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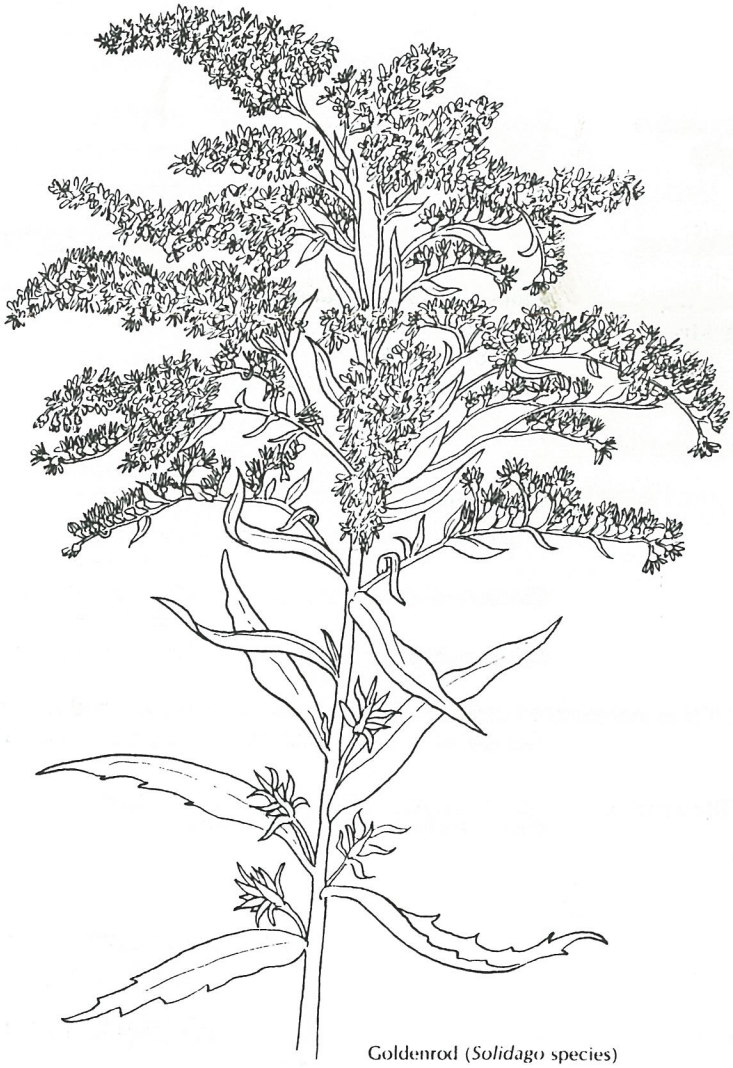
HALIFAX FIELD NATURALISTS' NEWSLETTER

September to November 1993 No. 72



Goldenrod (*Solidago* species)

Return address:
Halifax Field Naturalists
c/o Nova Scotia Museum
1747 Summer Street
Halifax, NS B3H 3A6

HALIFAX • FIELD • NATURALISTS

Objectives To encourage a greater appreciation and understanding of Nova Scotia's natural history, both within the membership of HFN and in the public at large. To represent the interests of naturalists by encouraging the conservation of Nova Scotia's natural resources.

Meetings On the first Thursday of every month at 8:00 pm in the auditorium of the Nova Scotia Museum, 1747 Summer Street, Halifax.

Field Trips Are held at least once a month, **and it is appreciated if those travelling in someone else's car share the cost of the gas.**

Membership Is open to anyone interested in the natural history of Nova Scotia. Memberships are available at any meeting of the society, or by writing to: Membership Chairman, Halifax Field Naturalists, c/o NS Museum. New memberships starting from September 1 will be valid until the end of the following membership year. The regular membership year is from January 1 to December 31. Members receive the HFN Newsletter and notices of all meetings, field trips, and special programmes. The fees are as follows:

Individual	$10.00 per year
Family	$15.00 per year
Supporting	$20.00 per year
FNSN (opt.)	$5.00 per year

Executive 1993

President	Colin Stewart	466-7168
Treasurer	Shirley van Nostrand	835-3673
Past President	Michael Downing	823-2081

Directors Patricia Chalmers, Ursula Grigg, Bob McDonald, Bernice Moores, John Newbery, Mary Primrose, Bonnie Saxton

Mailing Address

Halifax Field Naturalists
c/o Nova Scotia Museum
1747 Summer St., Halifax
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Committees

Programme	Roy John	868-2373
	Jane Carlisle	
Newsletter		
Editor	Ursula Grigg	455-8160
	Connie Mack	477-1469
Conservation Issues	Colin Stewart	466-7168
	Ursula Grigg	
Membership	Shirley van Nostrand	835-3673

HFN is incorporated under the Nova Scotia Societies Act and is a member organization of the Canadian Nature Federation. It is registered for federal income tax purposes. Official receipts will be issued for individual and corporate gifts.

