwong** and **Ashley Ng**
Photos by **Jonathan Cheah**

A very thorough and insightful commentary of Little Tern courtship, breeding and feeding, the result of long hours of dedication by Jonathan and Ashley.

Terns are a cosmopolitan group of birds that are closely allied to gulls. They are among the noisiest birds, making harsh and grating calls. They are also gregarious; breeding, foraging and migrating in flocks. There are a total of 44 species in 10 genera (Gochfeld & Burger 1996). About a third of these species are black-capped terns belonging to the genus *Sterma*. Of the 14 species recorded for Southeast Asia, 12 have been seen in Singapore, mostly non-breeding visitors, winter visitors or vagrant (Lim, 2009). Only Black-naped (*S. sumatrana*) and Little Terns (*S. albifrons*) are residents.

The Little Tern is a small, slender and streamlined bird with a pair of narrow, sharp-pointed wings and forked tail. These features make it well adapted to a swift and graceful flight, they also enable it to dive for fish from high above the water. The white belly helps to reduce its conspicuousness to underwater prey, when the bird is flying over the water.

The Little Tern is a common resident as well as a non-breeding winter visitor to Singapore. It has been breeding on Singapore's coastal sandfills at Changi, Seletar and Tuas since 1987 (Wang & Hails 2007; Wells 1999). Breeding has been suspected on Pulau Semakau (Lim, 2009); we know of suspected or confirmed breeding at Kranji, Kalang River and Tampines as well.

The juveniles show some individual plumage variations.

The juveniles use their camouflage plumage to hide when the adult are away.

Just a few days old the chick starts moving about in the colony.

Studying the terns

Our documentation of the Little Tern nesting took place in Changi Cove in 2006. Unfortunately this stretch of beach has since been reclaimed for development. It took both of us five weeks to complete the observations from July to early August of 2006.

Even though the Little Tern has been known to quickly colonize new man-made habitat of re-claimed land and open sandy patches near water, we should keep in mind that breeding numbers are low, colonies are vulnerable and the species is considered nationally threatened with extinction (Lim, 2009). We urge all observers and photographers to show utmost consideration when visiting the home ground of these birds.

In our studies two photographers were involved; we both paid careful attention to ensure minimal disturbance to the nesting birds. Photographing the birds was not an easy task. We were constantly harassed as the birds dive-bombed us while we were photographing the chicks. There was also the loud screeching and echoes of their cries bouncing off from the sand to contend with. All these distractions were designed to confuse us, as well as any potential predators, to allow the chicks to scuttle away and hide among the vegetation.

Facing page, from top: Adult coaching chick to fly; A newly hatched chick.

The Little Tern is a common resident as well as a non-breeding winter visitor to Singapore. It has been breeding on Singapore's coastal sandfills at Changi, Seletar and Tuas since 1987.

We observed that the birds would feed as a group, leaving the nests unguarded during certain periods where the ground was cooler and the chicks needed less shelter from the sun. It was during these periods that we entered the area carefully and marked each nest with plastic pickets as otherwise it would be difficult to relocate them.

Also, this would prevent accidental trampling of the nests. Even after hatching, there was the constant danger of stepping on the chicks as they remained well hidden, lying low and still. As far as possible, defined paths were used, especially when moving down the valleys.

Courtship and egg laying

In Singapore the Little Tern breeds from May to September (Lim, 2009). During this period the plumage shows a neat white forehead and a yellow bill tipped with black. Courtship feeding is part of the breeding ritual. With a fish in his bill, a male approaches a female he is interested in to offer her the gift. If the female is receptive to his advances, she may accept the fish.

Occasionally a male may indulge in teasing, swallowing the fish as soon as the female shows interest. At other times the pair may indulge in aerial displays with the female still clutching the fish in her bill.

Once the pair has bonded, courtship rituals may intensify and copulation occurs. Eggs are laid on a bare depression in the sand. A full clutch is three but usually only two eggs are laid.

A total of about 60 eggs were counted from the various nests, of which about 75% of the chicks that hatched survived. Those that did not survive died within a few hours of hatching. A number of chicks were victims of feral dogs that roamed the area. Some eggs remained unhatched, mostly from clutches of more than two.

