

Summer



The
English Year.

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THE ENGLISH YEAR

SUMMER

THE ENGLISH YEAR

COMPLETE IN THREE VOLUMES

SPRING

SUMMER

AUTUMN AND WINTER

LONDON: T. C. & E. C. JACK
AND ALL BOOKSELLERS

A SURREY MEADOW

By TOM MOSTYN





THE ENGLISH YEAR

SUMMER

BY

W. BEACH THOMAS AND A. K. COLLETT

With a Series of Reproductions in Colour from
the work of Sir Alfred East, Harry Becker,
and Tom Mostyn, and Drawings in
the Text by A. W. Seaby



BULLFINCH IN BOX-TREE

LONDON: T. C. & E. C. JACK

67 LONG ACRE, W.C.

AND EDINBURGH

THE ENGLISH YEAR

SUMMER

BY BESS THOMAS AND A. K. COLLIER

Illustrated by the Authors

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AND BIRMINGHAM

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CONTENTS

	PAGE
SUMMER,	I
JUNE CALENDAR,	9
CLIMBING THE HEDGEROW,	13
THE LONELIER HOURS,	22
MIDSUMMER BUTTERFLIES,	35
THE STRUGGLE FOR LIGHT,	43
DANGERS OF THE GROUND	50
THE ROSE OF ENGLAND,	57
SONGS AND MUSIC,	65
ALONG THE RIVER,	73
THE DAY OF THE MOTH,	95
ON THE CHALK DOWNS,	106
DISCS OF BLOSSOM,	120
JULY CALENDAR,	127
AMONG THE GRASSES,	131
LEARNING TO FLY,	141
CORNFIELD FLOWERS,	157
BUTTERFLY FLIGHT,	167
DYING MUSIC,	180
THE WAYS OF A TROUT,	185
THE DRAGON FROM THE POND,	197
THE TURNING TIDE,	203
THUNDER AND LIGHTNING,	210
CHAFERS AND CLOCKS,	217
WILD WALL-GARDENS,	228

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	PAGE
AUGUST CALENDAR,	239
THE ENDED TRUCE,	243
JOY IN HARVEST,	252
BELOW THE TIDEMARK,	264
THE YELLOW WASP,	276
A CHANGE OF DIET,	283
FIR-WOODS AND HEATHER,	290
THE SACRIFICE OF WINGS,	300
THE HEAT OF THE SUN,	306
SUMMER LIVERIES,	313
WHERE FISH ARE FOUND,	320
SHORE AND SALT-MARSH,	326
INDEX,	337

LIST OF COLOUR PLATES

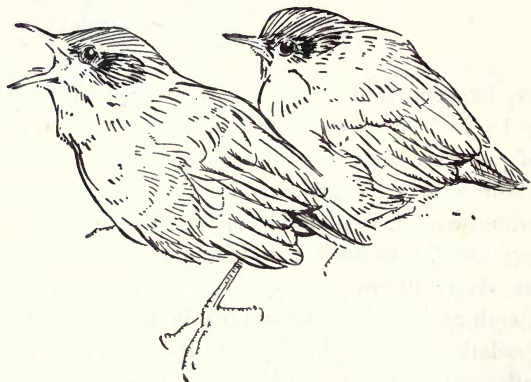
A SURREY MEADOW. BY TOM MOSTYN,	<i>Frontispiece</i>
SUMMER (IDYLL). BY TOM MOSTYN,	6
THE GARDEN OF MEMORY. BY TOM MOSTYN,	60
THE PATH THROUGH THE WOODS. BY SIR ALFRED EAST, R.A., P.R.B.A.,	114
THE MOWER. BY HARRY BECKER,	136
NIGHT IN THE VILLAGE. BY SIR ALFRED EAST, R.A., P.R.B.A.,	158
A WOODLAND GLADE. BY TOM MOSTYN,	180
A SUFFOLK FARMSTEAD. BY HARRY BECKER,	226
THE BEAN HARVEST. BY HARRY BECKER,	256
BUILDING THE RICK. BY HARRY BECKER,	286
THE EDGE OF THE WOOD (SURREY). BY TOM MOSTYN,	292
THE OLD WATER MILL AT HOUGHTON. BY TOM MOSTYN,	322



SUMMER

SUMMER, as compared with the seasons on either side of it, may be looked upon in spite of many exceptions as a time of puberty, when vigour keeps, so far as we see, at a constant point. There are indeed only two seasons, summer and winter, two static times bound together by the changing months of spring and autumn. But the tide of the year, rising in spring, is quicker, more sudden, than the ebb, though nothing is quite sudden in this happy island of quiet gradations, where the days are bound, each to each, by lineal affection. One day in late June, almost before we are aware, the country before us is at the full—the tide is in. The green waters have quietly made through the creeks and inlets and crept through the ridges of the sands. They have hidden the rocks that sloped down to the sand; and the scenery of the shore, various if bleak, is clean gone under an everlasting wash of twinkling ripples. One may speak of the summer overcoming the face of the country very much in the same terms as one may speak of the rising sea. The green leaves are a tide that hides the tracery of bough and twig, not much unlike the flowing of the sea over sand and rock. Many shapes and forms give place to one wash of colour.

The mood of summer is quite another thing than we have known in spring. Birds and mammals share in the mood with men. Those ecstatic dashes of flight over wide seas are passed. The colours that relit the winter feathers have remained brilliant; and the body and being of the animal feels none of the unrest of growth. It is true that the old birds fall to the work of feeding the young with an



YOUNG WHITETHROATS

energy that is almost the energy of migration; but the mood of all animals is in general static. The flight quite alters. Before summer is over the old blackbirds will hardly take the trouble to top the hedge when you pass them. The pigeons no longer clap their noisy wings behind them. The mothering birds that before showed nervousness of excitement are now among the lurkers, slipping out of sight, not dashing away on a tumult of wings. The noisy flocks that challenged observation are split up into secret pairs. You will have some ado to find where hares are lurking; and the

foxes slink very secretly to their earths. The high tide hangs at the full or close to the full for a long time, as sometimes the real tide will. All the change you note is that the elms are blacker and heavier and more massive than ever. The distinctive shapes and patterns of the hedgerow bottom are rather more hopelessly buried than ever by grasses and kexes and nettles. The bronze and reddish colours that



‘THE ELMS ARE BLACKER’

bided for a long while on oak and walnut and rose are lost in a monotone of green which may compare with the sea—‘too full for sound or foam’—when the air is still. The true midsummer, the hours of the high tide, come in July. The very dog-roses, which lit the hedgerows in the splendour of flaming June, are themselves subdued to the colour that is now puissant and prevailing. A green case hides the seeds and swells in the place of the white and pink petals. A like subdual has come over the chestnut blossoms, which stood up almost comically like candelabra to carry on the

sense of spring into the new season. Summer comes progressively,

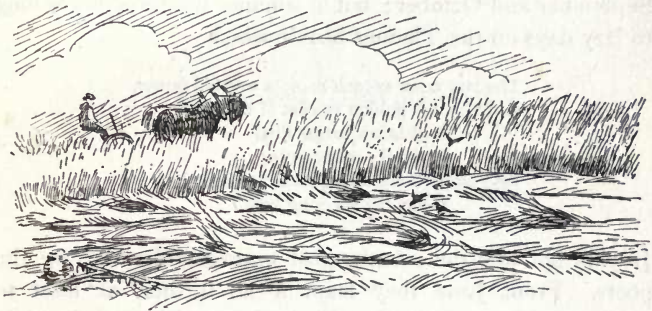
‘Annihilating all that ’s made
To a green thought in a green shade.

In some countries the symmetry, the changelessness of summer, becomes an oppression. Colour has the effect of glare. You escape from a dusty town into country that is a kiln—such sometimes is the impression. We feel this in England, too, a little. The world has a desire for something that is not town and is not, in the ordinary sense, country. People fly to the sea for the sake of its movement and its variableness and its coolness; and to escape the dry and torrid monotony, as it seems to some, that has taken possession of the land, while the succulent stems of wild grass and tame corn are drying their juices, and the leaves of the trees are palpably losing freshness and ‘surface.’

Great changes there are, of course, in these months; but to the eye many of the changes are rather artificial than natural. The grasses are cut at the time when they have hardly reached that full tide at which the trees abide the summer long, and growth begins again after the cutting. As for harvest proper, it is felt to be an event of autumn, though it intrudes into summer; and in a highly cultivated country makes the greatest change of all.

The sounds of summer suffer a more thorough change than the sights. Almost before we know it all the birds, or almost all the birds, have gradually sunk into silence. Even expert naturalists are surprised year after year by the completeness of this silence and its early date. Burroughs, king of American naturalists, came over to England largely to hear the nightingales sing; but he went back home with his desire unfulfilled. He had simply stayed in towns too late; and when they journeyed into the country he and his advisers

found themselves in a land where 'no birds sing.' The nightingales were tending their young in the thick coppices and wide bits of the hedges. The flames of 'flaming June' had died into a hot glow, and the ecstasy of song into a motherly quietude. How could birds sing in so gorgeous a place, where nothing is 'half-revealed and half-concealed,' where the wonder and the wild desire are subdued to a steadfast and curtained splendour. You will find in English poets who have been most prodigal of descriptions of spring



and autumn—especially autumn—and winter scarcely a really summer song. They are as mute as the birds when August is near.

What summer songs there are treat of June, which is half spring, not of full summer; and even so perhaps the most notable of June songs in our language is not English. The words are Lowell's:

'And what so rare as a day in June?
 Then if ever come perfect days,
 Then heaven tries earth if it be in tune,
 And over it softly her warm ear lays.
 The flush of life may well be seen,
 Thrilling back over hills and valleys.

The cowslip startles in meadows green,
 The buttercup catches the sun in its chalice ;
 And there 's never a leaf nor a blade too mean
 To be some happy creature's palace.'

It is June, not July, with Lowell, too ; and he is thinking not of the mute nightingale, but the bobbing bobolink. Most of the summer songs there are find their inspiration in the water rather than the land. You will mark this especially in the work of the present Laureate, who is a great teller of the seasons. He loves January and February and May and September and October ; but in summer his thoughts belong to lazy days on the Thames beside which

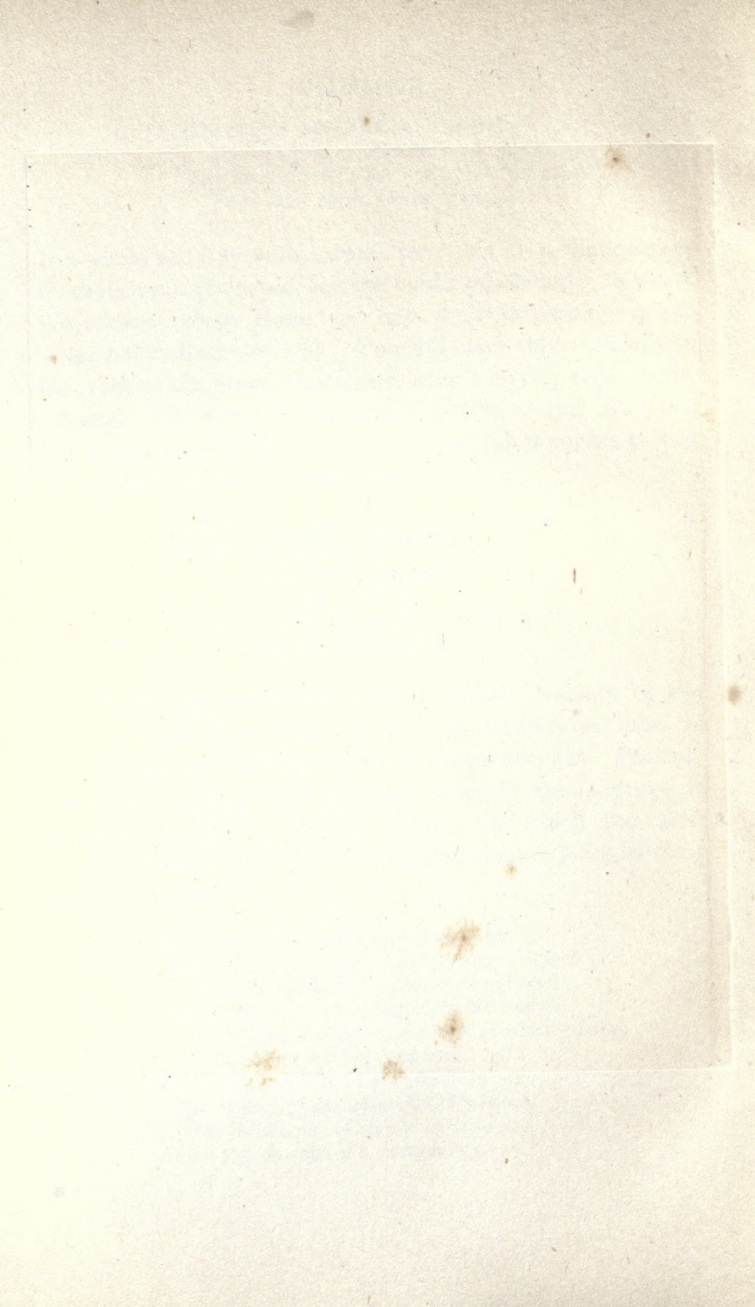
'The lazy cows wrench many a scented flower,
 Robbing the golden market of the bees ;
 And laden barges float
 By banks of myosote ;
 And scented flag and golden flower-de-lys
 Delay the loitering boat.'

July is perhaps the month most expressly deserted by the poets. From June they leap, if no further, at least to August and harvest time, which is almost autumn. Possibly one of the most perfect summer pieces in the language is Matthew Arnold's 'Scholar Gipsy,' in which the most English Oxford county in the summer time is brought clear before our eyes.

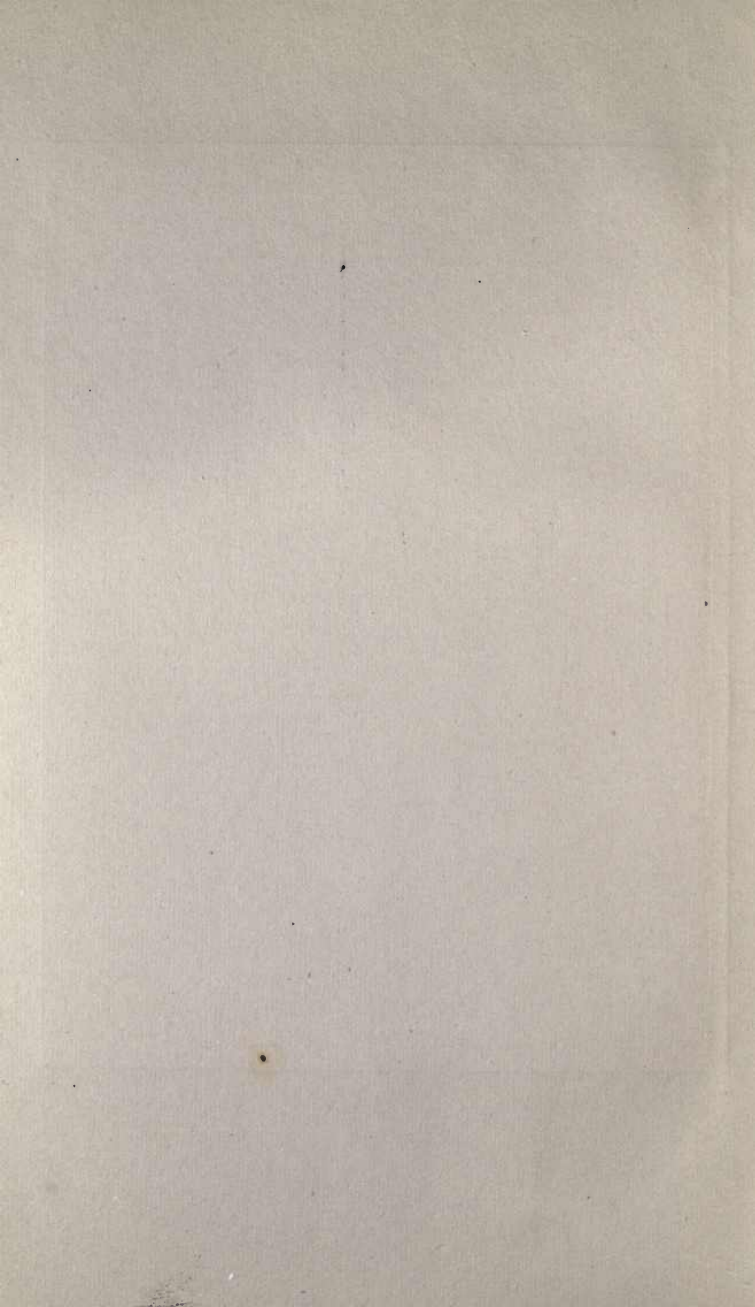
'Here, where the reaper was at work of late,
 In this high field's dark corner, where he leaves
 His coat, his basket and his earthen cruse,
 And in the sun all morning binds the sheaves,
 Then here, at noon, comes back his stores to use ;
 Here will I sit and wait,
 While in my ear from uplands far away
 The bleating of the folded flocks is borne,
 With distant cries of reapers in the corn,
 All the live murmur of a summer day.

SUMMER (IDYLL)

By TOM MOSTYN







‘Screen’d in this nook over the high half-reaped field,
 And here till sundown, Shepherd! will I be,
 Through the thick corn and scarlet poppies peep,
 And round green roots and yellowing stalks I see
 Pale pink convolvulus in tendrils creep;
 And air-swept lindens yield
 Their scent, and rustle down their perfumed showers
 Of bloom on the bent grass where I am laid,
 And bower me from the August sun with shade,
 And the eye travels down to Oxford Towers.’

The lines recall some of the very few lines that surpass them in giving the sense of a summer. Wordsworth was not the peer of Arnold as botanist, but the Tintern landscape is even surer than the Oxford, and more English.

‘The day is come when I again repose
 Here under the dark sycamore, and view
 These plots of cottage-ground, these orchard tufts,
 Which, at this season, with their unripe fruits,
 Are clad in one green hue, and lose themselves
 Among the woods and copses, and disturb
 The wild green landscape. Once again I see
 These hedgerows, hardly hedgerows, little lines
 Of sportive wood run wild; these pastoral farms
 Green to the very door; and wreaths of smoke
 Sent up in silence from among the trees!’

But though we think of summer in England as ‘clad in one green hue,’ it is worth remembering that those who have travelled round the world, and pried into the forests of tropical regions, have found England conspicuous not only in soft scents, but in brilliance of colour. Both the joys and sorrows of English are highly coloured. What is more gorgeous than the crimson of a field of Australian clover, or the mauve of common clover, or the pink of sainfoin? You will find no such fires of colour as the mustard-field of the Eastern counties or the sham mustard or charlock that adds too much brilliance to too many fields. The

poppies in the corn in Poppyland have a vivid salience you will try to parallel in vain. When Linnaeus, in the legend, fell down on his knees to thank God for the golden gorse that covered one of our Welsh hillsides, he was saying grace for a sight that quite outdoes the tropics. The tale may be taken along with the anecdote of Tennyson who, walking with a friend, suddenly went down on his knees and buried his nose among the shyest of our flowers, saying, 'Smell 'em, man. Smell 'em.' We have regions of gold and of scarlet. We have also great regions of purple which clothe the summer downs with as joyous a dress as the floor of the woods in bluebell time.