Illustrations **This Issue (No. 72):** p. 11 — tide table courtesy Dept. of Transport;; cartoons from Natural History , September 1993; other illustrations from copyright-free sources.

! NEXT DEADLINE !
15 Nov. for Dec. Issue

Contributions to the Editor, HFN
c/o NS Museum or phone 455-8160

HFN NEWS AND ANNOUNCEMENTS

EDITORIAL

This quarter, we have some requests for you.

As naturalists, we enjoy our local parks, and care about how they are managed. One of them, Shubie Park in Dartmouth, is under stress because some of the land is still in private hands. Purchase of the lands was never completed, and the owner is drawing attention to the long delay by restricting access to his part of the park. Trees have been felled across paths, and now some routes are barricaded.

Members are asked to go and walk these paths, and write or phone their comments to Dartmouth City Council. Shubie Park, alongside the historic Shubenacadie Canal, is a pleasant and interesting small park, and is surely worth completing and protecting.

Next: this Newsletter will be late, so some members will get their programs late. (Goodness, was there ever a time in which more people went out of town...?)

The programme committee is going to plan two months ahead of the Newsletter, so that members will know of proposed events early. This committee traditionally has four members, but now has only two; is there anyone who could give them a hand, even occasionally? If so, please call Roy John, 868-2373, or Jane Carlisle, 492-3849.

Meanwhile, Connie Mack has offered to help put the Newsletter together, to speed up preparation.

Volunteers are also needed for the 23rd Canadian Nature Federation Annual Conference, which HFN is hosting next summer. This is going to be fun; if you would like to be part of it, please call Mary Primrose, 423-5165, or Bob McDonald, 443-5051.

Ursula Grigg

PIPING PLOVER SHIRTS

Orders are coming in slowly for T-shirts and sweat shirts with the Piping Plover design on them; we don't have quite enough yet for a new printing worthwhile. To quote our Past President - "It's a nice design, and Christmas is coming..." Anyway, to order them, please call Catherine Strugnell at 835-8289

PARKING TICKETS

Members who went on a recent field trip, leaving their cars in the Museum's public parking lot, returned to find them ticketed. It seems that the "no parking except while in the Museum" rule is now being enforced, and the directors have not succeeded in having those tickets.withdrawn.

However, we have been invited to leave our cars in the employees' parking lot, down the ramp on the other side of the Museum building, while we are on trips. Of course we can continue to park in the public lot while we are in the Museum for meetings.

NEXT YEAR'S DUES

Members are reminded that dues for 1994 are pending, and can be paid to the Treasurer, Shirley van Nostrand, at any time. New members joining now will be considered paid-up until the end of 1994 (bargain!).

NEW AND RETURNING MEMBERS

Carolyn and Robert Lake
Lesley Anne Partanen

CONTENTS

SPECIAL REPORTS;

MCNAB'S ISLAND

The environmental report on Halifax Harbour Cleanup Inc.'s proposal to put a sewage treatment plant on an artificial island on a point of land at Ives Cove was published in September.

The environmental assessment panel, chaired by Dr. Shirley Conover, accepted the proposal because of the urgency of the problem. The panel pointed out that Ives Cove is not the best site, and a plant there will prove much more costly to build and operate than one on the Dartmouth shore.

The panel added more than 70 provisos, designed in general to protect and develop the rest of the island as a park, to keep the park and the sewage plant separate, and to replace landing facilities which will be displaced when the plant is built.

The provincial government has accepted the report with its provisos, but the cost will exceed the amount of funds now available.

Ursula Grigg

SPECIAL ARTICLES

ALBINO BIRDS

During the last thirty years I have seen albino birds of many species and I am constantly being asked questions about this phenomenon. In this short article I will address the following questions:

1. "What is an albino?"
2. "Is there more than one kind of albino?"
3. "What causes albinism?"