The man-made sand dunes that the terns like to nest in.

An egg, a day-old chick and a newly hatched tern.

Courtship feeding is part of the breeding ritual. With a fish in his bill, a male approaches a female he is interested in to offer her the gift. If the female is receptive to his advances, she may accept the fish.

The eggs are well camouflaged on the ground. They are thickly spotted with dark brown and pale lavender. Both parents helped in incubation and brooding. Whenever a parent bird arrived at the nest it would inspect the eggs and position them carefully before settling down to incubate them. Incubation usually lasted from 21 to 30 days.

Chicks

Once an egg is hatched, one of the adult birds will invariably remove the shells and dump them some distance away. This is to ensure that the nest is not compromised as the inner surface of the shell, being white, can easily attract predators.

Newly hatched chicks are blind and partially covered with down feathers. Chicks born blind and naked are known as precocial but here there is a partial covering of down, thus they are termed semi-precocial. Within a few hours, the chicks we observed began to move about and by the next day they were totally covered with down feathers.

The first two days are crucial to their survival, but once they can move about, their chances improve. The chicks normally remain motionless in the nest until they hear the all-clear call of the adults. Then they move out, bill gaping, sometimes chirping, to beg for food. However, at any sign of danger they immediately freeze.

Chick fatality can be high as a result of various causes as mentioned earlier. The adults react strangely to the death of their chicks. In one instance the parent covered the chick's beak with a piece of stone as ants began to crawl over the carcass. It continued to sit on the remaining egg and dead chick, whilst being harassed by the sudden increase of flies and ants. Unfortunately the remaining egg failed to hatch, probably due to the heated ground. The site was obviously a poor choice for nesting.

The chicks take about 20 days to fledge and during this period they are subjected to many dangers. The adults are kept constantly busy feeding the chicks.

The chicks would normally face the persistent wind direction in order to learn how to lift when their wings are spread, be it morning or evening. Hence, the adults always got into a bit of trouble positioning for landings. Fish was sometimes dropped as a result. Passing on the fish to the juvenile were mostly done without problems in the evenings.

The juveniles become near-hysterical whenever a parent arrived with fish. They would wave their wings to attract attention to themselves. Juveniles from other nests normally remained silent, waiting patiently for their own parents to arrive. The parent that was keeping an eye on the juveniles would then fly off to get food for the other chick. Should the other chick manage to snatch the fish, the rightful chick would normally chase it around until the fish was dropped and retrieved.

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Originally the chicks were fed with bits and pieces of fish; as the chicks grew they were gradually fed the entire fish. The parent bird would hold the fish just behind the head and direct it into the gaping mouth of the juvenile, head first. With a larger fish the juvenile had to grab the fish itself and manipulate it, so that it was swallowed head first. During this period, courtship feeding between the parents continued as well.

Ashley Ng *has been a member of NSS for over 10 years and is especially active in the Bird Group; by profession he is Marketing Director in a property company.* ***Jonathan Cheah*** *is a keen bird photographer; his day-job is Chief Operating Officer of a food company.*

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A Day's Worth of Butterflies

Text by **Simon Chan** Photos by **Gan Cheong Weei**

It all started off with an email from a butterfly enthusiast in the UK that led Simon Chan and Gan Cheong Weei in pursuit of spotting as many of these fluttering beauties as they could in a day.

Lebadea martha.

Horaga syrinx.

Curetis santana.

David Hudson, a 60-year-old banking consultant from Great Missenden is an avid butterfly enthusiast and an experienced nature photographer. He has traveled widely wherever his work takes him. With his trusted camera by his side, he has gone to more than 40 countries including Malaysia, Peru and countries in East Africa, photographing butterflies in the wild for 30 years. During all that time he has also studied their systematics and distribution, with particular emphasis on the tropics. Davis has also found the time to become good friends with John Banks, a renowned butterfly cinematographer.

Simon, David and Gan at Sime Road forest.

When a mid-May business trip to Singapore coming up, Davis started surfing the internet for local butterfly interest groups. Although he has been here a few times since his first tropical excursion way back in 1977, his last trip was nearly 20 years ago and he was no longer conversant with the best places for butterfly watching. He would require a keen lepidopterist to recommend and accompany him to the good sites.