The meadows are green, and the hedgerows are green, and the trees are green pillars; but let those who would picture the English summer not quite forget the plaques of colour that the hedges frame or the wide spaces of colour where no hedgerows are.



YOUNG GREAT TITS



JUNE

'The pinks along my garden wall
Have all shot forth their summer stalks,
Thronging their buds 'mong tulips hot,
And blue forget-me-not.
Their dazzling snows forth bursting soon
Will lade the idle breath of June ;
And waken thro' the fragrant night
To steal the pale moonlight.
The nightingale at end of May
Lingers each year for their display ;
Till when he sees their blossom blown,
He knows the spring is flown.
June's birth they greet, and when their bloom
Dislustres, withering on his tomb,
Then Summer hath a shortening day ;
And steps slow to decay.'

ROBERT BRIDGES, *Garden Signs.*

'Where the bee sucks, there suck I ;
In a cowslip's bell I lie :
There I couch when owls do cry ;
On the bat's back I do fly
After Summer merrily.
Merrily, merrily, shall I live now,
Under the blossom that hangs on the bough.'

SHAKESPEARE, *Ariel's Song.*

THE COUNTRY CALENDAR

JUNE, which is the top of the year, is a month with several constant epithets. 'Leafy' June is one. 'Flaming' June is another, and

the best. Energy and colour are the marks of the month. Spring is not over, and summer is not stale. The garden certainly flames, principally and most notably with roses, of which the carmine pillar is a real pillar of flame. The trees are alight. How many people in June have thought of the upstanding pink and white flowers of the horse chestnut as a candelabra? Tennyson, though he was scolded for it, wrote of the laburnum's 'slow-dropping wells of fire,' another type of flaming June. The may-trees are bright with flower, and the lilac and the acacias. The syringa weights the air with scent. The hedgerow gleams on June nights with discs of light, with heavy-scented alder-flowers, and guelder and dog-rose and wayfaring tree, and with a galaxy of kexes at the foot.

The naturalist can pursue every sort of his quarry. The guillemots' eggs on the Bempton cliff are still lawful prey; corn-buntings' eggs may be found; and the latest migrants, the reed-warbler, the flycatcher, turtledove and swifts begin to lay. The leaves of the hedgerow are alive with young birds; and the hayfields, which are reaped this month, are a wishing-well of discoveries. You have flower, you have fruit, and yet, plain on the ash and oak, you have the breaking of the leaf-bud and the change from red to green. In no month do birds so baffle one with a range of notes. Before the nightingale grows silent towards the end of the month, and the cuckoo changes his tune, young birds and hen birds, as well as the fussy cock birds, indulge in a number of calls and cries and whispers that have quite evaded the attempts at classification. But before the month is over the hunt for caterpillars and insect food for the young has brought the song of the parents to an end, and it has become little more than a cluck such as the robin's when calling the young, or the blue tit's just before entering the nest.

Some moths now first emerge, the fox moth and the hawk moth; but the time is rather remarkable for the host of beetles and weevils and chafers that appear: the bright green nettle weevils, the long thin-bodied red 'soldier' and blue 'sailor' beetles, the cockchafer, noisy on June evenings, and the rose chafer. It is the month too to see the glow-worm, the little beetle of the hedgerow. The month has several nature festivals.

Shearing day, now an occasion less thought of, was once one of the most hilarious and characteristic, especially celebrated by the picking of posies.

Many country rhymes pay great honour to St. Barnabas' Day, the summer solstice under the old calendar. The most quaint and informative runs—

'When St. Barnaby bright smiles night and day,
Poor ragged robin blooms free in the hay.'

Another traditional signpost of the ripening of the grass is the sound of the seeds in the pod of the yellow rattle; and this is perhaps a better sign than the blooming of the ragged robin, which is often premature. An old weather couplet of the month says truly—

'A leaky May and a warm June
Bring on the harvest very soon.'

A wet June is said to spoil the rest of the year.

In Germany the St. John's wort, which has a saintly splendour of flower, is associated with St. John's Day, June 24th.

Heavy thunderstorms, which kill many ground-nesting birds, and towards the end of the month a spell of north wind, are common symptoms of June weather.

June 1st.—The close season for coarse fish ends in many waters.

June 24th is Midsummer's Day, the longest day, the sun rising at 3.45 a.m. and setting at 8.19 p.m.

Average temperature of June 1st, 57.4°.

Average rainfall of month, 2.2 inches.

June 1st. Sun rises 3.51 a.m.; sets 8.5 p.m.



YOUNG WRYNECKS



CLIMBING THE HEDGEROW

AT a particular date very early in summer the hedgerow, which was a maze of crooked twigs of quick or a tangle of many growths, begins to take on an appearance almost as if it were being crushed out upwards, from bottom to top. Then begins a race for the upper air, and the hedgerow bushes, which are always visible, which are the hedge, become mere supports, like pea-sticks, for a variety of climbing aspirants. At the foot, quaintly suggesting the scoop of a wave before it breaks, the goose-grasses and stitchworts begin the race. The stitchwort perhaps would not generally be called a climbing plant; but it is too weak-kneed for the most part to stand alone, and with proper support attains a greater height than most people would realise. On many characteristic hedgerows these stitchworts along with the goose-grass, reach upwards with a concave dip, where they sag before reaching the support of higher branches. They climb so regularly that a long stretch is almost symmetrically covered; and when the star-flowers come out at the upper edge, you might be persuaded into thinking that they were flecks of foam on the upper ridge of a curling wave. The goose-grass is more regular still and more truly a climber. It has the proper apparatus, whereas the stitchwort climbs only because it

flourishes most where supports happen to be. The stitchwort wobbles upwards, if one may say so, resembling Meredith's maxim that 'the flame of the soul burns upwards; but we must allow for atmospheric variation.' No atmosphere or accident prevents the goose-grass taking the shortest, that is, the straightest route upwards which its supports allow. It opens so successfully that often it makes a fringe as symmetric as you could see on stuff in a shop.

The device is not uncommon. Touching the plant, you might vow that it was sticky with a gummy substance. Even on the hard and smooth palm of the hand it feels as if it was clinging by some adhesive ooze. The hairs on stalk and leaf are more numerous and sharper than the teeth of a fretsaw, and can attach themselves to roughnesses quite invisible to the eye. It climbs very much as many seeds distribute themselves, by a system of little grappling irons. The goose-grass stem and leaf have an affinity with the burr. But the climbers have more devices than one. The seed, like the cat in the fable, has one; the climber, like the fox, a number. Though this mechanical stickiness is the master device, there are others. Everything that climbs, in what may be called the loose way, grows at a great pace. The tip of the goose-grass has just enough strength to keep upright and just enough limpness to sway into touch with the nearest support. Like other climbers this grass tapers to the tip and anchors itself, like the worm in its hole, by putting out leaves at right angles. The pretty whorl of leaves, which encircle all members of the family to which the goose-grass belongs, may indeed very well be compared with the hairs on the worm. They lie at first smoothly along the stem or body; and are then put out at an abrupt angle, greatly assisting to maintain the position gained.

When we see first the constellations of the stitchwort and

the tiny flowers of the goose-grass, and note this wealth of green over the back of the hedgerow we know that summer is really come. Few plants add more to that luxuriance of green which distinguishes summer from spring. But these climbing binds spring to summer and enjoy a progress which shows no division. A more sudden emergence of a new season is presented by that prince of climbers the white bryony. It has no rival in the English hedge, either in speed of growth or in perfection of device. Botanically it is in a class by itself, as its colour and form may well suggest. The time to watch it is in a wind on some loose hedgerow. On the tight, clipped hedges which are almost walls, this bryony suddenly pops its head out from the top, growing like Alice when she bit the tall side of the mushroom; and it looks almost as much agley as Alice, in the picture in which she appears to be mostly neck. It has climbed through the fence with its prehensile fingers, sailor-like, but is quite at a loss in its new position with a cut surface below and nothing to cling hold of above or to the side. Its grappling tools now pull it down instead of up; and its attraction upwards, an attraction felt by all plants, even in some degree by ground ivy, is a vain instinct. Its crooked leaves, glaucous and soft, its green and grey flowers and spiral shoots make a very lovely fringe along the top of such a hedge; and later the berries look as if they had been placed there in patterns by some artificial aid. But the real place for the white bryony is in a loose and freely grown hedge. Here, as you watch it daily, it might almost be taken for an animal, so conscious the movements seem. Just like a finger, the lip of the tendril hooks over any twig or leaf. Almost while you watch the grip is tightened, and the complete hitch made. By the next morning what one may call the spiral instinct, which is implicit in the growth of nearly all such plants, begins to express itself. The tendril

'corkscrews' daily, working from both ends, so that in the sequel you have a double screw, from right to left on one part, from left to right on the other, the two being joined by a little untwisted bar. The contraction of the tendril has pulled the shoot up half an inch or so. These spare springs are holding the weak shoot in place on all sides and at all angles, so that it is buoyed in complete safety.

But it is only in a wind that you note the full perfection of the tendrils. They have done more than pull the parent



WHITE BRYONY

shoot upwards and upwards. Their spiral form is more than a contraction of the muscles. Though the wind becomes a hurricane, and the bryony has grown in a place fully exposed to it and has bridged wide spaces in the hedge, it will weather the storm without suffering so much as a strain. The tendrils are springs of such sensitive strength that they temper the most blustering attack on the plant. It is a liberal education in mechanics to watch them give and stretch and return to their first form; and in spite of their tender tissue ride out the gale in consummate ease.

One of the pleasures of the season is to observe the sheer speed of growth; and as one watches one sees how necessary an aid to the grappling devices is this faculty of speed. The plant, as it were, rushes at its hills, and sur-

mounts them often by sheer impetus. The speed is curiously little affected by weather, and few plants are truer to date. Why this is so, any one will know who has attempted to translate a white bryony. For the sake of observation the writer transplanted some from hedgerow plants to his garden, and a very difficult task it was. The root stock is buried deep, and it consists of an almost formless mass, a white rather marrow-like tuber consisting wholly of food. From this the bryony grows without heed of outer circumstance. If some moralist is in search of a good illustration of the causes of success in life he might make good use of the bryony. This rapid progress to higher things is not, as it appears, sudden and unexpected. It is the direct result of years of storing. The preparations have been long made: all is ready; and at the signal, at the touch of the summer sun, the stored power is expressed, the capacity proved.

There are seductive illustrations too in the clematis, the lustiest of all the climbers, which is said to be increasing beyond all measure throughout England. We notice the clematis most when it is best described by its nickname of 'old-man's-beard'; but it is best worth watching in summer. The leaf-stems and leaves have more than one curious device. They delight, as the moralist said,

'To rise on stepping-stones
Of their dead selves to higher things.'

The green stems of last year look, till a late date in spring, as if they were stone-dead, withered to nothing. Even to the touch they seem dead. You may say of them, as was said in another reference, that they are 'generally shamming when they're dead.' But they are, as one may say, treated as defunct by the growing shoots. They are made to serve

in the place of ropes by which youth shall climb above the parents' heads. One may make protest against the wild clematis that the instinct to grapple is overdone. The leaf, with its innate power to twist, is so sensitive to stimulus that it grips instantly whatever it touches. If it can grip nothing else it grips itself. You may find hopeless knots and tangles into which some leaves have become so absorbed that they have ceased to perform the function of leaves. The young principal shoot only is saved, and it is not always saved from being dragged down instead of being helped up, by its amazing rapidity of growth. When once the grip is fixed and the leaf stem, or indeed the leaf itself has made a half-hitch, all hope of extrication is over. Not only is the hold tight and tightened daily, but when once a complete circle is made the stem thickens and hardens, so that the most delicate touch could never in any circumstances unwind it. The stuff, so to say, has set. But in spite of its excesses the clematis is perhaps the most successful of all climbers. It reaches immense heights, and being perennial makes good its position. It has one common, indeed almost universal trick, in great perfection. The growing shoot is slim and spearlike, without protuberance on this side or that. As soon as it has insinuated itself through a past opposition, out shoots the side leaves at right angles, making relapse impossible, if there has been any tangle to penetrate.

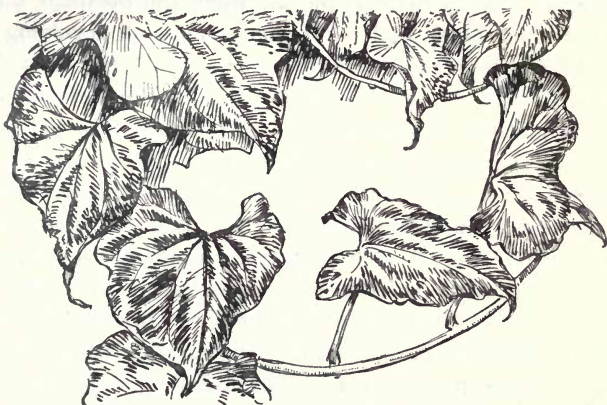
This dodge is most necessary perhaps to the blackberry, a humble and much modified climber. The blackberry leaves in the sequel actually slope backwards, and being very stiff, quite prevent the young shoot from slipping backward through the hedge in which, as a rule, it grows. But the leaf of the clematis excels in length. The barb, as it were, is wider, and though its mission is not to be a barb, as in the

blackberry, but a grappling tool, it performs also the double function. The very tip of the leaf can grasp, only less successfully than the tendril of the white bryony, even such small roughnesses as are formed by the bark of a spruce or a Scotch fir.

In a contest of what we may call, following Mr. Francis Darwin, plant intelligence, perhaps the hop would come out first. The time comes in summer when wide areas of Kent and Worcestershire are quite changed in appearance by a strangely sudden metamorphosis, when the obedient bines mount their poles and wires and strings, all revolving in accordance with their nature in the same spiral from left to right. They are also helped to start by deft fingers. But it is not in a geometric hop garden that you will best discover the intelligence of the hop plant. Circumstances there are too easy for the stimulus of intelligence. It is at its best when seeking a support that is not near at hand. You would swear then that the tip of the shoot had eyes or an equivalent sense, such as roots have. The sensitive tip of a root will make a bee-line for water and will slip round obstacles miraculously. The hop shoot appears to possess more than a spider's skill in finding support. The spider lets herself down on a streamer and swings till something is caught by chance and the help of the wind. She plays for the accident. The hop having reached the top of its support sets out for adventures new with a more delicate aim.

In a particular adventure watched by us, a shoot which reached the top of its support, about seven feet from the ground, set out in a quite direct line for the only pillar that was within reach. It advanced at right angles to its main stem, and in spite of some drooping and eccentric wavings in the wind reached its bourne after a week's journeying. As

it grew you could trace the spiral instinct and habit belonging to all the genus. But the screwing in this passage had the effect of strengthening the stem and increasing its power of direct growth. It enabled itself to grow horizontally and in one general direction by twisting its fibres, just as you can increase the stiffness of rope or string by tightening the ravels of its skein. This method is adopted in quite another form both by the black bryony and in a less degree by the honeysuckle. Almost the normal growth of the



BLACK BRYONY

beautiful black bryony is in the form of a twisted faggot of stems, which support one another in the upward march, just as the bundle of fibres within one hop shoot. It makes a very complete contrast with the white bryony with which it has no affinity except in name. The one has grey, furry, odd-shaped leaves. The other's leaves are dark and very shiny, shaped with precision to a heartlike form. You scarcely notice the stem of the white for its leaves and tendrils. The curled stem of the black make one of the

most conspicuous standards of the season. And yet one can understand the similarity of name. The two are the most conspicuous climbers of the summer hedgerow, and when autumn comes both leave strings of poisonous berries along the line of their withered shoots.



BLACK BRYONY BERRIES



THE LONELIER HOURS

THE glories of summer nights are earth-born, and their lights are warmer and nearer to us than the splendour of the winter moon. All night at midsummer the colour of daylight hardly fades out of the north if the sky is clear; and on wet or cloudy nights the dusk is full of earth's perfumes, and obscurely lit with flowers still gleaming in the unreal darkness. There is seldom a really dark night in June or the first half of July; the sun's path still creeps so near the horizon that light is reflected from all light objects, and even from the upper clouds. The earth on a June night seems plunged in a conscious rest more refreshing than sleep; its spirit seems etherealised rather than sunk in torpor. Cries of half wakeful birds continually suggest how light is the veil of unconsciousness; most creatures hibernate in some degree like dormice or bears, and expend in summer wakefulness the energy they accumulate in long winter sleep. The summer twilight of England is one of the happiest features of its geographical position. The soft veil of the June night is a more exquisite gift of nature than the positive daylight prolonged by the midnight sun.

Sheer daylight prevails in the June nights even in England; we can watch the cool grey stain contending with the stars of the north. In July as the nights grow a little

longer, this white light is often replaced in fine summers by deeper glows still joining the sunset and dawn. Night becomes stiller and more solemn than at midsummer, but hardly darker; and it is often fuller of colour. A glow of rich orange or living cornfield gold illuminates the northern sky and defies the darkness; night is filled with the essence of sunshine poured in the July day. The afterglow of sunset is prolonged by exceptional causes, and the nights become a festival of the sun, yet with the sense of repose shed by its absence from the sky. The afterglow is caused by the rays of the descended sun reflected from lofty clouds or invisible vapours above us, but an ordinary afterglow fades about an hour after sunset. The remarkable nocturnal glows which last on almost till dawn may be due to an unusual volume of floating particles in the higher atmosphere, such as the dust-clouds expelled by a volcano or lifted by a tornado from a desert. Sometimes they may share the principle of the mirage, and be the afterglow of tracts to the west transmitted round the earth's curve by refraction, as travellers see the image of towns or ships projected in the air overhead. The product of earth's own atmosphere, these summer glows give a sense of the fullness of summer unlike the alien brightness of moonlight and starlight.

On cloudy summer nights the earth is lit with its own moons and stars. Elders and wild-rose bushes frame constellations of blossom in the dusky hedges, and a little later white heads of clover shine in the pastures like a Milky Way. White campion flowers gleam opaquely pallid on the grassy banks, and privet blossom stars the shadow of the thickets. The motionless lamps of these blossoms are mingled with other moving lights. Glow-worms set their signals at dusk by roads and rivers, and the white ghost swiftmoths of midsummer vibrate in their fantastic

dances over the grass stems where their golden mates sit hidden.

This dance of the ghost swifts is one of the most ecstatic of all flights. No bird and no other insect combines so intense a movement with so marked a rhythm. While the



WHITE CAMPION

moth's wings whirl with such rapidity that it is a mere nebula in the twilight, it flings itself backwards and forwards on a track a yard or so wide like the weight on the pendulum of a clock. A pasture or hay-field after dusk at midsummer may be covered by dozens of these large white moths absorbed in their passionate exercise. It gives an intense sense of the vitality pulsing in the earth at this midsummer season. The dance seems intensely exhausting, even for a moth with such long and powerful wings. After each bout of frenzy, lasting for one or two minutes, the dancer rests on

a grass-stem, looking a little denser and whiter than the surrounding clover flowers.

The analogy of the displays of birds suggests that the exhibition of speed and glittering whiteness is designed to win the admiration of the female moth. Certainly she is often to be found resting in the grasses over which the male moths dance; but it is hard to be sure in the dusk whether

the dancers deliberately perform before her eyes, or whether the dance is simply an outlet for exultation in her company. As the last glow fades the dancers rapidly desist, and the whole display is over before midnight.