Albinism is just one of several types of abnormal colouration that you may see in bird plumage as a result of a lack or excess of pigments in the feathers (see Gross 1965a, b). Pigments of and by themselves do not always result in the colours that you see on a bird. In many cases the colours result from an interplay between the light that is hitting the pigment in the feathers, which may be reflected or refracted, or by the structure of the feathers themselves causing changes in the light that hits them. It is always fascinating to take a brightly coloured feather, e.g. that of a macaw (*Ara* species) and look at a light *through* the feather - you will only see brown pigment (melanin) in the feather and not the red, orange or blue that you normally see.

Albinism is caused by a reduction or absence of the pigment melanin in the feathers, irises and areas of skin that are normally pigmented. (see Pettingill, 1985). It may take any one of four forms. In some cases melanin is completely lacking in the bird, and resulting in a *total albino*. Over the years I have only seen one such bird in the wild, an Eurasian Blackbird (*Turdus merula*), in the north of England, which had completely white feathers, red eyes and skin that was pale in colour. If other pigments are present, e.g.carotenoids, the bird may have small amounts of colouration in its plumage, e.g. pink, red, orange or yellow. An *incomplete albino* is one in which pigment is lacking from one or two of three areas noted above (feathers, eyes, skin). This phenomenon was well seen recently on the CBC Television programme "Here and Now" which aired a video of three American Crows (*Corvus brachyrhynchos*) in Winterton, Trinity Bay (January 1993), that had completely white plumage, pale legs and beak yet had dark irises. In some cases the pigments may be reduced in quantity, or diluted, resulting in an *imperfect albino*. In June - August 1968 on Green Island, Witless Bay, I saw, on several occasions, among some 1000,000+ Common Murres (*Uria aalge*) one individual that was a very pale chocolate colour on its dorsal surface (rather than dark brown to black) with normal legs and a slightly paler than normal beak.

By far the commonest type of albinism, and that which elicits numerous questions, is that known as *partial albinism*. Since 19965 there has not been a single year in which I have not seen partial albino crows in the St. John's area, and have had them reported to me consistently from the Harbour Grace/ Carbonear area. Partial albino birds normally show

an absence or reduction of pigment in *parts* of the feathers, irises or skin. In crows this lack of pigment is most obvious in the feathers of the wings and tail. To date I have seen birds with the following albinistic areas;

a. all the primaries completely white
b. the outer 3-4 primaries white
c. the inner part of the primary vanes white
d. all the secondaries completely white
e. several of the outer secondaries white
f. the proximal portion of the inner vane of the primaries and the secondaries white
g. the primary and secondary upper wing coverts white
h. a few of the upper wing coverts white, resulting in a "mottled" looking wing
i. all the tail feathers white
j. the outer 1-2 pairs of tail feathers white
k. the inner 1-2 pairs of tail feathers white

In all these cases the lack of colouration always appeared to be symmetrical. The most commonly seen forms were c. and f. above, with several individuals (more than ten). with this defect having been seen over the years. In all other cases only one or two have been seen with the pattern noted.

In early 1992 I was sent a videotape of a. partial albino crow in Little Bay East (Fortune Bay) that had plumage as follows:

Head - white with black lores and throat
- crown and nape white
Back - pale yellow-gold
Breast - white with two small black patches laterally on each side
Belly - black with three anteriorly directed extensions
Flanks - white with black in the axillary region
Legs - all black
Tail - white with some very pale yellow. Tips of rectrices on left side of bird tipped black
Wings - white with the slightest hint of brown

This bird was seen throughout the summer and fall (1991) and appeared to change its colour slightly over time, becoming darker in some regions and lighter in others. The bird interacted in a completely normal way with conspecifics and had the same repertoire of calls.

Such changes in plumage colour have been reported in the past; e.g. Frazier banded an American Robin (*Turdus migratorius*) with "normal" plumage, but when recovered two years later the bird was a partial albino (see Frazier 1952).