For the first stop, we wanted David to experience the forest species in an awe-inspiring way. Sime Forest was selected over the other Central Catchment Reserves because it was the best 'performer' to date with a whopping 63 species recorded on one single day.

Appias lyncida puddling.

Ideopsis vulgaris.

The caterpillar of the Common Birdwing butterfly.

In his initial e-mail Davis introduced himself and mentioned having visited the Bukit Timah Nature Reserve, MacRitchie Reservoir and Singapore Botanic Gardens. Putting on our thinking caps, Gan and I pondered over the few remaining forested and park areas in Singapore and finally decided on two new ones, where we were certain many butterfly species still exist.

For the first stop, we wanted David to experience the forest species in an awe-inspiring way. Sime Forest was selected over the other Central Catchment Reserves because it was the best 'performer' to date with a whopping 63 species recorded on one single day. For the second stop we settled for a more urban setting with an artificially created habitat in the form of a butterfly garden. The Alexandra Hospital Butterfly Trail fits that bill to a tee.

The day of the walk finally arrived. It started off surprisingly well in spite of incessant rain on the weekdays past.

Sime Forest did not disappoint. A total of 62 species were spotted including some seasonally abundant species like the Chocolate Albatross *Appias lyncida vasava* and the Banded Yeoman *Cirrochroa orissa orissa*. Then there was the single specimen of the very rare Chestnut Angle skipper *Odontoptilum angulatum angulatum*. In addition, a group of butterflies puddling (i.e. extracting minerals from the ground) on muddy ground near a water pipeline gave David a photographic moment. He managed to capture the likes of a Five Bar Swordtail *Pathysa antiphates itamputi*, some Blue Jays *Graphium evemon eventus* and a few Chocolate Grass Yellows *Eurema sari sodalis*)

Throughout our leisurely but energy-sapping walk, we encountered many of the more common denizens of the forest from the big and showy Papilionidaes to the tiny but brilliantly luminous Lycaenidaes. After what felt like a long march, we were back at where we began at the rangers headquarters. By then it was already early afternoon and we were parched and famished, so off we went to Alexandra Hospital for lunch.

What greeted us at Alexandra Hospital were the usual suspects of Blue Glassy Tigers *Ideopsis vulgaris macrina*, Dark Glassy Tigers *Parantica agleoides*

Odontoptilum angulatum.

At Alexandra Hospital, while the presence of three magnificent male specimens of the Common Birdwing *Troides helena cerberus* and a lone Common Rose *Pachliopta aristolochiae asteris* fascinated David somewhat, the limelight actually belonged to a single Ambon Onyx *Horaga syrinx maenala* which seemed to have difficulty laying eggs on a pomelo bush.

agleoides, Common Palmflies *Elymnias hypermnestra agina*, Bush Browns *Mycalesis sp*, Common Mormons *Papilio polytes romulus* and Lime Butterflies *Papilio demoleus malayanus*. While the presence of three magnificent male specimens of the Common Birdwing *Troides helena cerberus* and a lone Common Rose *Pachliopta aristolochiae asteris* fascinated David somewhat, the limelight actually belonged to a single Ambon Onyx *Horaga syrinx maenala* which seemed to have difficulty laying eggs on a pomelo bush.

David remarked that the only other place he saw the genus Horaga was in the Philippines. Adding to his delight, a Commander *Moduza procris milonia* made an unexpected appearance and a quick dash up a tall tree. That made our day, because this particular sighting added one more species to the list of butterflies encountered at Alexandra Hospital.

All in all, it was an excellent day. The weather held up and many butterfly species were there for the count. David was extremely fortunate to see 84 species in one day and so were we!

David working the Sime Forest bushes and at the Alexandra Hospital Butterfly Trail (bottom).

Gan Cheong Weei *and* ***Simon Chan*** *together constitute the core of the NSS Butterfly Interest Group. By day Gan works as an IT manager in a multinational corporation; Simon works as a Senior Systems Analyst in an offshore Singapore bank.*

Remembering Sian

In this personal and moving account, Goh Yue Yun recalls the last year of Ong Kiem Sian's remarkable life.