Songs of the summer nights mark audibly the change that comes over the season between the springlike opening of June and the autumnal ripeness and gravity that tinge the dewy August dawns. For the first ten days of June the nightingales are still in song before midnight, though they are rapidly declining; song-thrushes sing late into the white twilight hour, and the cries of plovers and water-fowl show how lightly they are dipped in sleep. The deep and passionate song of the nightingale seems in accord with the scents of evening, and the warmth of the early night. Nightingales stop singing, as a rule, when the air begins to grow chilly towards one o'clock; they are not among the earliest singers of the dawn, in the keener air of the new day. After the nightingales have fallen silent, and before the first larks rise, comes the wind of dawn that runs round the world in advance of the sun, and divides the old day from the new one. The change is palpable; the cooler air has lost the scents and languors of the outworn summer day, and has the renewed freshness of morning. About two o'clock, before it is light enough to see the larks rise in the sky, they can be heard in a great singing company, soaring into the grey morning vault. Sometimes the music comes from the ground; they seem often to utter their first hymn to the coming day before it is clear enough to draw them into the sky. Blackbirds sing a few brief strains, and then fall silent again for nearly an hour. When the light is already clear enough to see the dewdrops hanging on the grass blades, then bursts forth a universal pæan to the sun. In a wood or garden where birds abound,

this song before sunrise in early June is amazing in its vehemence. It does not give a perfect display of the song of any one species, for the din of music is so confused that only the most individual voices can be followed. Blackbird and blackcap and nightingale and a dozen other species are mingled in a chaos which can only be likened to the buzz



BLACKBIRD

of voices at a dinner-party; and through the tumult we can only distinguish clearly the measured rhythm of the ring-dove; and the turtle-dove's hollow double note. This burst of song lasts for about twenty minutes; then it suddenly ceases, and the sun being now well over the eastern woods the birds fall keenly to feeding.

There is a great change in the night by about the middle of July. It is still

unmistakably summer. None of the peculiar dampness of autumn, with its subtle sense of vegetation beginning to decay, yet hangs in the coolness of dusk or the filmy mist of dawn; there is not yet apparent that first presage of autumn's oncoming, the drenching August dew. But the night is far more silent. The nightingale's music is long over; except in cool upland regions and dales of the north, the evening strain of the song-thrush is

also past; and as the deep glow fades into real darkness only the babble of the sedge-warbler by the river recalls the full nocturnal music of early June. The sedge-warbler is peculiarly associated with July nights; not because it does not sing as readily by night in earlier summer, but because other singers are silent, and leave it to chant alone. There is something strangely conversational in the sedge-warbler's voluble monologues in the July night. They are half scurrility like the bickering of the house-sparrow, and



SEdge-WARBLER

half sheer beauty; and the bird seems singing for itself for company, in the loneliness of the night. The ear is struck with notes that recall the day; it is the sedge-warbler mimicking the cries of the birds that haunt the streamside under the sun. Now comes the sharp call of the chaffinch, now the sibilant signal of the water-wagtail, and presently the chatter of the sparrows that practise fly-catching under the noonday willows. A veil of sleep half dulls the sedge-warbler's vigilance; the song becomes a softer babble in the reeds, like the song of a swallow on the weather-cock

in the early dawn. A moorhen calls sharply in one of its nocturnal alarms, and instantly the singer is awake again, pouring a loud recitation into the darkness. The song dies away after midnight, when the confines of the new day are near; but even as late as August a sudden disturbance by the river at any time of night will sometimes draw a burst of song from a sedge-warbler hidden in the reeds.

Sedge-warblers, like nightingales, are day-birds which also sing at night; but the nightjar is a true bird of dusk, though it occasionally murmurs its curious music while the sun is high. It does not begin to flit abroad till its prey of moths appears in the darkening air; but it will rise about sunset to some bough in the quiet copses, and reel out its music actively until it is time to feed. It is a strange bird in many ways, but the reeling murmur which it pours forth in the dusk is the feature which has most struck popular imagination in this country. Hence comes its names of nightjar, evejar, and evechurr; while its other common name of fern-owl suggests its owl-like flight and plumage and nocturnal habits. The nightjar's murmur is emphasised by the growing stillness of the July nights, like the songs of the sedge-warbler; and it is more deeply in accordance with the ebb of summer vitality which adds solemnity to the summer darkness. It is a low and monotonous sound compared with the songs of May. In May, indeed, it is apt to be overlooked or neglected; but now it sheds a soothing sound in the night, and suggests the full but calmer current of the ageing year. Unlike the cry of the corncrake to many ears, it does not become wearisome, because its monotony is never absolute. From time to time the jarring is slightly changed in tone, like the distant sound of an autumn threshing-machine, which it often recalls. In the stillness of the night the delicacy of these modulations is emphasised; they fascinate the ear by their slightness and the precision of their effect.

In proportion to its gentle pitch the distance to which the sound will travel is remarkable, but much energy must go to its utterance. Close observation in the early twilight has shown the lower mandible of the bill intensely quivering while the sound was being produced, and there is the same hint of force in Gilbert White's record of how the Selborne summer-house quivered when a nightjar perched and murmured on the roof. It seems clear that the song, like the sedge-warbler's, is prolonged after the breeding season,



NIGHTJAR

though nightjars are late nesters. Depending like swifts and flycatchers on a diet of summer insects, they do not arrive till May, and their eggs are often to be found in the middle of June. In the earlier weeks of their stay, when the cocks are probably seeking their mates, a reduced half-whispered jarring is sometimes to be heard uttered from the ground on ferny commons and in the woods. The same tentative murmur is sometimes heard early on a June morning a little before sunrise, but the shades of evening and the early night form the song-time for this nocturnal bird.

It is rarer to see the nightjar hunting than churring, because of the increasing darkness; but it will sometimes reap a harvest of the little moths that buzz on warm even-

ings round the crown of the oaks, and its flight can sometimes then be watched against the half-lit sky. It is extremely rapid and skilful, and the activity of its mazy motion is emphasised by its silence. The nightjar flies as silently as an owl; though moths and beetles cannot be alarmed by noises, like rats or mice, yet a harsher flight might set up disturbing currents of air which would be equally effective in scaring the prey. Very owl-like, too, is its cry of 'kowick, kowick,' which it occasionally utters on the wing.



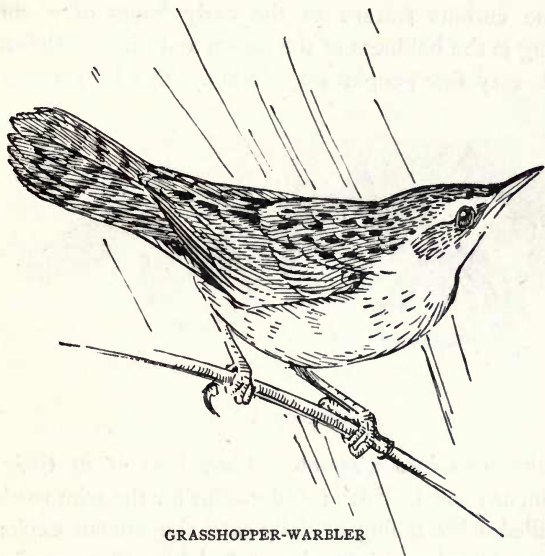
NIGHTJAR

It gathers its food in its huge mouth, guarded with bristles to prevent live insects from escaping. The bird's wide gape gave colour to the widespread legend that it sucks the milk of goats, which is perpetuated in various languages by

the name of goat-sucker. There is no other explanation of this ancient slander, except that the rough, dry goat pastures in many parts of Europe are a favourite haunt of this lover of warmth and dryness.

The grasshopper-warbler sheds another subtly changeful murmur into the air of summer evenings. Though it usually ceases in the later dusk, about sunset this creeping mouse-like bird is almost as vocal in the river-meadows as the nightjar a little later in the copses. Its voice is shriller and more chirping than the nightjar's, but there is no very close likeness between the irregular and fitful scraping of a grasshopper and its steady reeling cry. It is much more like the sound of a fisherman's well-oiled reel, and as the bird haunts the same banks as the fisherman at his favourite evening

hour, one can easily be mistaken for the other. The grasshopper-warbler's song—for it takes the place of a more musical ditty—possesses nearly as conspicuously as the nightjar's the delicate change of pitch which averts monotony and adds a characteristic attraction. In the case of the nightjar the change is said to take place when the bird ceases



to draw in breath and begins to expel it; but owing to its habits of concealment the grasshopper-warbler is one of the most difficult of all birds to observe, and there is no evidence of the same cause in its case, though it is at least probable. The corncrake's note in the June mowing grass constantly varies in intensity, but has no change of pitch; and the alternating softness and loudness of its cry is simply due to its turning its head in different directions while it calls. In early May, when the grass is still short, it can sometimes

be plainly seen lifting its head above the green pile of the meadow, and calling in different directions, apparently seeking a mate. In the south of England the corncrake usually falls silent in June; but in the valleys of the north and west, where it remains more abundant than it has been of late years in the south, it calls in the late-mown hay-fields far on into July, when the bilberries are ripening on the hills.

One curious feature of the early hours of a summer morning is the boldness of the beasts and birds. Before five o'clock very few people are stirring, and wild creatures do



PARTRIDGES DUSTING

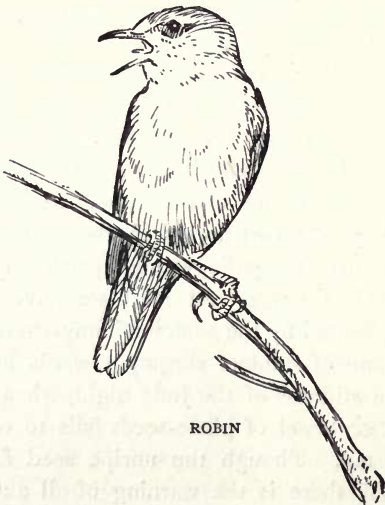
not take man into account. They lord it in their own domain, as once in Eden; and except for the trim roads and well-tilled fields telling of daily care, the human explorer of the June morning might almost feel himself a survivor on a planet from which mankind had flown. The roads are occupied by the birds for courting, preening, fighting, bathing in the dust, feeding and exercising their young, and for every purpose that a smooth and wheelless terrace naturally suggests to a bird's mind. If it were not so natural and unconscious, there would be something actively contemptuous in this annexation of a country highway as a promenade of infant partridges and amorous yellowhammers. When the explorer approaches the birds show little of the

timidity which they display towards mankind later in the day. They gaze at him indifferently, and are little disposed to give him room. The yellowhammer goes on tracing his golden semi-circles about his hen; thrushes stare from the middle of the road as if they were half ready to break out in noisy abuse, but preferred to treat the intrusion with silent dignity; and shyer birds appear so numerous about the road and hedges as to give a new realisation of their fugitive and elusive lives in the hours when man is king. Even the shy hare on its way back from the cottage garden looks twice and three times at the rare apparition before deciding that it must be a man; and the wilder stoat, which will sometimes attack a man in defence of its young by broad daylight, gazes at him in the hour of dawn with the true look of the wild animal—half insolence and half sheer bloodthirstiness. All this hostility and indifference on the part of the familiar beasts and birds of an English village gives a curious jar to man's instinctive sense of his own predominance. We have only to get up three or four hours before breakfast to find a world in which we are still of small account; and it is positively comforting to human self-esteem to find a friendly welcome from the old cart-horses in the pasture, pushing their hairy faces over the palings and expecting to be led off to work for their masters. At least we have tamed the horse if we are flouted by the common jenny-wren.

The first note of summer verging towards harvest-time is heard in the stillness of the June night, when the green horse-chestnut or tassel of plane-seeds falls to earth with a single sudden tap. Though the unripe seed falls with a miniature sound, there is the warning of all autumn in it.



The nightingale soon breaks out singing again from his thicket, and the dawn has its jubilant cries; the impression is quickly eclipsed, but returns with gradually increasing frequency as the summer goes on. July dawns are mistier than those of June, and far more still; instead of the chorus of all the birds, we hear little but the chirp of the sparrows presaging heat, the faithful crooning of the ring-dove, or the deep and rasping caws with which the rooks at this time of morning post from tree to tree on their way to their feeding-grounds. August dawns break later and mistier still; and now, in the weeks of deepest silence by day, the piercing warble of the robin is lifted to the earliest stain of light. It is his autumn song renewed; the birds' moulting time, which forms the only real break in the circle of the English seasons, has intervened since he lifted his voice in the pæan of the midsummer morning, and this song already tells that it is passing.



ROBIN



LITTLE BLUE RESTING

MIDSUMMER BUTTERFLIES

MAY butterflies last long into June, and late June wakes others which haunt the woods and heaths in July; the longest day marks a sharper division in the lives of these sun-loving creatures than for most other wild things. But there are certain butterflies which are peculiarly the children of midsummer, and as deeply associated with the pride of the long June days as the wild roses or the yellow irises, or the full gleam of the waving hay-fields. So long as the hay stands uncut the common blue butterflies enjoy the height of their season among the lotus and clover; but their bands first broke into the hay-fields in May, and to find the typical blue butterfly of midsummer we must mount among the wild hay-crop of the downs. The attraction of the little blue lies not in conspicuousness or special brilliance of colour—it is the smallest and one of the duskiest of its tribe—but in the punctuality of its emergence in the high June days, and its faithfulness to some definite and fascinating spot. The rampart of a primeval encampment, lapped for centuries with the smooth downland turf; a sheltered dip in the downs where year by year the little burnt orchis thrusts up its brownish spike; some thyme-scented flank of a thorn-clump, where the larks and the sheep-bells mingle

in one wide noonday tune;—in most such haunted spots the little blues appear punctually June by June, and we know that if we rise and go into the high places of that wonderful country we shall find them faithful to their time. Their unfolded wings are of a smoky brown, like those of the brown argus; but those of the male are shot with a purple iridescence which betrays their family as they flutter gently from one cluster of bird's-foot trefoil to another, or quiver on a head of lady's fingers. Ineradicably faithful to their haunt, they are feeble fliers, and spend much of the bright days, and all the grey ones, resting with closed wings on a flower-head or grass stem. The under side of their wings has the typical pearly and silvery pattern of the blues, but without the usual brightness. Like so many of the scarcer butterflies and plants, it is confined to chalk or limestone soils; its food-plant in the larval stage is the lady's fingers, within sight of which it passes all its life.

A little later in the month, on higher and wilder hills far to northward, the mountain ringlet emerges, and is equally true to its one chosen spot. It holds a very remarkable position in English wild life, for it is a surviving member of the Arctic fauna which flourished here in the Ice Age, so far as anything can be said to have flourished at that time. Its only remaining haunt in England is among the mountains of the Lake District, and that is its last station until it is found again in the Alps. It lives in grassy hollows of the mountains at a height over two thousand feet, and then it may be seen in June and early July fluttering about the rough slopes in the thin, high air, whenever the sun shines brightly. It is a dusky little creature, a little larger than the common small heath, but at once darker and richer in colour. Its dark brown wings are banded with deep orange-red, and spotted with a row of

the characteristic eyelet markings of this and many other butterfly tribes. Only the ubiquitous small tortoiseshell ranges as high as the mountain ringlet among the Lakeland fells, and the tortoiseshell is a wanderer from nettle-beds in the dales, and is attached to no native hollow among the bare grey crags. The Scotch ringlet is a rather larger butterfly, with the same deep brown and orange markings, which is not found south of Lancashire. It is curious that neither of these glacial species survives in the Snowdon district, or the other mountain masses of Wales.

The large heath is another June butterfly which is confined to the more northern and mountainous parts of the country, but ranges further south and to lower levels than the two mountain ringlets. It is commonest in the north of England and south of Scotland, where it is found on the mosses, and among the sandhills close to the sea. But for its larger size, and hoarier colour, it is much like the small heath, which is almost the commonest and hardiest of English butterflies. The characteristic hardness of this tribe of 'browns' comes out in different ways in different species. The two mountain ringlets and the large heath are confined to breasts of high mountains, sweeps of wind-beaten moor, and barren northern tracts. The small heath does not refuse to colonise the warmer and more fertile parts of England, but it cheerfully puts up with the bleakest and dustiest pastures, and seems indifferent to the wettest and coldest seasons. Except for the common white, which is artificially fostered by cabbage-gardens, the first and last butterfly to be met with on the sparse turf of building plots in the outskirts of towns is usually the small heath. *Par excellence*, it is the 'common brown.' Almost as widely distributed, and quite as unsusceptible to cold and rainy summers, is the large meadow brown, which punctually

appears every midsummer in pastures and hay-fields just when the hay harvest is beginning. It flaps across the field paths as cheerfully in the gloomiest years as in the brightest, and its casual, skulking flight seems to suggest that it does not know the difference. The emergence of this unpretentious butterfly is one of the chief events in the year to all who note the minor signals of the seasons. It foretells the change from the days of growth to the days of ripening—from the lengthening to the slowly shortening evenings; and although it comes out a little before the longest day,



LARGE MEADOW BROWN

when there is still but small sign of the year's decline, only too soon the pastures grow dark with July heat. The bare hay-fields call it to the scanty and monotonous hawkweed blossoms which are all that they have to show for their wealth of blossom among the June grass.

Mountain, moor, sand-dune, and meadow find each some opportunity for the virtues of this Spartan tribe, and the common ringlet disregards comfort in the woods. It varies greatly in numbers in different years, so that presumably it is subject in some way to the hardships of the seasons; but certainly it does not share the antipathy of

most butterflies for damp and drizzle. On June days of fine soaking rain it can be seen flitting about the rides and wet rushy patches in the woods with a movement which, if not precisely animated, is at least as lively as it displays on days of true June warmth. It loves the coolness and shadow of the deeper grassy glades; and it is one of the most softly beautiful of all our butterflies, with an extreme delicacy of bloom which could perhaps only have been developed by an insect of such quiet ways and gentle flight. It is very difficult to secure a perfect specimen of the ringlet for a collection; despite the utmost care in capture and setting, the satin lustre of its deep green wings will show some scratch. Its colour is the dark, full green of a rush-stem, but darker still; and the eye-spots common to the tribe take in this case the unusual form of a variable number of fine yellow circles, strewn near the margin of the under side. The haunts of the ringlet are in the deepest peace of the woods, and all the grace and gentleness of nature are expressed in its movement and bloom.