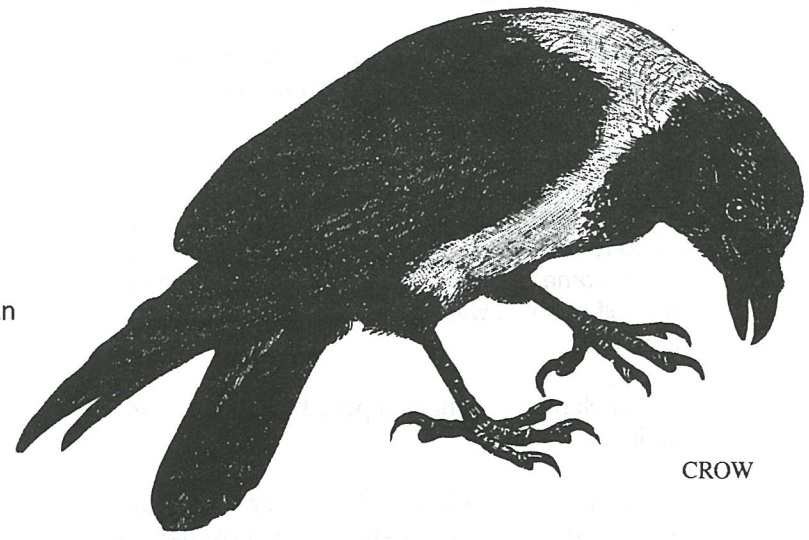
In a small number of cases it is difficult to categorise the animals seen, as in the case of a Starling (*Sturnus vulgaris*) that I saw in September and October, 1990, in St. John's, which had a pure white tail, creamy coloured body, pale pink legs and normally pigmented eyes.

Albinism may arise as a result of genetic factors and be inherited or it may occur spontaneously. True albinism is the result of a bird carrying recessive genes for this trait with the bird being *homozygous* for this condition i.e. no dominant genes are present that could cause colour. (pigment formation) to be expressed in the adult bird. In the case of the birds mentioned above I doubt that the albinistic conditions seen are the results of natural selection but are much more likely to be the result of random mutation, or the physiological changes that caused the condition have resulted from the ingestion of various (man-made) pollutants. The adaptive value of this white colouration is questionable and may/may not have been selected for. The presence of white on an otherwise coloured bird may apparently put that organism at greater risk of predation as seen in the case of "pied" pigeons (*Columba livia*).

Thanks are due to Dr. D.H.Steele for constructive criticism of this paper.

FRAZIER 1952, Depigmentation of a Robin. Birdbanding 23, p.114
GROSS 1965a, The incidence of albinism in North American birds. Birdbanding 36, pp. 67-71, and 1965b, Melanism in North American birds. Birdbanding 36, pp. 240-242.
PETTINGILL O.S. 1985, Ornithology in Laboratory and Field. Fifth Edition,Academic Press, Inc., Orlando.

William Threlfall, Biology Department, Memorial University NFLD
First published in THE OSPREY, Vol. 24, No. 2, June 1993



CROW

"...and if you hold it up to your nose, you can smell the sludge."

SAVING GOLF GREENS FROM SOIL BACTERIA

A Saskatchewan scientist has helped local golfers overcome one of their biggest handicaps.

Dr. Roy Cullimore, director of the Regina Water Research Institute, found a way to stem a grass disease that was ruining greens at the nearby Tor Hill golf course.

The disease, 'black plug layer', is caused by a cocktail of micro-organisms that live deep in the soil, explains Cullimore. Sometimes the bacteria come to the surface, where they compete with the grass for water, nutrients and living space.

The result is a black slime that plugs the soil so that water and nutrients can't get through. Then the grass roots die off, the grass turns brown and the golfers get mad.

Though most of the greens at Tor Hill were blighted, another nearby golf course was trouble-free.

Cullimore, an expert in soil and water contamination, figured that black plug layer was linked to the capacity of the soil to absorb water and to some nutrients - and that even though the two golf courses were close, the soils might be different.

Black plug is almost impossible to eradicate, but it can be controlled, he said.

As these bacteria don't like oxygen, Cullimore suggested "maximising penetration of oxygen into the green."

To do this, the soil is regularly aerated by poking holes in its surface with a mechanical fork.

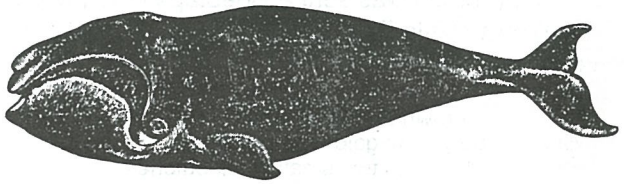
Also the watering pattern of the green was changed from short and frequent to long and intense.

Cullimore cautions that "although it worked at Tor Hill where the greens are sand-based, it might not work for some other soil types."