The phone rang. It was Sian; she wanted to go to Fraser's Hill. Like before when she wanted to go to Fraser's or Panti Forest Reserve, she would call to ask if I was interested also. Of course, I was keen, just like before. But this time, it was different. It was June 2008 and Sian had been battling cancer since September 2006. When she was diagnosed, the lung cancer had already spread.

So we were going together now to Fraser's Hill, one of Sian's favourite birding destinations in Malaysia. She took the wheel of her car, like before. Our good friend Swee Leng came along, the co-driver in case she got tired. But Sian drove most of the time. In her usual steady, confident way.

At the Brinchang bungalow, the skilful cook whipped up special vegan dishes for her. A long-time fishetarian, Sian had stopped eating all animal products to deal with the cancer. During our last dinner—yet another sumptuous meal—in the cosy Brinchang, Sian held court, regaling us with stories of her earlier life and sharing a bottle of wine-like berry juice rich in antioxidants.

She took along copies of her book of bird photographs, *A Passion For Birds*, to give to the friends she had made at Fraser's Hill over the years.

On the last day, we walked up the winding road from the Gap Resthouse. Sian took her camera with her, Swee Leng carried it. And she was rewarded with good views of a special bird—the elusive Bamboo Woodpecker—a bird she saw that day for the first time in her life.

On the journey home, a policeman on the highway stopped our car. We were speeding, he said. What was he thinking when he saw a small-sized, demure, white-haired lady in the driver's seat?

"She was a kind and helpful person"

Minister Mentor Lee Kuan Yew
30 June 2009

Photos: Ester Gerber

Sian enjoying ice cream at the hotel in Bukit Tinggi.

Later that year, in November, Sian was showing me her new compact SUV. She liked this version better and was especially pleased with the cup holders. As she got into the car, she used her hand to help lift her leg. A few months later, in early 2009, she was selling the car. She did not want to trouble her family with such matters later.

Weeks went by... Sian had a new set of wheels—a wheelchair. A Nature Society member, Lay Tin, and I went to visit her at home. Her maid wheeled her out into the living room. She had lost so much weight, her bones were visible under her skin.

What to say? But Sian wasn't at a loss for words. She started to tell us about a trip she made to Bukit Tinggi in Malaysia just a week ago. Her friend Ester drove her up. It was a beautiful place with French-style buildings set amid a forest and she had enjoyed the trip tremendously. Light came back into her eyes as she spoke and she appeared rejuvenated.

We asked if she wanted to go anywhere else. We thought we could help. Sian paused for a while. She remembered Evelyn had a guestroom at her organic vegetable farm in the Kranji area. Perhaps she could go and stay there. I got her book containing her friends' phone numbers—all neatly written in pencil—and we called Evelyn, who was the honorary secretary of the Nature Society. "I want to go camping," Sian told Evelyn.

The guestroom was occupied by Evelyn's mother now but Evelyn invited Sian over for lunch the next day. She was going to blend energy-giving juices. Looking forward to the outing, Sian was already energised. She started to think who else could come along... have a party. Call Ester, call Swee Leng... I started searching for their numbers in the little book.

A small bottle of morphine syrup stood on a table near her bed—a silent reminder of the painful and debilitating disease that was slowly taking her away. A portable video player was also on the table. "It doesn't have to be birds. Anything to make me laugh," she said

about what she wanted to watch.

At our next meeting, I gave Sian tea-light candles. She had asked for them. She wanted to burn the floral-scented oils she had bought on a trip to Israel. A breeze came in from the window in her living room and she enjoyed the fragrance wafting towards her. She served us tasty home-roasted nuts. We ate together; her appetite was still good.

As Lay Tin and I said our goodbyes, Sian told us, in a firm, determined voice, that she was going to have lunch at Ester's place the next day. Her maid told Lay Tin that she had stopped taking morphine; it was making her drowsy. Sian didn't want to waste what time she had left taking naps. In dying, she lived with her trademark indefatigable spirit and love of life intact.

On June 14 I was thinking of another visit, but Sian slipped away that night.