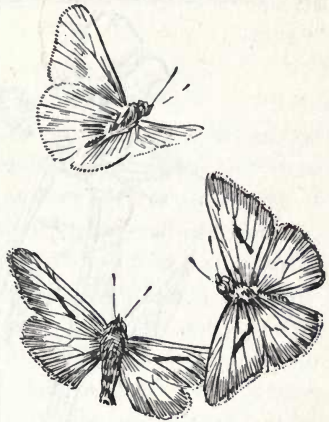
One more trace of a hardy evolutionary upbringing may be noticed in this tribe of browns, and that is the salient fact of their general emergence in this month. In the Arctic regions, where a species of mountain ringlet is found about as far north as butterflies exist, they must emerge in June, or not at all; for the time of the midnight sun gives them a chance of active life which is at once unrivalled and unique. When most of our own land lay under ice the same exigencies of the seasons must have prevailed to a great extent here, and the ringlets and other 'browns' most nearly allied to them seem to show the ancestral habit to this day. The most aberrant member of the group is the small meadow brown, which waits to come out until July, and is abundant in lanes on the blackberry blossom which opens in that

month. It is the brightest of the group, with less brown in its wings and more gay orange-red, and this coincidence of brighter colour with later appearance and a more southerly distribution is suggestive. It may indicate that the small meadow brown became distinct from one of the other members of the group after the Ice Age ended; or possibly that it never existed, or became extinct in the northern part of the country, most of which the ice-sheet covered. In all the wealth of the June woods it is strange to sit in the sun and think of a time when, of all our present butterflies, only a handful of browns and ringlets may have basked on the raw walls of the glacier's moraine, just as we may still see them in the higher Alps, where this tribe is characteristically abundant. A brown butterfly may sometimes be seen travelling in the wind and sunshine over the crests of the highest snow mountains.

When ringlets begin to appear in the dewy shadows, the sunnier foliage of the woodland glades is haunted by the large skipper and the small pearl-bordered fritillary. Compared with the grizzled and dingy skippers which precede it, the large skipper is a brighter and far more summer-like little butterfly, and has all the sturdy liveliness of its tribe. Its wings are of a rich golden brown, not unlike the tawny hue which marks the fritillaries, but with less red in it, and more nearly approaching a bright bay. They are dappled with deeper brown, and set off in the case of the male—which is by far the commoner—with an oblique black stripe on each of the upper pair. Large skippers delight to flicker about the young sprays of beech and oak and other June foliage, basking on the tufts outstretched in bright sunshine, and rubbing the edges of the upper and lower wings together in active delight. Before they settle down to enjoy the sunshine they often pace circumspectly about the chosen leaf with their stout wings obliquely raised; then, if any other

butterfly appears—but especially one of their own species—they leap at once into the air, and bicker with it as pugnaciously as the small copper, and with an even more active and vigorous flight. After buzzing with a flylike motion they have a way of making a sudden leap or 'skip' in the air, which often makes it hard for the eye to follow them; and they will practise this elusive flight out of sheer inner velocity, and when there is no other butterfly to provoke them. Though they are often found in rough pastures, they are fondest of the sunny glades in woods and copses; and they appear, like the full sprays of tender foliage, at the height of the growing year.

Small pearl-bordered fritillaries also love luxuriant and leafy places, and are less often seen on drier and more open commons than the earlier and commoner large pearl-bordered kind. To the incurious eye they might easily appear to be small specimens of that fritillary which has grown so familiar among the bugle blossom and bracken since some bright morning early in May. But they come freshly forth when the earlier butterfly grows worn with winds and wayfaring; and if we watch it fanning on a spray, or absorbed in some midsummer blossom, we see that there are plain differences in its marking. The upper side of the wings are more lightly chequered with black, giving them a more uniform and rather less handsome appearance; while, on the other hand, the gleaming silver plaques on the under side are more numerous and convergent. Like most of the



LARGE SKIPPERS

fritillaries it feeds in the larval stage on dog-violet leaves ; but none of the family, except sometimes the large pearl-bordered, ever see the violet in flower in their winged state, or feed from its blossoms.



MEADOW CRANE'S-BILL



THE STRUGGLE FOR LIGHT

IF one thing more than another proclaims and boasts the arrival of summer it is the solid mounds of the elm-trees cloaked with leaves so thick that they give as little hint of the structure beneath, as an Eskimo's dress of his anatomy. If any one would make a picture of summer let him, supposing the feat possible, paint a great English elm, a Huntingdonshire oak as it is called, standing solid and vivid against one of the black thunder-clouds which June breeds. Suppose presently that thunder-showers fall vertically, the ground beneath the elm will be surprisingly dry, and it may be that it will be encircled by a puddle of wet, a gutter round it; so successful are the little leaves, in their close ranks, at drawing off the water. They serve a secondary purpose so. If you study the way of a root in the ground, a way as wonderful as that of a bird in the air, you will discover its marvellous skill in taking a bee-line for dampness and water. The little sensitive tips, the antennæ of the rootlets, wheedle their way past the stiffest obstructions to the patch of moisture. They will make their way to this gutter round the elm, and so roots and branches set up something of an artistic balance. But this is not the first and foremost purpose served by the screen of leaves. The clothed tree

looks most solid, a hill of green, against the cloud; but it is in reality a hollow hill, an architectural dome, hollow in the centre. Of course the shell of the dome is not symmetric, but in tree or bush, in elm or rose, a vast majority of the leaves reach to the outside, and the obscuring of one leaf by another is avoided with amazing success. Only those who climb will quite realise this. The leaves on most trees interfere not at all, and though there are little leafy twigs here, there, and everywhere, the number of leaves they carry is very small indeed compared with the case of the dome. Bush leaves are even more successful than tree leaves in this struggle for 'a place in the sun.' If you were to take an instrument and peel a wild rose-bush you would disclose an emptiness of leafless shoots. But the successful skill of the struggle for light is best seen in the arrangement of the leaves that have reached the outer circle. They arrange themselves in mosaics so accurate that a bird looking outward would scarcely see more than a pattern of slender cracks of daylight, in places would see merely a pattern of unbroken leaves. This natural mosaic is perhaps seen best of all in some climbing plants, notably the ivy. The ivy shoot seems to rejoice in darkness. It bores its head into any crack, as it should do seeing that it carries roots. But the leaves are light-lovers, and however thick they grow they arrange themselves so that each overlaps its neighbour as little as may be. Without much searching, especially if you look to the younger shoots, you may find patterns as neat and comely as they are ingeniously fitted.

It is true that leaves both old and young may suffer from much light, and do indeed take precautions against its dangers. But the precaution is seldom found by way of avoiding the field of light. The defence is from within. We can all see the difference between the bright fresh green of spring, when first 'burgeons every maze of quick' and the sober greens

of full summer. The change in complexion is due doubtless first and foremost to age and exposure. It is only extreme youth that keeps a bloom. Time and weather must tarnish it. But this darkening is not only a slow progressive thing. In truth, as in semblance, the leaves are darker one day than another, and at one hour than another. Within the leaf a sorting of the green grains takes place, by which they have the power to protect their complexion from the sun and arrest the process of exhaustion. Many evergreens grow darker, even as you look at them, if the sun comes out hot and scorching; and they pale again, when coolness returns, to a tint nearer their spring freshness.

The struggle for light is with plants very much the same as the struggle for life. Light is life and darkness death. We have spoken elsewhere of autumn being another, a second spring. In one respect summer appears not as the summit of a year but as the preparation for a new year. The flower is over and the fruit shed from most of our native trees when they are at the full. The elm behaves as the crocus, which is a green bundle of shoots now that all sign of the flower is gone. The leaves, like Shelley's chameleon, feed on light and air, and are busy with the greatest chemical marvel of the world, converting the sunlight into the food of life, bridging the organic and inorganic kingdoms. Without the due share of light they die like bees in a sunless world. It is almost a pitiful thing to see, as one has seen, a shoot of clematis penetrate into a covered place. It waves this way and that; it grows apace reaching out for food. If there is a crack of light it struggles towards that region so far as its power of growth permits. The leaves acquire a pale green, and begin with the poor material at their disposal to manufacture from light, making bricks without straw. But before the summer is out they are dead, cut off just at the point where light begins to be insufficient. You may watch

some strange struggles between light and darkness. In a certain high hedgerow an ash and a holly grew in close juxtaposition, and the holly as it progressed made a dark shade for some ten feet from the ground. From the ash stool the shoots set out at an astounding pace to escape through this deadly darkness. Most of those that reached the top lived, though even they had a struggle, as the stems were hardly stouter than reeds so fast had they grown. Those that could not get a leaf to the light in time withered and stood in a sheaf like the centre of a blackberry or raspberry bush in winter, when the annual shoots have withered.

Trees and plants go to almost as many devices to obtain the maximum of sun for their leaves as they do to scatter their seed in autumn. As a general rule the lower the boughs the more horizontal. You may see some remarkable examples on the firs and the maples; and whatever the direction of the bough, the leaves turn themselves so that the plane of their surface is as nearly as may be facing the sun at its height. On some plants, such as the nightshade, the size of the leaves varies so that the smaller may fill up the interstices of the bigger without overlapping. In some the leaves are actually modified in shape in order that none may be shaded. The tulip-tree, one of the quaintest and most charming of exotics, offers examples. In a host of plants and some trees the stalks of the leaves grow long or short with just such precision as the mosaic demands. There is a common wild geranium with a mauve-pink flower that forms rosettes of almost mathematical precision. The rose lies flat on the ground, and in a good specimen you may have some ado either to find any considerable crevice between the leaves or any serious overlapping of one leaf by another. Low-lying plants are perhaps most successful in this, especially if they lie in sombre places where light is valuable. Some amazing mosaic tracings have been made of ivy growing

on the floor of a wood where life depended on utter acquisitiveness of the small rations of sunshine. Plants of course differ immensely in their need of light. The grass, the else invincible grass, which makes its way to the roofs and carpets a neglected roadway in two seasons, pales to a jaundice colour in a twilight situation, and dies out at once. The kexes, especially the lesser chervil, grow a splendid dark green under the shade of very thick hedges, and seem to suffer not at all. St. John's wort, it is generally supposed, delights in shade, and has clothed the ground under many a garden tree with thick cover and flowers as gold and sunny as the sun. But its delight in such places is in part due merely to its earliness. When its leaves begin the canopy of the tree is not yet spread nor the light intercepted. But doubtless it can endure gloom, as may that lusty and at times light-loving plant the periwinkle. It is a little surprising too that the beech, which of all trees is most destructive of life beneath its shadow, will grow in coppice shape under trees that will shade other bushes to death. Happily no place is ever quite bare of the green things whose life is light. Deep mosses mimicking now trees in their form, now jewels in their tints, carpet the woods. On the roofs of dark caves by the coast hang green the ribbon leaves of *asplenium marinum*, which, like the mosses, steals light out of water and stores reflected rays.

We all mark the full leafage seeking sunlight and storing its energy. But flowers and fruit have as vital a need of sunshine as the leaves. The sun is needed at all stages. We just begin to understand that flowers are only fructified when the sun is hot. The fertilising of the flowers of clover and hazel and doubtless many others is a midday function, when the full energy of the sun is directed upon the pollen. Even when fertilised the seed or fruit has not its full strength to resist frost unless it enjoys a bout of sun. When well set it retires for a while in some obscurity behind the leaves and

develops strange protective devices. The leaves are green, one might say, in order to be seen. The fruit is green to escape detection. It is imbued with strange acids that warn off enemies. The shucks of the marvellously invisible nuts and walnuts are acutely bitter, and the hop surpasses them. Green apples are a byword, and only ants or very thirsty birds will attack green pears. But the sun begins to play its part again when the fruit is plump; and the acids must be baked to sugars, the green rinds split, and the green skins reddened. But in this little history the most crucial work of the sun has not been told. Trees in dark places bear only leaves. They grow but are fruitless. The great seed places are only the sunny places. But more than this—fruit is made in the sunny summers, though it may come to maturity in a dark summer. When a summer is over the buds for the next year are made. How many flower-buds, how many leaf-buds will open next year is pre-ordained. By what alchemy and by what courses the stuff that the leaves manufacture from the sun are turned into new buds we cannot trace. The thing is too near the central mystery of light and growth. But it is tolerably well established, at any rate it is a strong and credible belief, that when the sun is hot the making of fruit-buds flourishes. It depends on other causes too. There is a sort of exuberant vitality in trees which tends solely to leaves, to growth not to produce; and there is a want of vitality which encourages fruit. A dying tree will often bear a heavy crop, and young trees are sparing of flowers. But apart from other causes we may feel with some confidence, as we bask in the hot summer or in shade watch the green leaves 'clap their little hands in glee,' that the agent of present pleasure is also the earnest of fruit in the year that follows. The twigs and boughs as well as the leaves are taking profit of the sun.

It may well be that the sun performs different functions at different parts of its course. The midday sun by reason of its heat is the fertilising sun, and the patterns of the leaves seem to be designed to meet a vertical sun ; but we have now, within the last few years, good reason to believe that separate species of plants are greedy of other angles of sunlight. Just as a German doctor has maintained that it is only the morning meal that fattens, some gardeners argue that it is only the morning sun that properly ripens some fruits and colours some flowers. Without the early morning sun tomatoes and nasturtiums languish ; but suffer no sort of harm, at least to all appearance, if they are screened from the afternoon sunlight. It has long seemed to the writer that the tits prefer a nesting-hole which faces the east. We all know that all birds are at their greatest activity in the morning. The more one observes nature the more one is struck by the parallelisms of the natural kingdoms. Many plants may live their most active hours, like the birds, in these early hours. The corn-cockle, Jack-go-to-bed-by-noon, takes his rest at this flaming hour because his energy has remained unflagged since sunrise, when he found the quality of light that his being needed. The St. John's wort and tobacco plant are owls of a sort, disliking the light, and the grass and dandelion a wake-robin.





YOUNG PARTRIDGES

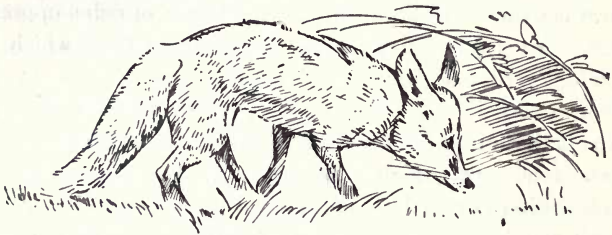
DANGERS OF THE GROUND

EVEN in midsummer weather, perhaps chiefly in midsummer weather, the solid earth is one of the most dangerous of places for birds' nests, though it is quite the best place for concealment. Probably the safest nests are the highest and most conspicuous, but in all cases a risk is run. The rooks' nests are thrown down by a gusty wind. In one case such a fallen nest was found to have been twice used by other birds than the maker. A great tit and a starling had both hatched broods in its interstices, and both for the first time faced a danger quite new to them. The conspicuous nest of the colony runs also risks from neighbours. Just as penguins spend a great part of their time in robbing one another of stones, the rooks will from time to time, though not often, steal from any unlucky neighbour who for some reason has not pleased the flock. There is also another little known danger. When at all pressed for food squirrels will climb to the nests and carry away young birds. But when all is known the rook in the colony is as safe as he could well wish to be. Compared with such a bird as a partridge his state of security is complete. For the ground bird is never safe till the young can fly almost as well as their parents. When the country naturalist sees descend

one of those sudden June thunder-storms that gives us vastly more rain to the minute than any storms of the year, one of his first thoughts is apt to be of the young partridges. Every year, or almost every year, scores of young birds are killed by such rains. It is not that they are drowned right out, though this may happen. It is that they cannot dry their fluff. The oil-glands do not work. Though there may be bouts of sunlight sufficient to dry birds in the open, they are caught in the corridors of the corn or the tall grasses, which drip and rub the moisture on them long after the storm is over. Rheumatism and all manner of pains oppress them. They dwindle and die. Even insect food, which is their chief diet at this date, may be hard to come by in stormy weather. It is by way of escape from such dangers perhaps that often the old bird takes her dapper little brood to the roadways, which serve as warm and smooth promenades, where everything is provided that a bird in search of health could well desire. It is a little dangerous perhaps if traffic is frequent; but the spry chicks even when very young manage as a rule to skedaddle into the gutter of the roads even if the approaching motor is fast, and pedestrians who may now and again pick up the young usually replace them.

In fear perhaps of the dangers of wet, partridges often prefer the bases of the hedgerows for their nests, but here they lose the security of the open field. The hedges are the roads of all sorts of vermin, of rats and weasels and stoats. Foxes, moreover, accept the hedgerow as their proper hunting-ground. They go out bird-nesting, and their nose and eye is so keen that they will on occasion destroy every single nest along a mile or more of hedge. Out in the fields it is comparatively rare to find a nest destroyed by vermin, however obvious the place; but along

the line of any hedge or fence the destructions are innumerable. In one case that the writer watched, a rat began a strangely ingenious and secretive attack on a partridge's nest, but quite failed for some reason to proceed with it. The nest was a scooped hollow in some rather rough grass alongside a line of chestnut fencing, at the bottom of which was stretched some mesh-wire. A rat, presumably by design, tunnelled under the fence, coming up in the very nest, but rather to one side of the centre. Into the hole he



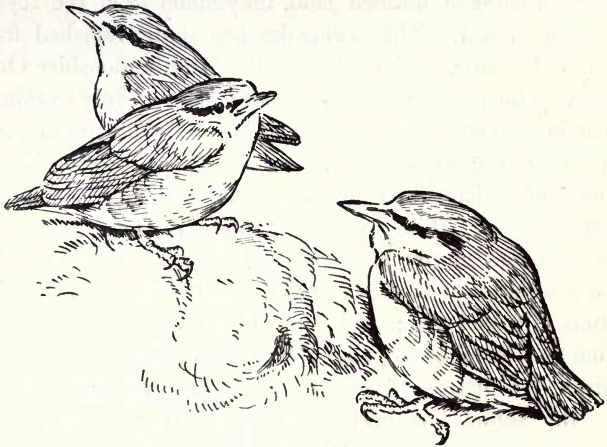
took, or there fell, three of the eggs. It was thought that the partridge had deserted, as the remaining eggs were cold. But two days later, when the nest was visited, the nest-end of the hole was quite covered, indeed half blocked by some very coarse bents of crested-dog's-tail grass. These were also spread about the rest of the nest, which looked generally redecorated, and the eggs were half concealed by grass. The rat made no further onset, for the very good reason—such at least was the plausible inference—that the vermin itself had fallen victim to other vermin. At any rate within twenty yards of the nest a dying rat was found terribly mauled by a stoat. Thus did the partridge, after touching the razor-edge of danger, maintain her place.

All these ground-nesting birds suffer from the increased thoroughness of cultivation, although some of them, par-

tridges especially, flourish most on the best-farmed lands. They rejoice, both for nesting and for refuge, at other times in any piece of waste ground; and where these waste bits have yielded to cultivation the ground-nesters have shrunk in numbers, except under special and artificial preservation. They do more than lose their proper haunt. Among the standing crops, that after all resemble in some respects the rough growths of untilled land, they suffer from the scythe and the mower. The corncrake has quite vanished from many old haunts. The valley of the Huntingdonshire Ouse is one. One of the delights of warm June or July evenings, spent in a boat along reaches that encircle a great plain known as the Port Holm, was the strange mingling of sounds, of which the corncrake's ventriloquial note was the most insistent. The wind kept up a rustling whisper, a secret sibilant mutter among the great banks of reeds. The reed-warblers, by this date rather chattering than singing, fluttered in and out; and among the ranker grasses the running corncrakes kept up a burr that recalled a frog or a murmur of distant machinery or some vast grasshopper. But the sound has been mute for many years, probably owing to the greater precision and earliness with which the grass is cut. The ground-nest, though immeasurably hard to find if you desire it, could not compete with the blade on the chariot wheel. So the south is in great measure robbed of this quaint and pleasing summer visitor, though happily it is still not less common in the far north.