Black plug layer needs to be closely monitored as the condition returns very quickly. To help the greenskeepers Cullimore devised a special portable instrument which measures water filtration through the soil and the thickness of the layer.

Funding was provided by the City of Regina and the National Research Council's Industrial Research Assistance Program.

Canadian Science News, Vol. 10, No.42



THE DIVING BEHAVIOUR OF ATLANTIC RIGHT WHALES

Atlantic Right Whales (*Eubalena glacialis*) dive far deeper than anyone had thought, and appear to spend their time in the depths eating. Jeff Goodyear, a graduate student at the University of Guelph, studied the whales' diving behaviour using a device he developed to provide continuous data about a whale's dive while it is happening. The small device is attached to the whale's back with a suction cup or shot into the blubber with a crossbow.

Before Jeff Goodyear began his research in 1988, scientists had no idea how deep the whales dived, how long they stayed below, or what they were doing while submerged. This research has shown that the whales are far deeper divers than anyone expected, going straight down to a depth of 230 metres. All evidence indicates that the animals go to those depths to find their favourite food - the small crustacea called copepods.

Right whales eat copepods almost exclusively. There seem to be dense concentrations of them, each 4-5 millimetres long, just above the sea floor. Goodyear thinks this rich food source may explain the whales' deep dives.

"It does not make sense for an animal to burn up the energy required to go down to that depth if it isn't going to get some energy benefit from it," Goodyear says. However, he feels that more data are needed before he can be certain that feeding is the reason for the dives.

Atlantic Right Whales, which spend the summer months in the Bay of Fundy and on Brown's Bank off southwestern Nova Scotia, were hunted almost to the point of extinction in the 17th and 18th centuries. Today there are only 250 to 300 animals left. Whale researchers are trying to learn more about them - their feeding activity, calving and wintering grounds and so on - so that conservation measures can be taken to preserve the remaining animals. Jeff Goodyear's work is part of this effort.

In the United States, a Right Whale recovery plan was established to collect information and find ways to protect them. It involves moving shipping lanes away from areas where they congregate, or having whale spotters on board ships. Because Right Whales compete for food with the commercially important herring, an understanding of the whales is also important for fishery management.

Lorraine Brown, for Canadian Science, Vol. 10, No. 42

jaeger

SKUAS AND JAEGERS

Mid-September, out on the ocean, the late afternoon sun was beating down as the gentle swell lulled most of the passengers on the small craft into a light doze. My companion and I were enjoying a quiet conversation when suddenly the bellow "SKUA!" alerted everyone to the furtive seabird off the port side. I put up my binoculars and saw the unmistakable flash of white as the bird flapped off away from us. The broad, dark brown back and the wedge-shaped tail indicated that this was a Great Skua (*Catheracta skua*). A new species for several of us, it filled us with excitement as we scrambled for life lists and pencils. The ultimate thrill was to be able to identify this strong, seldom-seen cousin of the gulls and terns.

Later reflection on this great bird led me to do some research: Skuas and the smaller jaegers are found on both poles of the planet. The Great Skua and the South Polar Skua (*C. macormicki*) are rarely seen on land outside the breeding season, for they lead a pelagic life far out at sea. Both species migrate towards the tropics, commonly crossing the equator, and are seen in both northern and southern hemispheres. The Great Skua breeds in both the Arctic and Antarctic.

Jaegers (often called skuas outside North America) are also pelagic birds, breeding in the Arctic, circumpolar on the tundra. There are three species of Jaeger: Parasitic Jaeger (*Stercorarius parasiticus*), Pomerine Jaeger (*S. pomerinus*) and Longtailed Jaeger (*S. longicaudus*). In Europe and Asia these may be called the Arctic, Pomerine and Longtailed Skuas respectively.

Both skuas and jaegers are basically fish-eaters, for they spend so much time at sea. They do fish actively for themselves but are best known for their habit of piracy. They chase and harass gulls, gannets and cormorants, forcing them to disgorge their food, which the pirates quickly seize.

During the breeding season, in the Arctic, these birds earn the grisly reputation of killers. They regularly hunt and prey on Puffins, Kittiwakes, songbirds, and lemmings, but because of their webbed feet, cannot hold or dispatch prey as a raptor does. Consequently they do not hunt healthy adult prey, but raid nests for unguarded eggs and nestlings. In the Antarctic, the Great Skua targets penguins.