Ong Kiem Sian was born on Jan 5, 1946 in Solo, Indonesia. She came to Singapore in the late 1960s. Her father had come to Singapore to set up the Happy Manufacturing Company and build a factory to make peanut butter.

After completing a secretarial course in Jakarta, she worked at a Caltax office in Rumbai, Sumatra, and in the Brunei civil service. Later, she went to Rotterdam in the Netherlands to study optometry. Returning to Singapore, she got a job as an optometrist at F.J. Isaacs and worked there until she became ill. One of her patients was Minister Mentor Lee Kuan Yew.

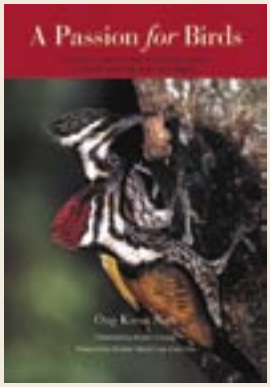
Sian joined the Nature Society in the early 1980s and became interested in bird photography in 1990. Spending countless hours in the nature areas in Singapore as well as in Panti forest, Fraser's Hill and Taman Negara in Malaysia, she developed an impressive and unique portfolio of bird images and videos. Her favourite subject was nesting birds. If possible, she would tirelessly follow the full range of the birds' activities from nest building to the fledging of the young. She also made excursions to other neighbouring countries such as Thailand and Indonesia, to photograph their natural wonders.

Over the years, Sian contributed many photographs to *Nature Watch*, and to the *Handbook of the Birds of the World*. Her book of photographs, *A Passion for Birds*, was published in December 2007 and reprinted with corrections in early 2008. Articles on travel written by her also appeared in other publications, such as *Silver Kris*, the in-flight magazine of Singapore Airlines. At the dinner closing the annual Singapore Bird Race, of which she was a regular participant, Sian often presented a slide-show of her images or a video.

Photos: Ester Gerber

Sian, her maid Komsi Indaroni Katimin and close friend See Swee Leng having a break during their journey to Bukit Tinggi in late March 2009.

Sian captured this Yellow-breasted *Warbler Seicercus montis* during one of her last field trips.



Sian's best photographs collected into one volume.

Her artistry extended beyond bird photography. She took a course in folk art and painted on wood, stools, tabletops and picture frames. Good with her hands, she made lampstands and clocks, decorated them and turned them into pieces of art. Everything that Sian did, she did with dedication, meticulous attention and a dose of love. It was obvious in her handiwork, which often drew praise and admiration.

She also had musical talent. She sang well and played various instruments, including the accordian, piano, zither, guzheng and guitar. When her grandchildren were younger, she sang nursery rhymes in Dutch to them.

When she was a teenager, Sian swam competitively, training early in the morning before going to school. Perhaps this helped to develop the discipline and fitness she demonstrated in carrying out her bird photography. Anyone who had accompanied Sian in the field would have been impressed with her physical tenacity. She carried her camera equipment herself and waited or searched for her subjects in hot, sweltering conditions with mosquitoes and leeches often nearby.

As a Seventh Day Adventist, Sian attended church regularly and was active in volunteer work such as fund raising and cultivating a herb garden in the church grounds. When she was aware of a needy cause, she would donate generously.

After her cancer was discovered, Sian received a course of radiation, But she suffered severe side effects and decided to forgo further conventional treatment. She chose quality of life over quantity.

For many months, she was able to continue to pursue her interests. She went to a church camp on Batam at the end of 2006. In June 2007, she joined a church group to visit Israel and was the first among the tour members to reach the top of Mt Sinai. Later in the year, she attended a church camp in Bali and visited Solo, her birthplace.

Sian was 63 when she died. Her ashes were scattered in the sea according to her wishes. Because land is scarce in Singapore, she did not want to take up space in death. She left behind her mother Kwee Po Lin, husband Goh Tong Seng and siblings Ong Kiem Han, Ong Kiem Kiok and Ong Kiem Whye.

Acknowledgements

I much appreciate the conversations I had with Goh Tong Seng, Ong Kiem Kiok and See Swee Leng, who provided insights into Sian's life. Responsibility for the article, however, is mine and mine alone.

And thank you Sian, for your friendship and for the wonderful times we had with the birds.

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