All nests, being in some degree cups, are liable to flooding. One wet June a nuthatch's nest was found flooded out, and the young dying of wet. They were rescued, the nest drained, and the birds replaced, when some of the brood survived; but their plight showed that even a tree-hole, carefully selected and at some altitude, is not quite storm-

proof. But in general the builders in holes are tolerably safe, certainly safer than other small birds which choose the ground or a spot close to the ground. Treading feet must always be a menace, especially in gardens and places which men frequent. How often one has watched, with almost daily anxiety, a nest of a garden robin or chiffchaff escape a succession of threats; and then, just when safety seemed at



YOUNG NUTHATCHES

hand, catastrophe has fallen. The chiffchaffs used to build for example in the gardens of south London, especially Dulwich. A few no doubt survived; but some watchers, at any rate, found not once or twice that just as the young were nearly fit to fly they fell victims to a prowling cat. The dog is not, as a rule, though exceptions exist, a bird-nester; but in its restless and inquisitive wanderings it will destroy out of pure frolic many a robin's nest.

Yet some small birds are most singularly successful in rearing their broods. Stonechats and whinchats, which are fond

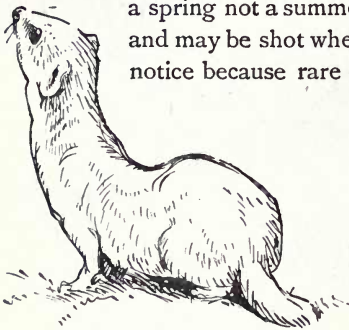
of nesting just beyond the shelter of a furze-bush, will defy the most prying eyes, though the neighbourhood of the nest is obvious enough. Larks, which build without protection in the open, suffer very little from weather, and are seldom pounced upon, thanks to a subtle sense of protective selection; and their fondness for very dry commons is no little protection against the rains of June. How snug the chats sit under a diaphanous canopy, that keeps off rain but



LARK'S NEST

not the sweet air. There is enjoyment as well as caution in the round-about approach to the nest, and ecstasy in the quick final run down the pathway passage. The common is a safe and lovely place for all the family: for the cock who sings lustily on the top spray, vaunting his fine colours that all the world may see; for the hen, quick with the thoughts of maternity in the soft nook the two have chosen and selected; for the chicks when they come to growth and hear the parent birds scuttling along the private path, secret from all intruders' ears and eyes.

Those birds of the common, which dislike wet, suffer very much less from summer downfalls than the water-birds themselves. It is unexpected, but ducks which delight in water, whose young are water-proof, as it were, at birth, and lovers of the stream, suffer much from heavy rain and wet weather, overwhelming the feather walls of their nests. It is not uncommon on this account for the duck to build in the hollows of waterside trees; but more often they nest on the ground, some yards from the water, and during this time suffer as if they were land-lubberly partridges from flood. But this is



WEASEL

a spring not a summer story. The ducks are flying and may be shot when August begins. It is worth notice because rare that pheasants will now and again give up their ground-nesting habit. In one instance a pheasant's nest was found, safe from flood beneath or rain above, in the upper part of a thick spruce, her eggs laid on the flattened deserted nest of a squirrel.

As numbers increase, and nesting-sites become fewer, naturalists begin to note a tendency among bush-nesting birds to seek the ground. Thrushes are certainly more fond of the ground than they once were. We have found their homes well concealed in the midst of high kexes in a spinney. It may have been no more than accident, but the nests were in such case rather slighter, as if the bird was beginning to come into line with the ground-nesters which naturally prefer a hollow in the earth to a manufactured cup. Will the weasels and rats drive back this company of earth-lovers to the bushes they have deserted?



THE ROSE OF ENGLAND

WE go out into our gardens and sow seeds or transplant plants or watch green tips of herbaceous things top the soil, or pick our first snowdrops in February if not in January. The garden is still a pleasant place of flowers and life, it may be, even in November, if frosts have spared the dahlias and damp the chrysanthemums. So many things are now 'perpetual' that it is difficult to say which is the proper month of each flower. If we adopted the custom of the North American Indians, who called each month by the name of its properest plant—so June was the Moon of strawberries—we should be rebuked for a series of months by finding bits of June astray in November. Not many flowers are more perpetual, even those not christened with that blessed word, than roses, once taken as the very symbol of brevity. As the petals have multiplied and the colours extended and the characters commingled, the life has been prolonged. Not only 'Christmas roses' bloom at Christmas; and in a garden you may have plenty flowers of 'the short-lived rose,' from the blooming of the Banksia, it may be even as early as March, to November or December blooms of Frau Karl Druschki or Gruss an Teplitz and the old Blush Monthly.

But in spite of science in the garden June remains above other months the month of roses. The short-lived flower of single petals gives the note. It begins the rose season and in one sense ends it. The garden is a fair place because it is a part, though an intensive and often formal part, of the nature that is outside it; and abroad the roses first bloom in June and are clean vanished before July is over. Beyond all rivalry the dog-rose is the fairest flower in English hedgerows. It possesses a score of virtues. The first green leaf-buds of the year are the buds of the rose, and most delicate is their tint. Behind the light and airy but very complete screen of the leaves the early nests are built, most cunningly built, not inside the bush but right against the fringe, so that the sitting bird and the young have every advantage of a screen from prying eyes without any want of air or light. And the twigs on which their home rests are so slight that the nest is as safe from heavy climbing creatures—from stoats or rats—as from preying birds. There is no lovelier thing in the lap of summer than a lichened chaffinch's nest perched with secure lightness in these fringing leaves, sometimes right against a flower. The bird is not perhaps so fond of the rose as are some others, as the whitethroat, for example; but now and again you find a nest there of such perfection that it remains a jewel in the mind's eye however many nests be found elsewhere afterwards. This dog-rose possesses almost all the qualities that appear in varying degrees of strength in our newest garden roses. It is a bush rose, but it is also a climber. Great festooning sprays swing out above bullfinch hedges; and as you catch the dim discs of the many flowers some summer night you might take them for a pattern of stars, illimitably remote. The dog-rose has signs, too, of that almost evergreen habit which we admire in the *Wichuriana*. It has the colours too.

It is pink and it is white, and in its yellow anthers we catch the promise of the gorgeous things that will emerge under cultivation and hybridisation.

The gardener owes to the dog-rose other thanks too. It supplies the power of life to our garden standards, as the wild crab, its nearest rival in the list of hedgerow beauties, to our apples. It is surely one of the strangest mysteries of botany, the mother science of the world, that the budded scion should be thus fed by the vitality of the wild plant's



CHAFFINCH'S NEST

juices and yet be untouched in mien and character. But the wild thing rebels sometimes at the service. There are garden roses which are reluctant to flower on their own roots, and are always budded at the base of a wild plant. The frequency of the wild brier in the wilder parts of many gardens is no doubt in part due to the direct victory of the wild over the tame. The budded stock has triumphed over the inserted slip and relapsed to its native state.

England is rich in native roses, more rich than many good observers quite know. We have native wild roses that differ widely in all the marks by which we recognise roses: in flower, in scent, in leaf, in thorn, and in habit. Some of

them, too, have double virtues. The dog-rose, which is the master of them all, carries flowers which are very pink, almost as pink as the unopened buds, and others which are nearly white, only less white than the flowers of the most popular rival to the dog-rose, *rosa arvensis*. This 'rose of the field' is common in most places, and often accepted locally as a variety of the dog-rose. But the kinship is remote. Its scent is very much more distinct and sweet. Its petals have



the rich crumpled look of some rock-rose petals, and the wide golden centre raised to prominence in the shallow cup lends it an attraction very rare in the family. Soon, too, one learns to pick out its guise, its habit of growth, from afar as one distinguishes the pattern of an oak from an ash. It aspires nearly as high, but the flowers are ranged in arcs of branches that set out horizontally from the main stem.

Both the common wild roses that light the June hedge-row have fathered some of the loveliest garden roses at a remote date: and many an experiment has been made with

THE GARDEN OF MEMORY

By TOM MOSTYN



the little wild bush rose, *rosa spinosissima*, which you find mostly by the seaside. Nature herself, too, has strewn the hedgerows with varieties that are scarcely varieties, differing capriciously in this quality and that: dog-roses with thorns almost straight, in place of the vicious hook which has given this rose its name. The gardens of the nurserymen are full of odd varieties impure in pedigree, some of which make very poor standards for the budded rose. But the rose that has parented one of the most pleasing new roses of recent history is the sweetbrier, the favourite of all our native roses. Like mint or currant it is endowed in all its parts with its peculiar and delightful lemon fragrance. The fruit is at least as fragrant as the dainty leaves, and you can extract the scent from the bark. It is not, in the words of Bacon's division, 'fast of its smell,' but breathes it out, especially into the evening air, so that its neighbourhood is as odorous as a shut room with bowls of lilac. Its sweetness secured its place even in the most luxurious of tamed gardens. But the gardeners were not content; and at last one of them, in the garden of Lord Penzance, wedded to the sweetbrier flowers as bright and various in colour as even the English gardener could desire. The making of the Penzance Brier, of Anne of Geierstein, and the rest, joined the garden to the hedgerow. The bushes are at least as lusty as any dog-rose, tremendous with thorns, and from the centre branches send out as sweeping boughs as the 'rose of the field' would boast. The scent pervades leaves and fruits, and fills a whole garden on a June evening with the subtle odour. But the flowers, if single, are garden flowers, pink and russet and bronze; and in place of the brevity of the wild roses, a few blooms will succeed one another for many months of the summer season, indeed until the hews are red.

The flower of June is the rose; but the months are now

almost wiped out in the garden, so 'perpetual' are the new flowers. Roses, as different as roses can be, imitate one another in flowering at seasons the most unnatural. Does any rose so persist in growing and in flowering even when summer is forgotten as Gruss an Teplitz? It is red; its flower is rather formless; it is very fragrant. Racially it is as divergent as may be from its nearest rival in the art of putting out lusty and perpetual flowers. Frau Karl Druschki is pure white when once the bud is open. It has no odour beyond the faintest suspicion of a scent after the sun sets. Its form is the most perfect that any judge in



search for the ideal 'four point rose' could ask for. But it expresses its hardiness in defying the seasons, both in the output of flowers and in the sprouting of shoots. It will give you white blooms in December and green buds in February. There are those who come to despise the single brier and the short-lived blooms when they have such variety of gorgeous and solid hues. The Lyon is a vivid bronze, Juliet doubles bronze with the deepest purple red, the depth of colour in Madame Heriot runs over into the leaves, and the yellow Malmaison has the freshness and scent of early spring. But when all is said the garden fellows to the six wild briars of Britain have certain unchallenged beauties. No blaze of colour quite equals the flame of Paul's Carmine Pillar for a

gorgeous week or two in June, and the lustiness of its growth makes it a fellow even of the wild clematis. No garden can spare the Dorothy Perkins, with its fresh pink flowers, that have also some of the perennial quality, and its long green petals and robustious health. It is an individual opinion that the loveliest of all is the true single brier Jersey Beauty. Is there any plant on which leaves and flower consent together with quite so common a grace? And if the single flowers do not live with us with the constancy of Gruss an Teplitz, the shiny deep-hued leaves are evergreen. As the crooked fang of the dog-rose announces its hardiness, the length and straightness and sharpness of the Jersey Beauty's arms proclaim it a real 'struggle-for-lifer.' If tea-roses and hybrid perpetuals have multiplied the glory of the garden indefinitely, the companions of the wild briars, British and Continental, have made possible new designs and new structures. They have created, one may say, a new style of architecture, which might be called the hedgerow style.

We have six, some say seven, wild roses now growing in England, of which the first three in the list are found almost everywhere.

Rosa canina. The dog-rose.

Flowering stems long, rather weak and straggling. Leaflets five, or sometimes seven. Flowers pink or white, usually sweet scented, solitary, or three or four together at the end of the branches.

Flowers summer rather early.

Foliage varies considerably, either glabrous or more or less downy, sometimes glandular at edges.

Fruit ovoid without bristles.

Rosa arvensis. Field rose.

More trailing than *Rosa canina*. Foliage very similar.

Flowers white with gold stamens. Usually three or four at the end of the branches, rarely solitary.

Flowers summer, lasting much later than *R. canina*.

Rosa rubiginosa. Sweetbrier.

Very nearly allied to *R. canina*, but easily recognised by the aromatic scent of the foliage when rubbed.

Leaves glandular.

Flowers pink, usually solitary, rather smaller than *R. canina*.

Flowers early summer.

Rosa spinosissima or *pimpinellifolia.* Burnet or Scotch rose.

The most spiny of all the roses. Small bushy shrub.

Leaflets small, seven or nine to each leaf.

Flowers rather small, white or pink, solitary at the end of the short branches.

Fruit black.

Flowers spring or early summer and sometimes again later.

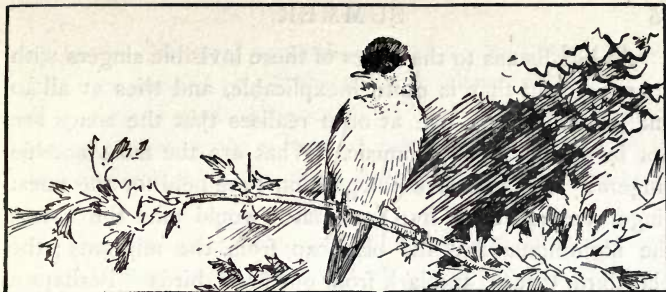
Rosa villosa or *pomifera.* Downy rose.

Fruit globular, more or less covered with small fine prickles.

Leaflets downy on both sides.

Flowers white or pale pink.

Flowers early summer.



BLACKCAP

SONGS AND MUSIC

ONLY in June may you hear all the songs and notes of birds, young and old. There is more of the zest of spring in many May songs; and in the middle of June other birds than the cuckoo change their tune for the worse before descending into a croak or to silence. But the opening of June is the only time perhaps when the chorus is quite full, when the turtle-doves croon behind the leaves, and the pied flycatcher ripples on his garden perch, and the swifts scream in the high air, and the corn-bunting gurgles his few rough notes, and the robin calls fussily to its young. There are at any rate more noises, if not more song, in early June than at any other date. This is the time when a real knowledge of song and note tells. Earlier one has at least a chance of watching the singer, though it is hard enough even so to mark his identity. A silhouette against a skyline can give as little information as any object of sight, but it gives some. In June the bulk of the songs and sounds come from mysterious depths of green. You may spend a day in seeking the singer, and at the end have scarcely caught the glint of his wing. Even the nightingale, which loves a low perch and is not very shy, is hard to watch with any distinctness. A wry-neck is virtually invisible.

As one listens to the songs of these invisible singers with an enjoyment that is quite inexplicable, and tries at all to analyse the charm, one at once realises that the songs are not in any strict sense music. What are the most notable singers? Probably if a competition were held for the finest singer among birds five candidates would take the votes: the nightingale and the blackcap from the migrants; the blackbird, thrush, and lark from our home birds. Perhaps a few would maintain the cause of the missel-thrush and the willow-warbler.



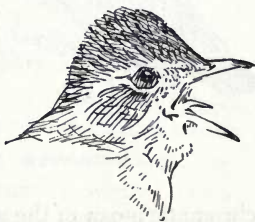
Of all these the blackbird is the only one which can be called musical or tuneful in the sense that one generally gives to 'music' or 'tune.' He almost, perhaps quite, whistles an air. The notes are clear, and succeed one another with a recognisable connection. The tone is fluty; and when this early morning singer breaks through your sleep, you might mistake him for a cheerful boy whistling odd bars for sheer lightness of heart. Some people can only admire the blackbird among birds. They can find no harmony to which their ears can respond in other songs. To their sense the robins and thrushes merely make noises, which are perhaps some addition to the sense of gaiety in things, but not sufficiently interesting or musical to warrant the trouble in distinguishing. 'I know the robin's song only because it stops so suddenly,' or 'That must be a thrush because it is saying "Pretty Dick, pretty Dick"'—their perception of the points of the many songs does not go further than this. At the other end of the scale we find ears so finely tuned to the notes of birds that every song can be remembered as well as recognised. Mr. Hudson,

whose ear for song amounts to genius, could recall to himself, after twenty years' absence from England, the song of all our birds save three or four; and probably the finest passage in any book of natural history is his account of the towering songs of the great American birds in one of his books.

The strangest thing about the welcome given to birds' songs is that people may be within range of a particular song year after year and never consciously hear it. One day a naturalist says to them, 'Listen to the golden-crested wren in the cedar,' or 'That is a girl bunting in the elm'—and for the future the songs of the two birds, previously unnoticed and unknown, take their proper place among the pleasures of the garden. No doubt a surprising number of people are absolutely deaf to song. The trill of the grasshopper-warbler—a wonderfully accurate reproduction of the noise of a fishing-reel, though pitched higher—is wholly inaudible to some people of moderately acute hearing. The song of the blue tit and the lark disappears from the list of audible sounds at the very first approach of deafness; and hundreds of country people never seem to have heard the pretty little whispered piece of the goldcrest.

If music proper be the test the blackbird comes first. Those seven or eight clear notes that he whistles at sunrise and again after sunset also carry farther than the song of any bird, even than the thin, pleading cry of the nightingale beneath the stillness of summer stars.

As you loiter near a singing nightingale the force of the guttural throat most astonishes and thrills you. But, as the distance from the singer increases,

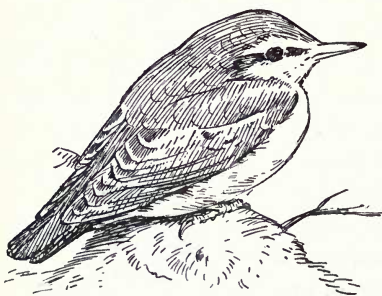


NIGHTINGALE

one part of the song after the other falls away till you can only hear that one lone and thrilling cry. The notes of the blackbird, very often in a sequence of seven, are describable in music. They differ a good deal, but the consecutiveness of the notes and the liquidness of the tone form the most unmistakable and cheeriest of all songs. Of the strains given in Witchell's wonderful book the following, though more monotonous, is, so to speak, the foundation of the song,



with the exception of the final note, which is the same as the penultimate. Witchell, however, gives this as the alarm note. But we must not judge birds' song by any of our musical standards. Sounds in nature, whether made by animate or inanimate things, please us because they are



WOOD-WREN

consonant with the mood and form of the world at the moment: 'The moan of doves in immemorial elms and murmur of innumerable bees' are harmonious for more esoteric reasons than—may one say?—the music of those two famous lines of the young Tennyson. The tinkle of thin ice, the

chromatic moan of the wind, the sucking whisper of the receding surf, are not musical sounds, but each has the power to stir Celtic sense of 'old, forgotten, far-off things' as powerfully as the triumphant harmonies of Teutonic masters. Birds' songs

have such a quality. The most musical are not always the most pleasing. Few can give more pleasure than the high crescendo ripple of the tree-pipit as he makes a sharp gable of flight above an oak, or—to give a personal preference—the first bell of the wood-wren, to be heard year after year, much about the same date, from a neighbouring group of beeches. It has no music and little variety; but yet it could ‘beget the golden time again,’ as did the cuckoo’s song, for Wordsworth ringing gently like this :



a moving mystery of sound now from one place, now from another, penetrating the leafage of the wood where he lay on just one particular sunny day.