Jaegers and skuas nest in colonies like gulls and terns, but at lesser density. A pair shares incubation for 24 to 28 days, and the two chicks are fed by both parents. Nests are aggressively guarded and the adults divebomb intruders from fifty feet straight up, striking with wings and feet. A four pound skua has been known to knock a man off his feet, stunning him. Jaegers are also noted for their distraction displays.

These birds are rarely seen around our coasts, and are unpopular with some people, due to their bad reputations; perhaps they do not deserve it. I know that I was overjoyed at seeing my first Great Skua, and look forward to my next!

Catherine Strugnell

NATURAL HISTORY

WHY DO WE SPEND SO MUCH TIME ON BIRDS?

All natural history societies spend a lot of time discussing birds, and their newsletters reflect this. What are the reasons?

Birds are abundant, relatively large, often brightly coloured, and are about in daylight year-round. Except for house pets and the spider in the bath, they are the first animals we see every morning. In fact we feed them, at least in winter. They are our typical animals; many of our members watch them - and write about them too.

The same thing happens with plants: we look for flowers, and largely ignore mosses, lichens and even trees, although I think we have more talks and walks devoted to these than we do to the many invertebrate groups.

In contrast to birds, mammals and. reptiles are less common, reclusive, nocturnal, boringly brown (until one gets to know them), and often carry emotional baggage. Mice, rats, garter snakes (and spiders) suffer from bad press.

Invertebrates are many, usually lumped together, often considered as pests, and few of us know much about them.

Actually birds are very good animals and particularly good examples of vertebrates. We think they arose from a late and specialised dinosaur line, while mammals began early from a fairly basic pattern; birds have kept many reptilian characters, while sharing their warm blood with mammals.

All animals share certain biochemical, physiological and behavioural strategies, so what we learn most easily from birds can often be applied to other groups.

THE OSPREY, the newsletter of the Natural History Society of Newfoundland and Labrador, Inc., recently published an article by William Threlfall on albinism in birds. This followed so naturally on Roy John's 'Colour in Birds' that the article is reprinted here. The information is relevant to molluscs and insects, among other things - and also to flowers.

The topic of colour leads to other interesting questions: pigment sources, colour inheritance, and of what happens to the animal with unusual colouration. White lions in Africa find it hard to catch prey, because the prey sees them first; domestic cats often have the same problem.

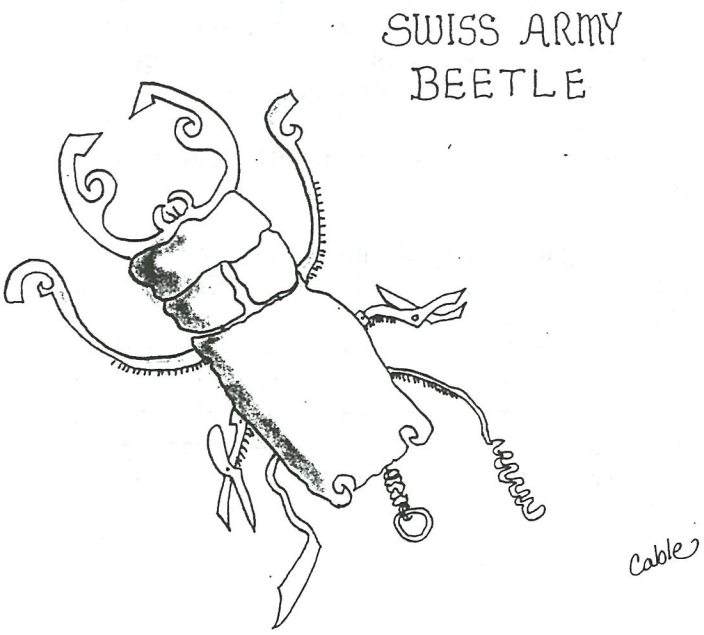
Some Halifax sparrows have white feathers in their wings and tails and there are sometimes crows around Tower Road with white wing feathers. In both these cases, the specimens I have seen are not symmetrically coloured, contrary to Threlfall's report. And the peregrine falcon I saw chasing young crows was targeting the one with white wing feathers...

What happens to the off-colour insect? Well, some of the tastiest ones achieve the warning colouration of predatory or poisonous species, and those which don't adopt camouflage get eaten.