The secret of the charm of the more real singers is much the same as of the cuckoo. In the lark’s song is contained all the sense of surrounding things, as catalogued—if one may say so—in Meredith’s ‘Lark Ascending,’ one of the great poems of the century. Much of the nightingale’s supremacy is due to the night and quietness, and if the poets had been early risers we should have heard as much of the blackbird.



The blackbird apart the best songs are least expressible in music. It is quite impossible to give in musical notation the song of the lark, which, with a very few exceptions, may be called the one continuous singer among birds. Scotsmen have compared the song with the music of the pipes, and the resemblance is quite perceptible. Whether this is an argument for or against the musical nature of the song is a question that may be left undecided. But the majority of

songs are little set pieces of more or less constant length and time. They are more easily expressed and learned. The chaffinch or the yellowhammer are good types of the set



song. The chaffinch in captivity and under instruction will learn to lengthen out his piece by a bar and more, but in nature the rippling trill,

suggestive with the tinkling rise in the last two notes of a fountain, is generally of an even length. An excellent reproduction, so far as pause goes, of the yellow-bunting's song is given by Witchell, thus :



But certainly many buntings do not ascend in the first notes of the song with this regularity. Most, we should say, do not rise at all, in the first four notes at any rate. The subject of birds' song and its relation to music is doubtless worth study ; but to the field naturalist the more absorbing pursuit is to separate the call notes, alarm notes, and songs, and to read in them the language of birds. The more you listen to birds at nesting-time the more clearly you discover how wide is the range of expression, one might say, of conversation. In their songs, which most arrest our attention, lies but half their power of articulate utterance. But the learning of birds' songs and, so to speak, words, is only easy and fruitful in the early morning. For the rest of the day, with the exception of a period of evening ecstasy—very different from

the morning domesticity—the language of most birds is more or less pedestrian. Especially do the spring migrants exult in the morning hours. It is more necessary for the observer to be up with the blackcap than with the lark, one of the few midday singers.

The morning too is the best hours for hearing all those bird conversations which are almost as attractive as the songs. As great attention has been paid in recent years to

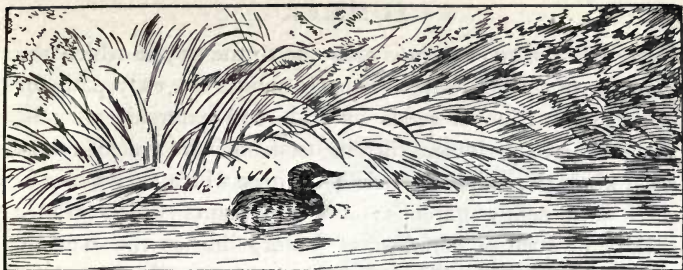


YELLOWHAMMER

the 'call notes' and 'alarm notes' of birds as to their songs, but from all classifications escape a host of half-whispered notes which are not song or call. The hen-bird does not sing, but she undoubtedly speaks and whispers. We have heard the hen stonechat make a singing noise; and if you are quite close to young and parents at feeding-time some summer morning, you will hear eager sounds and soft endearments that suggest a power to talk as well as to sing. Some cock-birds have a sort of croon which is quite different from song. You may, for example, hear from the cock bullfinch a

nest-side song which is very little like the spring song ; and the golden-crested wren sings songs which are only recognisable as his because of the tone. The sequence of notes has no set pattern at all. Perhaps in marking all the minor songs and calls of birds it is the quality of the voice, if one may say so, that makes recognition less difficult. The sibilant goldcrest, the soprano robin, the rough whitethroat, the hoarse corn-bunting, the liquid wagtail, the squeaky tits—have all a sort of voice that is recognisable, as well as a sort of song. Even when birds mimic to perfection, as the starling mimics the thrush, the quality of voice betrays them. This quality abides even when the song is sweet and the chirp harsh. Larks and pipits, for example, have calls that are perhaps harsher than any song-bird's. They sound more akin to the jackdaw than the thrush ; but it is still a lark's note, only it needs wide skies and a place in continuous sequence before it can achieve its charm.





ALONG THE RIVER

A STRANGE and luxuriant vegetation runs riot by the margin of lowland rivers at midsummer, and fosters abundantly the life of insect and bird. Although the water-plants rose slowly so long as the mists and frosts lay low along the stream in the spring months, once the summer suns have well warmed the marshy ground and shallow pools by the river their undergrowth grows almost tropical. Of all British plants the great water-dock has the most sumptuous and African growth; and when we see its huge and sappy leaves gemmed in June with azure dragon-flies, it seems a glimpse of some exotic flora and fauna. Many of the stream plants are survivors of very ancient forms of vegetable life, which have found a lasting refuge in the pools and channels; and they wear an alien air among the flowers of the pastures and hedges. It often happens that the plants of a comparatively small stream are more interesting than those of the land through which it flows. The alluvial ooze and free water-supply of the river make them less dependent on local richness in the soil; so that in the heart of a dull clay vale or bleak plain on the coal measures, where the land flowers are surprisingly scarce and monotonously familiar, there will often be some notable plant in the stream. The

interest of the river flora is also due to the way in which the network of a wide water-system provides an easy path for the dissemination of seeds by birds and waterside animals, and downstream by the current itself. Rivers are sowers of most kinds of seed, but specially of those which they foster in their own sedgy gardens; and the plants which muster thickly in such a paradise of watery life as the Norfolk Broads or the upper Thames backwaters are distributed far and wide among barer landscapes and beside austerer shores.

I. THE FLOWERS AND RUSHES

The thick screens of water-plants which fringe the bank of the Thames, and many other rivers in June, are chiefly made up of flag and pond-sedge and bur-reed and scented rush. There are scores of other plants gaily scattered among them, but these four usually supply the real substance to the thicket. The flag or yellow iris is in high flower before the middle of June, or even in May, in warm and forward years in the south. Its heraldic blossom seems emblematic of this regal time; oncoming midsummer lifts her sceptre by the luxuriant stream. Each flower passes quickly over, and though several open on a stalk in swift succession, the flowering of the yellow flag is over only too soon. The smooth flag-leaves give a glaucous sheen to the thickets where they predominate; from the day when they first push out, lusty and flat, from the knotted roots in April, they are bluer than most of the plants of the stream. The pond-sedges—for they vary in size and kind—have a narrower and greener leaf, rough, with a cutting edge; it is loud and rustling when the June storms toss by the water-side. Its handsome grassy tops of sepia and buff are scarcer in June than in late April and May, but still help to varie-

gate the green beds. Bur-reed is brighter green, with soft blades harmless to the touch; it has spikes bearing little silvery heads of unfertile blossom, and beneath them the fertile burrs like little thorn-apples, which grow larger as summer goes on. The scented rush is a local, but often an abundant, plant; if a boat is driven at random into one of the reedy islands on the upper Thames in soft June weather, the sweet spicy smell of the bruised stems and blades will often rise thickly all round. The scented rush bears an outstretched green finger, like the spike in the cowl of an arum, but netted with angular lines; by this it can easily be identified at a little distance, when deep water prevents the plant being plucked and its scent proved.

There is much confusion in the popular names of many of these water-plants. The scented rush is not one of the rushes, and indeed does not resemble them; it is some-



YELLOW FLAG

times called the sweet sedge, but belongs to a distinct family from the other sedges. The handsome plant usually known as the bulrush is also not a rush; its right name is the greater reed-mace. The tall plant usually known as the giant rush is the true bulrush; it is the graceful stem, six or eight feet high, often with a tuft of green blossom at the top, which grows in the shallower water, but not on land. Though it is so much like a large rush, and is used to seat rush-bottomed chairs, it is really not a rush but a sedge. In small streams the giant rush chiefly contributes to the great rafts of vegetation which collect against outstretched boughs of hawthorns and willows, and form playgrounds and resting-places for the water-rats and moorhens. The stems die, and turn brown and brittle, in autumn, and rap against each other with a peculiar restless pattering as they are plucked by the fuller stream. Presently it snaps them off, and they break into short lengths as they turn head-over-heels in the flooded channels. The dipped bough catches the light wreckage, and the stream continually adds to it and piles it higher, until nearly a cart-load of dead bulrush stems may be heaped among the boughs of the anchoring bush. As spring and summer advance the heap grows smaller than after the December floods, but settles into a more solid mass; and by the time that the new giant rushes are tall above the stream, it is hard to tell the nature and origin of the mysterious haycocks piled among the overhanging boughs.

The flowering rush is another delightful plant of the river-bank which is no real rush. It is not uncommon about midsummer along the Thames and other lowland rivers with a rich vegetation, though it is seldom found abundantly. It has a loose cluster of rosy blossoms springing from the very tip of its long slender stem. More local and confined to part of the Thames basin is the summer snowflake, or Loddon

lily, which flowers in late spring and early summer, long after the snowdrop which it resembles has been buried by the rising vegetation in the woods. It is to escape a like suffocation that the Loddon lily and all the later plants of the riverside sedge-belts must grow so tall. Only thus can they reach the sunlight, except when they have floating or half-sunken leaves, and flower on the surface of shallow pools and backwaters. The first blossom of these water-gardens,



LODDON LILY

after the familiar marsh marigold, is the delicate lilac water-violet, which shakes out its loose cluster in April and early May. Here the nomenclature of the waterside plants has run wilder than usual, for the water-violet is neither a true violet nor resembles one. It is more like the cuckoo-flower or lady-smock which blooms at the same time in the neighbouring meadows. About midsummer the arrow-head lifts its pink flowers and angular arrow-shaped leaves out of the water in many of the shallow ditches communicating with the Thames. Rarer plants of the same Thames ditches are the

frog-bit, with its large white blossom, and the villarsia, which has yellow flowers, and is like a small water-lily. Water-lilies spring from deeper water, and send their leaves and buds to the surface by long clinging stems. The yellow water-lily is the smaller and commoner of the two; its ripening seed-heads smell like anise, and are shaped much like the capsules of the poppy tribe, with which the water-lilies are closely allied, for all their difference of habit. The white water-lily brings the very fullness of summer to the ample lowland streams; it first opens its large green buds about midsummer, and goes on blooming throughout July. When the seed is ripened, the heads sink again into the depths. The same object of reaching the sunshine for the flowering and fruiting time is attained in a highly specialised manner by the bladderwort, which grows in the shallower ditches. The fibrous leaves are buoyed up by small bladders, and the plant thus gains stability to hold erect its spike of yellow blossoms, mouthed like the snapdragon. Forget-me-not spreads its turquoise blossoms and fresh green leaves among the running ditches; blue brooklime and purple water-speedwell mingle with the water-cress and white-flowered marshwort, which mimics the water-cress until we look for the notched edges to its leaves.

Meadow-sweet and willow-herb are two of the most conspicuous plants among the taller vegetation of the river-banks at midsummer; they begin to bloom when the comfrey has shed its bell-shaped blossoms of purple, pink, or white. Like the milkwort of the midsummer downs, its blossoms run through many shades of colour; nor does the difference seem to correspond to any difference in the soil constituents, as is the case with the garden hydrangea and the white or yellow anemone. Marsh woundwort lifts its nettle-like leaves and purple blossoms among the same varied vegetation, and

with it blooms the gipsy-wort, with clusters of smaller pink blossoms in the axils of its notched leaves. Another handsome plant which here and there grows freely on the Thames banks and the marshy edges of the backwaters is the meadow-rue. This has creamy yellow blossoms something like those of the meadow-sweet, but the plant is taller and its leaves more deeply cut. Because it shoots among the thickest streamside vegetation, where its blossom is easily mistaken for that of the meadow-sweet, it is apt to be overlooked, though it is one of the most striking water-side plants. Much commoner, and fonder of growing actually in the shallow margin of the river, is the water-plantain, with its large head of small lilac flowers. The leaves are shaped like those of the plantains which deface our lawns, though the plants belong to quite different tribes. The water-plantain is of the same family as the arrowhead. It is a curious



MEADOW-SWEET

sign of the way in which we regard the water as an alien element that many water-plants and water-beasts are given allusive names based on some likeness—often vague enough—to a plant or animal on the dry land, which is our own native element. We speak of water-plantains and water-violets and sea-mice and sea-cucumbers and sea-anemones, but never of land-coral, which would be a good name for certain fungi, or land-prawns for mole-crickets, or land-whelks or land-periwinkles for snails. This fantastic nomenclature of the water fauna and flora tends to hide the real wonder and beauty of the life of the water under an artificial appeal. Much as the manatee used not to be thought to be interesting enough for showmen to exhibit unless it was called a mermaid, the water-plantain is named after a less interesting land-plant in order to recommend it to our acquaintance in a more familiar light.

Two distinct riverside plants are known as the yellow loosestrife. One is the moneywort or creeping jenny, which crawls about damp banks, and opens its bright yellow blossoms like fallen coins. This is a close relation of the yellow pimpernel of the shady copses and the red pimpernel which blooms under the lighter shadow of the corn. The other yellow loosestrife belongs to the same family, and perhaps has a better right to the name than the moneywort, as it has no alternative in common use. Moneywort can put up with very little sunshine, and therefore remains a lowly plant, not competing with the tall flags and sedges; but the other yellow loosestrife grows in their midst, and spreads its brilliant yellow blossoms to the sun on strong branching stems which press among the harsh blades of the sedge. In its branched growth and the brilliant yellow of the blossoms it recalls the St. John's wort tribe, and might be taken for a slenderer tutsan. The commoner purple

loosestrife belongs to another tribe, despite the name, and to a different phase of the year. It begins to bloom by the banks of the river in July, like the willow-herb; and when their kindred purples begin to tinge the screens beside the river we know that the year is already declining, and the riot of midsummer has gone by.

Beside all these luxuriant marsh and water-plants, the banks of the river foster another company which prefer a well-drained soil. They are able to grow by the river because of the sharp contrast in soils which is often found in such a place. The low steep banks against which the river washes are often formed of alluvial grit, washed down by the river in earlier epochs, and freed of clay and slime. Thus the banks are porous and well drained, although there is a free passage of water from beneath to feed the plants that grow on them. Between the edge of the turf above and the lip of the water below, among the water-rats' holes and the rarer galleries of the sand-martins and kingfisher, there is a group of plants quite different from the stately water-flowers which overshadow them. It is more varied than the true water-plants, and includes many species which have strayed from the cornfields and pastures above; but several attractive plants are often found on the little earthen cliff, and some of the commoner species take a delicate miniature growth, in scale with the dwarf hanging garden. Dewberry blossoms open in June on their small straggling briers, and the soft berry with its delicate bloom is ripe before the black-berry is yet in flower. Scorpion-grass, with its smaller grey-blue blossoms, contrasts with the clearer colour and more luxuriant growth of the forget-me-not in the water below. Scorpion-grass is a land forget-me-not, and the common garden varieties are derived from it, and not from the more handsome water-plant, which is too thirsty a subject for the

ordinary garden-bed. One of the most attractive plants which are usually found by the waterside, and yet require a dry and well-drained soil, is the skull-cap, with its dark blue-lipped blossoms and narrow dark green leaves. Among full-grown trees the common willow has the same preference. It likes to plunge its roots in a stratum through which water passes freely, but to stand in a sound loam. The sallow, or palm-willow, on the other hand, is fond, like the alder, of a regular mire or slough, where the moorhens dabble among the ooze and the draggled sedges. Here and there, where the river-banks are formed of stiff clay, the bur-marigolds—there are two closely similar species—lift their solid round blossoms of dull yellow over frills of deeply-cut leaves. In its substantial growth and dull colouring the bur-marigold seems the true offspring of the heavy clays; and it is a conspicuous plant of the running ditches among the pastures of rural Middlesex, where the London clay nurtures its limited flora. Wild teasels tolerate the same inhospitable soil, and lift their purple heads and water-catching frills of leaves on the same clayey banks of the stream. Drowned insects are often found in these little cisterns, and they might almost provide breeding-places for the larvæ of mosquitoes, which are gnats under an imposing name.

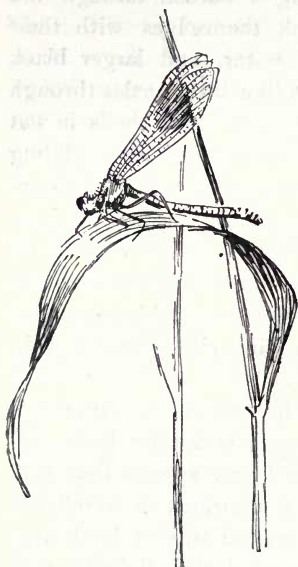
II. THE BIRDS AND INSECTS

Most of the insects which abound at midsummer by the river spend their earlier stages among the slime and weeds of the stiller reaches, or the gravel of the brisker runs. Mayflies, which rise thickly in early June on many rivers and certain lakes, spend two years in the mud of the river-bed before emerging for a few days at most to court in the air above. The caddis-worms, which drag their varied tubes

about the bottom of the channels, are not the larvæ of Mayflies as is often supposed, but of the heavy reddish sedge-flies which abound at evening by the water after the time of the Mayflies is past. With their black heads and fore-legs protruding from their case, the caddis-worms stumble among the water-weeds in the clear shallow pools of the little backwaters, like ants hauling a burden through the grass. Brown water-boatmen flick themselves with their paddles through the sun-warmed water, and larger black water-beetles slant their way down like little turtles through the weeds. Water-snails of many sizes, with shells in flat and spiral coils of varied patterns, go delicately gliding along the green blades of the weed, or tracing a little pathway across the gritty floor. The swifter life of this exquisite miniature water-world is supplied by the minnows hanging poised to start in shoals; and if we stir the mud beneath we come upon strange dragons of the under-world—sprawling larvæ of water-beetles, and the dragon-fly in its hideous sub-aqueous form.

Most dragon-flies are graceful in form and colour as well as fleet of wing, but the most exquisite species haunt the watersides from early June. The larger species that rove freely through gardens, lanes, and clearings in woodlands in later summer are excelled by several smaller kinds that haunt the watersides. Dragon-flies are badly off for English names; 'horse-stinger' is crudely misleading, and 'demoiselle,' which is sometimes confined to the smaller species, is not really English. There are scientific Latin names for use at need, but they seem stiff and out of place while the living insects float by the June waterside. But it is as well to know that the two commonest varieties—one with wings broadly splashed with metallic purple and the other with rusty red—are the two sexes of one species, and that when

they sail together in courtship nature is not planning some singular hybridisation, as the unlikeness of the two insects might seem to indicate. Their lazy, flapping flight is in harmony with the ease of the summer river ; but the little sapphire dragon-flies that drift in shoals among the sedges have the nimbleness of the minnows in the water-world,



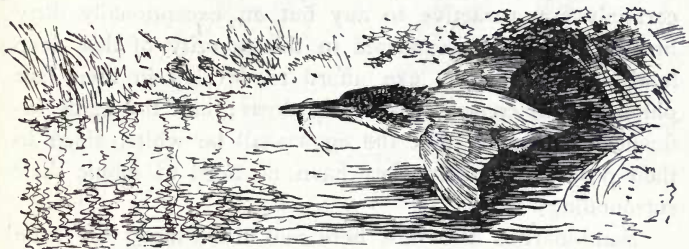
DEMOISELLE

where life has a crystal lightness unrelaxed by the July heats. Light plays in their slender bodies as in a jewel, and almost as jewel-like is a delicate crimson dragon-fly of the same size, which is more rarely seen by the stream. Both sexes of this species are of the same brilliant red, but the female of the small sapphire dragon-fly is dull yellow, with darker stripes.

The kingfisher's back as it shoots down the arcaded channel has the same sapphire gleam that harbours in the bodies of the dragon-flies. Compared with the brilliant blue of its back, the ruddy chestnut of its breast seems almost dusky ; and

even its back loses much of its brilliance as the bird comes to rest upon a willow-bough, and the light ceases to play on its metallic feathers. As it sits and eyes the stream below, waiting for the chance to plunge upon a minnow, the two white patches on the neck are often its most conspicuous feature, though we seldom notice them in flight. The kingfisher is heard three or four times by the

practised ear for once that it is seen; its thin but piercing pipe is very distinctive among the cries of the riverside, though it occasionally suggests one of the varied notes of the common sandpiper, which haunts the Thames and other lowland streams for some time on passage in late spring. Sometimes when the elfin piping is heard, we look up and catch a glimpse of the kingfisher spinning like a nebulous blue meteor in and out of the curves of the stream, or swerving directly across the meadows to the shelter of the willows; but often it flies so low behind the sedge-screen that we only hear it pass. Kingfishers sit motionless on their perches,



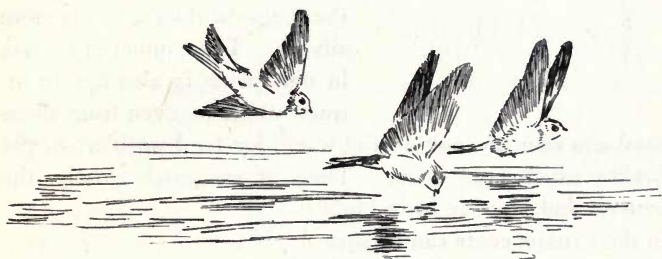
so as not to scare their prey; but their plunge, when it comes, is decisive. They strike the stream with a sounding smack, and usually fly back to their perch at once before tossing the minnow upright in their beak for convenience in swallowing it. If they have young to feed, we see the fish glittering in their bills as they spin off in the direction of the nest. More rarely they hover over the stream before plunging; and this is the most beautiful of all their displays, as the fanning wings multiply the shimmering iridescence. Thanks to steady protection, kingfishers are now by no means rare on the Thames water-system and many other southern streams. They are scarcer by the rocky torrents

of the north and west, for there are fewer calm pools suitable for their minnow-fishing; but they are found sparingly on many such waters, and also in rocky harbours and estuaries by the sea. The common situation for the nest-hole is in some vertical loamy bank of the river, or a bordering ditch or backwater; but occasionally they choose a bank some hundreds of yards inland from their fishing-grounds, or even a crevice in a quarry. The hole is much like a water-rat's, but more evenly oval; it leads into a gallery about two feet long, at the end of which the round white eggs are laid. The birds usually dig a fresh gallery each year, and the condition of the kingfisher's nest at the end of the season is certainly not attractive to any but an exceptionally dirty bird. Since they are nursed in the security of this deep hole, the young birds can afford to develop in their first plumage the conspicuous family dress; and the same influence determines that the eggs shall be white, since in their position of safety they have no need to mimic their surroundings.

Sand-martins also nest here and there along the little earthy cliffs of the river, though the favourite site for one of their colonies is in some inland sand-pit. By streams lacking dry and friable banks, but otherwise attractive to them, they have been found, nesting in narrow drain-pipes built into a stone embankment, and even in galleries bored in the soft wood of rotten willows. Sand-martins are as gregarious as kingfishers are solitary, and flutter like clouds of Mayflies above the midsummer stream. House-martins fly more strongly, and in more sweeping curves, and swallows more boldly still; but the swift is the lord of the swallows by right of swallow-like flight, though he is no real swallow. One of the delights of the streamside meadows in summer is to watch the swifts rushing past so close and low that we can

see the dull white patch on their chins ; and notice, as summer goes on, how their sooty feathers get worn by rubbing in their roosts, and bleached in the strong sun, until they gain the same transparent greyish look at the edges that we see in the ruffled plumage of the black swan, or the dowdy black moth—dressed in insects' bombazine—which is known as the Old Lady. This large dusky creature is also common in boat-houses and other buildings by the waterside, but not until July or August.

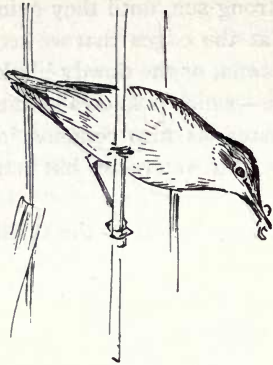
By midsummer the water-wagtails and most of the small



SAND-MARTINS

singing-birds of the riverside have finished nesting, and are in charge of dwindling troops of inexperienced young. But moorhens and dabchicks seem never to grow tired of the nursery, and go on nesting into August ; and midsummer is the height of the nesting season in the scattered colonies of reed-warblers. The reed-warblers sling their nests over water on supporting stems, and prudently make sure that the vegetation is ripe for its purpose before they trust to it. Exceptionally they hang their nests to willow and lilac twigs in withy-beds and gardens by the water ; but the traditional prop of their house is the true reed, with canelike stem and blue-grey flowering head, which grows in belts and beds not too commonly by the edge of the river. Like all river-

plants the reed springs late, and the reed-warblers wait till it has formed a dense cover to hide them building. Unlike the



sedge-warblers they usually nest in colonies, and this is clearly due to the scarcity of their favourite reeds, which concentrates them in the spots where the reeds grow. The reed-beds ripple at midsummer with the reed-warblers' babbling song, which recalls the sedge-warbler's, but is more silvery. The number of singers in one place is also apt to attract attention even from those

ramblers who are not on the watch for reed-warblers or the brakes which hold them. Then, if we watch closely, the smooth and slender little birds in their russet coats can be seen slipping from reed to reed, and resting on their vertical stems in a characteristic attitude, with the upper leg bent and the lower one stretched to its full reach.

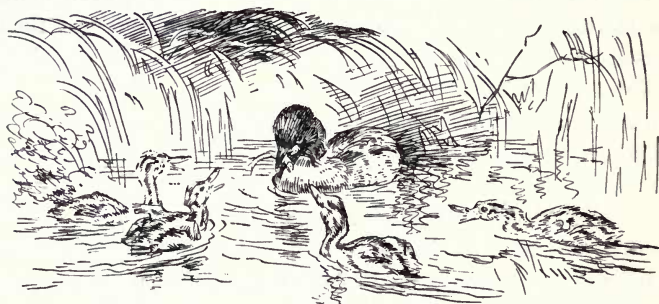
Perhaps because their colonies are easy for a wandering bird to discover, reed-warblers are very often victimised by cuckoos. The surest way to find a cuckoo's eggs or nestlings is to search in a colony of reed-warblers' nests. More meadow-pipits' are utilised by cuckoos than reed-warblers'; but it is not so easy



to find the same number of meadow-pipits' nests in a short time. Cuckoos' eggs found in reed-warblers' nests are suffused with a peculiar tint of olive green beneath the usual vague freckles; this rough approximation to the colour of their brother-eggs is noticeable if we compare them with the greyer cuckoos' eggs to be found in the pied wagtails' nests in the willows, or the browner type which are usual in the sedge-warblers' nests among the bushes and undergrowth. The young cuckoo is naked and copper-coloured, and squats at the bottom of the deep conical nest like a toad in a hole. Its task of murdering its mates is even more remarkable when it is born in a reed-warbler's nest than usual, for the sides of the nest are unusually steep and high. This is of no apparent effect in discouraging the murderous instinct of the little changeling; its effect is to prevent the legitimate eggs being blown out when the reed-beds dip deep to the stroking wind. The nests are usually bound to the reeds which support them by strands of reed-flower of the previous year; but reed-warblers have a sharp eye for other and more convenient materials, and use thread for binding their nests when they can find it.

Except for the placid swans, which seem to take pride in their favoured position as tame birds, the water-fowl of the river are shy and elusive. We have to keep a sharp lookout for a glimpse of the dabchick between its dives, and when we hear its loud bubbling laugh it comes usually from the midst of a thicket of water-plants, where the bird is invisible. Its nest is as elusive as itself. It needs some little practice to distinguish it from merely casual heaps of water-weed drifting on the surface by a shade more of design in its moulding. It is a round sodden pudding, out of which the end of one of the dirty white eggs occasionally sticks like a large almond out of batter. After the first or second egg is

laid, the dabchick drags the wet weed over them whenever she leaves the nest, and this soon changes their original chalky whiteness to a muddy brown. The eggs of coots and moorhens and most water-birds are exceptionally thick-shelled, which may possibly serve to protect them from being addled by temporary flooding of the nest. But the dabchick's nest is always soaking wet, and the thickness of the eggs is apparently not enough to safeguard them against chills when the sitting bird is away. Therefore she covers them with a blanket of weed, and the heat of this decaying vegetation

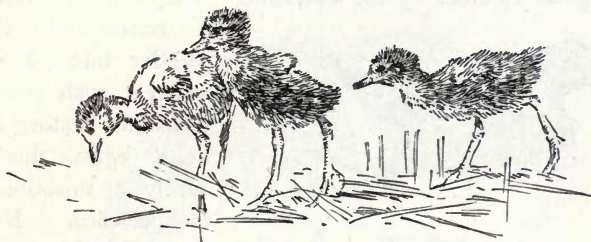


DABCHICKS

protects them, and probably helps to hatch them. It is clear that the object of covering the eggs is not primarily to hide them, for the first pure white egg is often not covered up; and later, when the eggs are covered, they are stained so deeply as to be very inconspicuous on their bed. The dabchick is most easily recognised by its quick and constant diving, in which it excels all the birds of the coot and water-hen tribe, and also the surface ducks like the teal and mallard. Its head and beak look impishly large for its body as it floats low in the water, with its back almost submerged; and its neck in the breeding-season is ruddy, where in winter it is

pale. Careful watching may show the young dabchicks riding on their parents' backs, or even taking a trip beneath the water, held beneath their wings.

Moorhens' nests abound in the reeds and rushes in June, and change their character as the season advances. Their nests of spring are substantial dishes of dry flags; in the warmer summer weather they often build for the later broods slighter nests largely composed of green flags and sedges of the year's growth. But these later nests built to hold eggs must not be confused with the slighter platforms, also formed

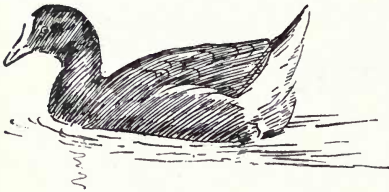


MOORHEN CHICKS

of green blades and stems, which the old and young birds build among the reeds simply to rest on. And all these structures of the moorhen are distinct from the platforms made by the water-rats, on which they sit upright like squirrels, and nibble the soft white stems of water-plants with incisors shivering in the rodents' familiar manner. So does a tame rabbit munch a cabbage-stalk, though he has not the skill to lift his food in his paws. Moorhens' and water-rats' platforms can be easily distinguished, for the rodent gnaws the stems into lengths, while the bird packs and twists them into a rough circle. Besides moorhens and dabchicks and coots on some slower and wider streams, a fourth species of water-bird seems to make its appearance in June and July.

It runs about as large as a dabchick, and is dingy greyish-brown above, with a paler throat and breast. These are the hobbledehoy moorhens, children of April and May, now mewing their youth by the waters of midsummer and the dog-days. In August we shall see the cleaner greys and olives of the adult plumage gradually replacing their indeterminate shades.

Dabchicks are street-arabs in all their moods and gestures; but moorhens are an extremely respectable race, with the air of being genuinely shocked at any violent or irregular conduct by the waterside. They seldom err, and



MOORHEN

if occasionally they wander into gardens and eat such strange meat as tomatoes and hens' eggs, this is surely a mistake of inexperience. Even the dull-looking elder

brothers are said to help their parents in bringing up the younger broods; and it may be suspected that the greener and slighter June nests are often of their building, since the architecture closely resembles that of the platforms which they make among the reeds. The sharp, shocked cries of the moorhens break out by the side of the river all day, and irregularly through the night. They are a fearful race, and their underworld is full of sharklike pike. Another harsh and persistent cry is often heard nowadays by southern streams where it was unfamiliar twenty years ago. This is the anxious note of the snipe with young, calling 'kek-kek-kek-kek' endlessly from the sky above, as some intruder wanders over the water-meadows, where the young are hidden. The snipe's more familiar drumming is sometimes

heard as late as June, but the note of anxiety gradually replaces it. Like redshank, and the ruff and bittern in one or two haunts, snipe are distinctly re-establishing themselves. This is largely due to increased protection; but in the case of snipe and redshank it is probably owing also to the spread of sewage farms, which form for marsh-birds a safe and congenial, if a rather unsavoury, asylum.

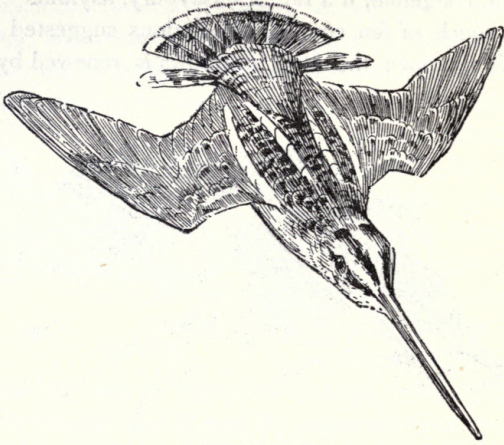
The touch of fen country associations suggested by the snipe calling above the level meadows is renewed by many



YOUNG SNIPE

peeps of landscape along the larger rivers. Sometimes the river diversifies a prosaic region of mildly undulating pastures, and sometimes woods drape the cliffs, steeply falling to the shore; but often between the stream and the nearest hills there is a mile or half a mile of green East Anglian scenery set in alien surroundings. A group of poplars dominates the level meadows, where a straight dike catches a stripe of brilliant colour from the sunset sky; or across the green expanse, with its true fenland note of composed dignity, the eye rests on the nodding gable of an old white wooden mill. Only a few hundred yards away the scene may change to

steep chalk or sandstone cliffs, or hanging woods of oak and beech; but the strip of fenland scenery is complete in its own narrow limits, and adds to the borders of the summer stream a richness and variety of landscape like its wealth in flowers and birds.



SNIFE DRUMMING



CINNABAR MOTHS

THE DAY OF THE MOTH

MOTHS are lovers of warm and obscure night skies, but a small number prefer the full sunshine of day like butterflies. Most of the day-flying species conform to the bright colours and markings of the butterfly tribe; but there is no invariable distinction of this kind, and in this respect, as in others, the boundary between moths and butterflies is ill-defined. Several of the thorn moths, the crimson underwings, and other night-flying species are as brightly coloured as most of the butterflies and day-flying moths; while the brown and white patterns of the Mi moth and bordered white, which fly by day, seem more in accord with the duskier markings of the majority of night-fliers. Certainly there is no lack of brilliance about the emperor moths which appear on sunny days in late April or early May in many heather districts, where the males with their rich orange-red markings and handsome eye-spots dash more swiftly than any of our butterflies along the woodland rides and over the shoulders of the moor. In flight as in colour these are very brilliant moths, and they have none of the comparative dullness and torpidity which distinguish many of their tribe. Later come the vermilion and sepia cinnabar moths, which appear on commons and in waste fields where ragwort grows, and in weedy gardens

where the kindred groundsel feeds their caterpillars. Burnet moths have much the same contrast of scarlet spots on a dark green ground, shot with blue like a rook's wing; and the beautiful yellow underwing flashes like a firefly about the heaths in the sun. In close company with the Mi moth the brown and orange burnet noctua visits the flowers in rough shrubby fields; and at the end of summer and in early autumn the bright chestnut wings of the male vapourer zigzag rapidly from tree to tree, and the humming-bird hawk moth vibrates with intense rapidity at the flowers. Cinabars and burnet moths are feeble and heavy fliers, but most of the other day-flying moths add vivacity and vigour to any summer scene in which they appear.

Emperor moths are the best-known examples in this country of a family of silkworm moths which in Asia and North America run to a great size. Their broad eye-spotted wings are familiar in insect-houses and private collections, for they are easily reared, largely owing to their habit of protecting themselves in a cocoon during the pupa stage. The cocoon of the emperor caterpillar is spun among the heather stems in July and August, and consists of a pear-shaped case of a tough material like oiled paper, surrounded by yellowish-brown silk, which holds it in place among the herbage. Inside the tough cocoon lies the pupa, with the shred of caterpillar's skin which is cast off; but the method devised for the emergence of the moth in the following spring is different from that of the common silkworm or the caterpillar of the oak eggar moth, which also spins a cocoon among the heather. The cocoons of the oak eggar and silkworm are evenly oval, but the narrow end of the emperor's cocoon is open externally, and is closed inside by a set of bristly silken threads, converging to a point. These effectually close the orifice against any small creature which might

try to penetrate, but the emerging moth can easily push them asunder.

Day-flying moths include representatives of all the most conspicuous families. The emperor and oak eggar and fox moth represent the cocoon-spinners; the humming-bird stands for the hawk moths, while the heavy noctuæ or owl moths contribute the beautiful yellow underwing, and the light geometers the speckled yellow of the May copses. But the great majority of moths are creatures of dusk and darkness; and unlike the day-flying insects of their kind, they prefer a dim to a clear sky. This is probably because overcast nights are warmer than clear ones, when the radiation of the earth's heat is unimpeded by cloud; and so frail a creature as a moth is naturally averse from cold, even if it shuns the sun. For the same reason, they are scarce in the chilly hours immediately before the dawn, and are most abundant on the wing from dusk to about midnight. One of the first signs of full spring in April is the appearance of the frail and silvery carpet moths after dusk in the soft night air; and moths linger late into autumn during soft weather, while a few flimsy yet hardy species are to be seen abroad on mild nights all through the winter. If moths originally became nocturnal creatures in order to escape from birds which fed upon them by day, the precaution has long ceased to be of any service. Bats feed far more persistently on moths by night than any birds do by day; and the luminous white and yellow tints of such species as the ghost swift and the swallowtail and sulphur moths serve as signals for their own destruction.