Meanwhile - does anyone have a hobby of spider-watching, snake-stalking or black-fly anatomising (as distinct from anathemising!) and will tell us something about it?

Ursula Grigg

EQUIPMENT UPDATE



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OCTOBER–OCTOBRE

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SU	1530	1.0	.3	MO	1630	.3	.1
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TU	1650	1.2	.4	WE	1830	.8	.2
MA	2255	5.1	1.6	ME			
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WE	1740	1.4	.4	TH	1210	5.5	1.7
ME	2335	4.9	1.5	JE	1930	1.0	.3
7	0545	2.1	.6	22	0055	5.2	1.6
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TH	1840	1.5	.5	FR	1310	5.2	1.6
JE				VE	2030	1.2	.4
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	0655	2.3	.7		0905	1.9	.6
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VE	1945	1.5	.5	SA	2120	1.3	.4
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MA	2330	.7	.2	ME			
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VE	1940	6.3	1.9	SA	2005	5.5	1.7
				31	0205	1.6	.5
					0805	5.9	1.8
				SU	1435	.8	.2
				DI	2040	5.5	1.7

NOVEMBER–NOVEMBRE

Day	Time	Ht./ft.	Ht./m	Jour	Heure	H./pi	H./m
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	0840	5.9	1.8		0920	6.5	2.0
MO	1510	.9	.3	TU	1610	.3	.1
LU	2120	5.5	1.7	MA	2200	6.1	1.9
2	0315	1.7	.5	17	0430	1.4	.4
	0920	5.8	1.8		1010	6.2	1.9
TU	1545	1.0	.3	WE	1705	.5	.2
MA	2155	5.4	1.6	ME	2250	5.9	1.8
3	0350	1.8	.5	18	0535	1.7	.5
	0955	5.7	1.7		1100	5.9	1.8
WE	1625	1.1	.3	TH	1800	.9	.3
ME	2235	5.4	1.6	JE	2340	5.7	1.7
4	0435	2.0	.6	19	0635	1.9	.6
	1035	5.6	1.7		1150	5.6	1.7
TH	1715	1.2	.4	FR	1855	1.1	.3
JE	2315	5.3	1.6	VE			
5	0530	2.2	.7	20	0030	5.5	1.7
	1115	5.5	1.7		0735	2.0	.6
FR	1815	1.3	.4	SA	1240	5.3	1.6
VE				SA	1950	1.4	.4
6	0000	5.3	1.6	21	0120	5.4	1.6
	0645	2.3	.7		0830	2.0	.6
SA	1205	5.4	1.6	SU	1340	5.0	1.5
SA	1915	1.3	.4	DI	2035	1.6	.5
7	0055	5.3	1.6	22	0220	5.3	1.6
	0750	2.3	.7		0920	2.0	.6
SU	1300	5.3	1.6	MO	1445	4.9	1.5
DI	2015	1.3	.4	LU	2120	1.8	.5
8	0200	5.4	1.6	23	0320	5.4	1.6
	0855	2.1	.6		1010	1.8	.5
MO	1410	5.2	1.6	TU	1550	4.9	1.5
LU	2110	1.2	.4	MA	2210	2.0	.6
9	0310	5.6	1.7	24	0415	5.5	1.7
	0955	1.8	.5		1055	1.6	.5
TU	1525	5.3	1.6	WE	1650	5.0	1.5
MA	2205	1.2	.4	ME	2255	2.0	.6
10	0415	6.0	1.8	25	0500	5.6	1.7
	1055	1.4	.4		1140	1.4	.4
WE	1640	5.5	1.7	TH	1740	5.2	1.6
ME	2305	1.1	.3	JE	2340	2.0	.6
11	0510	6.4	2.0	26	0545	5.8	1.8
	1155	.9	.3		1225	1.2	.4
TH	1740	5.8	1.8	FR	1820	5.3	1.6
JE				VE			
12	0005	.9	.3	27	0025	1.9	.6
	0605	6.7	2.0		0620	5.9	1.8
FR	1250	.5	.2	SA	1300	1.0	.3
VE	1835	6.0	1.8	SA	1900	5.4	1.6
13	0100	.8	.2	28	0105	1.8	.5
	0650	6.8	2.1		0700	6.0	1.8
SA	1340	.2	.1	SU	1340	.9	.3
SA	1925	6.2	1.9	DI	1940	5.5	1.7
14	0155	.8	.2	29	0140	1.7	.5
	0740	6.9	2.1		0740	6.0	1.8
SU	1430	.0	.0	MO	1415	.8	.2
DI	2015	6.3	1.9	LU	2020	5.5	1.7
15	0245	.9	.3	30	0215	1.7	.5
	0830	6.8	2.1		0815	6.0	1.8
MO	1520	.1	.0	TU	1450	.7	.2
LU	2110	6.2	1.9	MA	2055	5.6	1.7

DECEMBER–DECEMBRE

Day	Time	Ht./ft.	Ht./m	Jour	Heure	H./pi	H./m
1	0255	1.7	.5	16	0410	1.5	.5
	0855	6.0	1.8		0950	6.3	1.9
WE	1525	.8	.2	TH	1635	.6	.2
ME	2135	5.7	1.7	JE	2230	6.1	1.9
2	0335	1.8	.5	17	0505	1.7	.5
	0935	5.9	1.8		1035	6.0	1.8
TH	1610	.9	.3	FR	1725	.9	.3
JE	2215	5.7	1.7	VE	2310	5.9	1.8
3	0425	2.0	.6	18	0600	1.9	.6
	1015	5.9	1.8		1120	5.7	1.7
FR	1655	1.0	.3	SA	1815	1.2	.4
VE	2300	5.8	1.8	SA	2355	5.8	1.8
4	0520	2.1	.6	19	0655	2.0	.6
	1100	5.7	1.7		1210	5.4	1.6
SA	1750	1.1	.3	SU	1900	1.5	.5
SA	2345	5.8	1.8	DI			
5	0630	2.2	.7	20	0040	5.6	1.7
	1150	5.6	1.7		0745	2.0	.6
SU	1850	1.2	.4	MO	1300	5.1	1.6
DI				LU	1945	1.8	.5
6	0035	5.8	1.8	21	0130	5.5	1.7
	0735	2.1	.6		0830	2.0	.6
MO	1245	5.4	1.6	TU	1355	4.9	1.5
LU	1945	1.3	.4	MA	2025	2.0	.6
7	0135	5.8	1.8	22	0220	5.4	1.6
	0835	1.9	.6		0920	1.9	.6
TU	1350	5.2	1.6	WE	1500	4.8	1.5
MA	2045	1.3	.4	ME	2115	2.2	.7
8	0235	5.9	1.8	23	0315	5.3	1.6
	0940	1.6	.5		1005	1.8	.5
WE	1505	5.2	1.6	TH	1605	4.7	1.4
ME	2145	1.4	.4	JE	2205	2.3	.7
9	0345	6.1	1.9	24	0410	5.4	1.6
	1040	1.3	.4		1100	1.6	.5
TH	1615	5.3	1.6	FR	1700	4.8	1.5
JE	2245	1.4	.4	VE	2255	2.2	.7
10	0445	6.3	1.9	25	0505	5.6	1.7
	1140	.9	.3		1145	1.4	.4
FR	1725	5.5	1.7	SA	1750	5.0	1.5
VE	2350	1.3	.4	SA	2345	2.1	.6
11	0540	6.5	2.0	26	0550	5.7	1.7
	1235	.5	.2		1230	1.2	.4
SA	1820	5.8	1.8	SU	1835	5.2	1.6
SA				DI			
12	0050	1.2	.4	27	0035	1.9	.6
	0635	6.6	2.0		0635	5.9	1.8
SU	1330	.2	.1	MO	1310	.9	.3
DI	1915	6.0	1.8	LU	1915	5.4	1.6
13	0140	1.1	.3	28	0115	1.7	.5
	0725	6.7	2.0		0715	6.0	1.8
MO	1415	.1	.0	TU	1350	.7	.2
LU	2005	6.1	1.9	MA	1955	5.6	1.7
14	0230	1.1	.3	29	0155	1.6	.5
	0815	6.6	2.0		0755	6.1	1.9
TU	1505	.1	.0	WE	1430	.6	.2
MA	2055	6.2	1.9	ME	2035	5.8	1.8
15	0320	1.3	.4	30	0235	1.6	.5
	0900	6.5	2.0		0835	6.2	1.9
WE	1550	.3	.1	TH	1510	.5	.2
ME	2140	6.1	1.9	JE	2115	5.9	1.8
				31	0320	1.6	.5
					0920	6.2	1.9
				FR	1550	.6	.2
				VE	2200	6.1	1.9

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