YELLOW UNDERWING

Though most moths forgo the sunlight, they are as fond of the nectar in flowers as the butterflies. The luminous whiteness of some flowers seems correlated to the nocturnal habits of the moths which fertilise them; and the flowers which shine pale at night are often also strongly scented during the same hours. Other flowers have a rich nocturnal perfume without the luminous colour. There is no positively luminous quality in the blossom of the white jasmine or the garden tobacco plant, as there is in the glow-worm or the millipede; but their pale hue makes them visible on any but the darkest nights. Sometimes we see a sort of live mist, quivering at a jasmine or petunia blossom in the dusk, and may be fortunate enough to identify it as one of the rarer hawk moths. Hawk moths prefer twilight rather than darkness, but the garden blossoms after nightfall are often more populous than on a sunny day. Even if we are not collectors, it is worth while to go round the walks with a lantern after dark, and surprise both ourselves and the nocturnal revellers which spar so actively or drink so deeply on the blossoms. The moths now show an activity which is in strong contrast to their confused and torpid movements when we discover them by day. They move briskly on the flowers, and turn on us curious eyes which seem to glow angrily in the light of the lantern. These jewel-like eyes of the moths are a striking feature of the feasts on the flowers, and give them an attractive and oddly intelligent appearance by contrast with the earwigs which also abound by night on many flowers. Earwigs when surprised by the light writhe hastily into the dark, often falling headlong from the pinnacle of the blossom; and the same expedient is practised by one group of the heavy noctuid moths. They do not take wing, but tumble to the ground; and then they have two devices. Some lie as they fall, often on their backs, and try to escape observa-

tion by remaining perfectly motionless. This instinct is common to many wild creatures, which are often regarded as 'shamming dead.' But it is doubtful whether there is often any definite imitation—whether conscious or instinctive—of a dead body; more probably the effectiveness of the device is simply due to the concealment afforded by motionlessness and the absence of any movement which might excite hostility. While some moths lie comically supine, with their legs retracted, others on falling to earth waste no time in racing into cover. The large yellow underwing moths of several kinds and the turnip moths and several of their kindred are great runners, and are built accordingly. They have large muscular legs which lift them well off the ground, while their bodies and folded wings form a compact flat slip which presents as little resistance as possible to the grass and undergrowth. When disturbed by day, the common large yellow underwing darts into cover with amusing speed and cleverness; and once these running moths have fallen to the ground by night they vanish almost instantly.

Creeping insects are instinctively repugnant to humanity, and there is more attraction about the gauzy and slender-bodied geometer moths, many of which are also to be found feeding on flowers. Some of them fold their wings upright over their backs like a butterfly, when they settle on a flower; and this habit, which is sometimes wrongly stated to be peculiar to the butterflies, has at least a clean and butterfly-like air. The geometers are on the whole much lighter in colour, as well as in build, than the noctuæ or owl moths, which country people call by the expressive name of 'buzzards'; and, like the whiter flowers, they give freshness to the summer night. The sulphur moth flits yellow through the dusk, outstripped by the paler and much larger swallow-tail moth, which dances like a will-o'-the-wisp down the

dark garden alleys in July. In June the various species of emerald moths float abroad, obscurely pallid in the gloom, but of exquisitely delicate tints of green when we find them stranded in our windows next morning, or beat them out of the beech-saplings and undergrowth.

The attraction of bright light for moths at night seems partly due to their habit of frequenting pale blossoms. They are accustomed to visit flowers which advertise themselves in this way, and are consequently sensitive to any illumination in the gloom. In a perfectly wild land, where there were no lamps and few or no fires, moths would not be exposed to the perils which beset them so constantly in populous countries; and they have never acquired the power of guarding themselves against the fatal fascination of the candle or lamp. In a district where moths of many species abound, a surprising variety can be observed by placing a lamp inside an open window on a warm, cloudy night between nine o'clock and midnight. The commonest species and the chief tribes can be easily distinguished after a few evenings' experience by their method of approach. The strongly-flying noctuæ, such as the common yellow underwing and the dark arches—which is one of the commonest June species about lights—arrive with a sudden dash which often flings them straight upon the floor as they rebound from the lamp-shade or the wall. Common swifts also flock to light in large numbers near hay-fields about midsummer, and they are betrayed at once by their small size and wildly erratic speed. The flight of the geometers is comparatively weak and flapping, yet because of the more moderate pace with which they arrive they often reach the lamps most directly and singe themselves at the chimney the soonest. There are nights in June and early July when the moths seem seized with madness, and fling themselves through the

window upon the light in an almost unbroken procession. Yet no extraordinary frenzy really seizes them on these crowded nights. The number of the visitors indoors is only proportionate to the multitudes which are stirring out in the garden and over the uncut hay-fields. They are drawn abroad in greatest numbers by the warmest and dimmest nights, especially about midsummer, which is even more the heyday of moths than of butterflies. The same dark, warm nights draw out the perfume of the night-scented flowers most richly; the flowers and the moths which unconsciously mate the blossoms are stimulated alike by the warm nocturnal air.

Many of the blossoms sought by moths have a heady sweetness, so that it is after all not surprising that a number of moths can be attracted by smearing trees and walls with mixtures of beer, sugar, and rum. But these unctuous doses do not appeal to every species; and collectors know well which moths will 'come to sugar,' and which must be hunted in other ways. Sugar—as the various mixtures are collectively known to the fancy—will entirely fail to attract a large number of species, and is chiefly attractive to noctuæ. On the other hand, some moths are seldom caught in any other way. August brings out in gardens and shrubberies the copper underwing—a rather large noctua of which the underwings are of a burnished coppery-brown. It is often fairly abundant, but is likely to be entirely overlooked until sugar is tried, whereupon specimens will turn up regularly every night. Some moths, such as the herald and old lady, seem to have the tastes of anchorites, and are seldom found anywhere but in retired corners in sheds and outhouses. The herald's slate and orange wings, with a white thread stretched across them, are very commonly seen folded at rest on a wall in some dusky retreat, but now and

then it can be found visiting the garden flowers after night-fall, and displaying an unexpected activity. Not many geometers visit sugar spread on trees and walls, but if a spot of the sweet mixture is brushed on outstanding blossoms in the garden borders they will feed on it more freely, and can be caught or examined when the lantern is turned on the baited flowers. One advantage of spreading the sugar on flowers instead of on trees, palings, or walls is that it is safer from the inroads of slugs, which will lick up in an hour after dark as much of the mixture as would satisfy a hundred moths. On the other hand, the virtue of the mixture lies largely in its attractive smell, and it is difficult to spread enough of it on a flower to make it smell strongly enough to attract moths from a distance. This method chiefly provides a more potent attraction for moths which naturally visit flowers.

Watching for moths as they sit motionless by day on trunks, walls, and palings is one of the less productive but most interesting branches of moth-hunting. It is easy to acquire an almost instinctive habit of looking at all suitable spots as we pass them, and once this is done regularly, it is remarkable how often we shall find them occupied by a moth. Several of the hawk moths occur fairly frequently in this way, as well as many species of geometers and noctuæ. The habit of resting motionless on the mottled background of wooden palings or lichened tree-trunks gives a wide opportunity for the development of protective imitation, and if moths always sought their appropriate background, they would be hard to detect without a careful search. Often, however, they pitch on spots which provide a contrast rather than a harmony, and are conspicuous to any observant eye. The willow beauty is a large and common midsummer geometer which rests on flat surfaces, with all four wings

widely spread. This plan serves it well enough when it bivouacs on the trunks of trees which resemble its own mottled brown, but it is by no means difficult to detect on the grey rind of a beech, or on wooden palings of grey or yellow tints. Indoors, where its plan of protection could hardly be expected to apply, it will fix itself on a buff distempered wall, or some such situation where it is as conspicuous as possible. We may conclude, however, that the willow beauties which betray themselves are in the minority, and that the greater number perch on protective backgrounds and are never noticed. The buff-tip moth, of which the gregarious caterpillars strip the boughs of oaks and elms in August and September, emerge in June, and sit with wings wrapped cylindrically round them on posts and trees. When so arranged, the fore-part of their wings imitates a dead twig with silvery bark, and the buff-tip the broken end of the dead wood. But broken dead twigs an inch long are not usually found adhering vertically to the sides of the tree-trunks; and in such a position the little buff semi-circle is a mark to catch the eye. On the whole, however, the more closely resting moths are hunted the more exact and striking the imitative adaptations appear. The shade of an apple-tree in August is a pleasant place, and it is worth while to spend a few minutes day by day in looking for a resting marbled green moth. Its markings of green and frosted silver make it a beautiful insect, even when pinned to a board, but more fascinating still is to see how wonderfully it imitates the lichen on which it rests. The caterpillar feeds on lichen on walls, and is equally elusive.

The power of the female to attract certain moths is utilised by collectors with more success than either light or sugar. The process is known as 'sembling,' or assembling. If a newly emerged female emperor moth is placed in a

muslin cage, and set down in the morning sunshine on a heath which the species frequent, males will dash up, and with the utmost eagerness attempt to reach her in the cage. They are perfectly heedless of danger, and can be caught with ease as they crawl over the muslin. Remarkable accounts have been published of the way in which a collector carrying a live moth in his pocket was beset by the male emperors, some of which actually crawled into his pocket in pursuit. The fact that the males travel up wind when they are drawn by the female suggests that the message is conveyed by scent; but the female emperor has no such



FEMALE EMPEROR

scent perceptible to the human sense of smell as is possessed by the males of the common and green-veined whites, and the explanation is no more than a probable conjecture. It is even harder to give precise form to the suggestion that some form of atmospheric vibration, like wireless telegraphy, is set up by the female, which the males detect by means of their unusually elaborate antennæ. These are broad and deeply fringed, like a fern. Many moths of the tribe to which the emperor belongs show a similar difference between the simple, threadlike form of the antennæ in the female, and a fringed pattern in the male, and is possible that they all possess the power of signalling to the male in a less degree, but that

the fully developed organs of the male emperor are necessary to make the appeal so irresistible as it seems in their case. If the wings of the female, and the antennæ of the male form a living installation of wireless telegraphy between these moths, it would be no more wonderful than the normal change from creeping caterpillar to fettered pupa and winged imago which all moths undergo. But it is a process which we cannot yet verify, and the call of the emperors therefore remains one of the most fascinating mysteries in insect life.





YEW-TREES

ON THE CHALK DOWNS

THERE seems a refining influence in the clean and porous chalk soil which gives a peculiar distinction and charm to its characteristic vegetation. Even in winter chalk downs have distinctive charms, with their smoothly moulded curves, their dry turf and pure air, and their dark dwarf junipers. In spring they foster one or two special flowers among the bleached tufts of grass, such as the rich purple pasque-flower, or 'Dane's blood,' which is an anemone, like the lighter blossom of the woods. But the full flower-time of the chalk downs comes in June, with the rising of the wild hay-crop, among which many of our scarcer orchids and other curious plants are born. At the same time another and very distinct group of midsummer plants is blossoming on the broken ground and chalky warrens, with which the smooth turf cloak of the downs is here and there scarred. The ladies' fingers, with its stem four or five inches long, is a large plant on the open sward; but in the warrens the mulleins and viper's bugloss are measured by feet, not inches, and the henbane and deadly nightshade form shrubby bushes of poisonous foliage.

A great swell of the Berkshire or Wiltshire downs at

midsummer is embroidered with innumerable blossoms, as finely as the pattern in a piece of tapestry. When we stoop to examine them, we find that the multitude is composed of only a few species, but that several of these species are unusual. The least peculiar plant of the chalk sward is one of the hawkweeds, which sprinkles the downs in June with myriads of its small dandelion-like blossoms. All dandelions can easily be undervalued; there are no flowers more radiant in every sense of the word; but they are too familiar to be always impressive, and the hawkweeds are not their most striking type. Buttercups, which blaze in most May and midsummer pastures, are not true flowers of the dry down; they are chiefly confined to the damper bottoms, and bloom among ranker and undownlike grass. Their place as the typical golden flowers of the English landscape is taken by the common bird's-foot trefoil, its relative the horse-shoe



BIRD'S-FOOT TREFOIL

vetch, and the paler ladies' fingers. Bird's-foot, or fingers-and-thumbs as it is often called by country children, is a common flower on turf in most places; but it blooms with a singular fury in the downs. Its fierce golden yellow kindles more often to crimson, and its multitudes are innumerable. Horse-shoe vetch may easily be mistaken for it at first sight; but its growth is larger and wirier, its leaves narrower, and the yellow of its blossoms clearer and less ruddy. When the seed-pods form the distinction is clear; for the pods of

the bird's-foot are straight, and three of them thus mimic a bird's footprint, or the broad arrow, while those of the horse-shoe vetch are sharply twisted and wrinkled, and often curved into a horse-shoe. As the vetch is paler yellow than the bird's-foot, so the ladies' fingers or kidney vetch is a paler yellow again. It is another member of the great leguminous or pealike tribe, and looks much like an unusual kind of clover. Each stem commonly bears two heads of blossom, of which one expands just as the other fades. Though it is a free-growing plant, there is the peculiar distinction of the chalk flora in the contrast of its yellow quills with the fine grey wool from which they spring, and the graceful half-creeping stem. Yet another shade of yellow is seen in the finely wrought clusters of the yellow ladies' bed-straw, which foam under the midsummer sky like a mass of bubbles blown by the frog-hopper from a grass stem. It is sulphur yellow, with a tinge of green; and a companion bed-straw is white. Milkwort sprinkles the chalk turf with flowers of many shades of purple, blue, and white, and makes a pleasant contrast with the yellow blossoms.

The two most delicate plants of the chalk turf are burdened with two of the most clumsy names. They are the cathartic flax and the squinancy wort. These names are legacies from the old herbalists, who studied botany from a directly practical standpoint. The cathartic or purging flax is the branching hairlike plant with little white blossoms which lifts itself everywhere to its full stature of about three inches in the shelter of the downland hay. It is a rigid little plant, full of a miniature precision; and more graceful and no less curious is the squinancy wort, which is also found in almost every square foot of typical downland turf. It creeps about the turf with clusters of minute pink blossoms, like flakes of melting foam. Our inquiring ancestors discovered

in this inconspicuous plant peculiar virtues for relieving quinsies, and called it by their name.

Besides these staple plants of the down flora, the most attractive flowers are some of the scarcer orchises. The common early orchis blooms freely with the cowslip in April on many slopes of the down, but neither good spring flower is in any way peculiar to this site or soil. By mid-summer the pyramidal and bee and fragrant and burnt orchises are all to be found not uncommonly on many



stretches of down; while the butterfly orchises, and the white and red helleborines, are blooming in the clumps and groves of beeches. The Kentish downs are the chief home of some of the scarcer kinds, such as the man and musk and spider and fly, and the rarer lizard; but several of these species occur on the chalk hills of other counties, while slopes by the upper Thames are still a haunt of the military orchis, and apparently the only one. The commonest of these orchids are also found frequently on a soil of grey mountain limestone, which is closely akin to chalk, and nurtures much the same flora. But the chalk is the great headquarters of all but a very few of our scarcer plants of this tribe.

The pyramidal orchis, which is the commonest of the

typical chalk group, has the shape of the little trees in German boxes of toys, or their prototypes in Dutch and Rhineland towns. It is the primmest of all the little plants of the chalk. The head of purple blossom is conical rather than pyramidal, but the name gives a good general idea of its peculiar growth. This orchis is scentless, except for the slight odour of greenish rankness which is common to most lilylike plants when they lack any conspicuous smell. The meadow or fragrant orchis, as its name betokens, is one of the sweetest of the tribe; and although it is of much the same shade of purple as the pyramidal, and comes out among the same downland grasses and at almost the same time, it forms a contrast with it both by its fragrance and by the long, lax growth of its blossom. The fragrant orchis is in fact one of the lightest and most graceful of the whole family of British orchids, which, like all their tribe, are remarkable, on the whole, rather for curious interest than for grace.

The little burnt or dark-winged orchis, which is also found sprinkled here and there at midsummer on the downs, is certainly not a very graceful flower; and yet there is the usual fascination of the tribe in its blunt spike of blossoms so deeply stained with dark crimson that it looks as if the whole plant might have been seared in a grass-fire. The larger dark-winged orchis is one of the rarer Kentish species. The musk orchis, again, is almost an ugly little plant, with its stumpy spike of rather sickly yellow-green flowers; and yet it too has its peculiar charm, in the rich musky sweetness which the spike gives forth, especially in hot sunshine. The bee orchis, on the other hand, is both a curious and a beautiful plant. The allusive name of some of the orchises—for example, the butterfly—is far-fetched, but there is nothing fanciful in the name of the bee orchis. The

blossom is astonishingly like a brown bumble-bee sitting on a three-petalled pink flower. The mimic bee is even more like one other insect—a certain spotted beetle common in Switzerland, of which the wing-cases have just the same mottled colours. It is interesting to bring home a spike of bee orchis, and keep it in a glass of water in a bright and airy place, to watch it fertilising itself in the way which excited Darwin's apprehension and interest in its future. A day or two after the pink petals unclose and show the bee we can see, where the insect's head ought to join the thorax—but the resemblance does not hold good in so much detail—the two anthers gradually uncurl from their protecting pent-house, and arch over till their pollened tips adhere to the sticky plate of the stigma. Here they remain, and presently wither, with their work done. Darwin wished to live long enough to witness the gradual extinction of the bee orchis under this mischievous system of inbreeding; but, as he himself pointed out, it is probable that even the normally self-fertilising plants are occasionally cross-fertilised by insects, and thus have their vitality reinforced. The appearance and disappearance of this orchis often presents curious and fascinating points. A new plantation of pines on a limestone slope in Gloucestershire in a year or two blotted out a colony which had thriven for many seasons. Thirty or forty years hence, when those pines should be ripe for felling, it will be curious to see whether the bee orchises punctually emerge and begin to bloom again in the sunshine as if there had been no interruption.

'O mihi tam longae maneat pars ultima vitae'—

here again we feel Darwin's desire for more years. It is strange to see the first appearance of this curious flower in a new and unexpected situation, as when a single spike

recently appeared one summer on old and well-trodden turf in the sanatorium garden of a Berkshire public school. Is this really a first appearance, or does the bulb or seed take a rest of a human generation or two in the soil, waiting for times of refreshment? We can see the dandelion seed travelling on the autumn wind, and now and then the water hemlock seed borne down by the Lammas floods; but it is very difficult to account for the dispersal by land of a minute seed which cannot fly, and so far as we know is not eaten by any bird. Yet suddenly the bee orchis makes its appearance across miles of cornfield and wood.

Of the other chalk-loving orchises the man is not rare in Kent, and is aptly named; for from each green blossom there hangs the image of a little manikin, as if snipped out of paper. Of the two rare Thames-side orchises—the military and its variety the monkey—both are pink, and in both cases the little hanging figure has a tail. In either case this detracts from the verisimilitude of the comparison, red monkeys and tailed warriors being both rare. The lizard has a larger spike of spotted blossoms, with the tail vastly prolonged and agreeably twisted. Here the comparison is at least ingenious. But inspiration failed in naming the butterfly orchis, which has nothing of the butterfly but lightness and the semi-transparency of a butterfly's rubbed wing. It is a strange, shadow-haunting plant, full of a sweet and heady scent at evening; two or three spikes will perfume half the rooms of a house. More concrete beauty is shown by the white helleborine, which half opens its almondlike buds to show the lemon-tinted heart of the blossom in the shade of beechen groves on the chalk. It is more local than the butterfly, but sometimes abundant beneath the shadow of a group of beeches. The broad-leaved helleborine is a smaller and less handsome orchis

more often found in woods, and bearing a loose spike of red or greenish blossoms. This, too, is commonest on chalky soils, but is not confined to them.

To turn from the miniature plants of the open turf to the large and bushy growths of the warrens is almost to pass into a new natural kingdom. Yet luxuriant and brilliant in colour as are the bugloss and mulleins and other plants in this group, almost all have the typical distinction of the chalk flora, and none is merely rank or weedlike, except possibly the large wild scentless mignonette. Attractive as well as unusual are the rough grey leaves of the henbane and common mullein, relieved against the dark green of the yews and junipers; and the yellow torches of the mullein blossom, and the many-branched candelabra of the bright blue viper's bugloss, make a brilliant contrast with the many shades of green luxuriating on a downland warren in a soft and showery June.

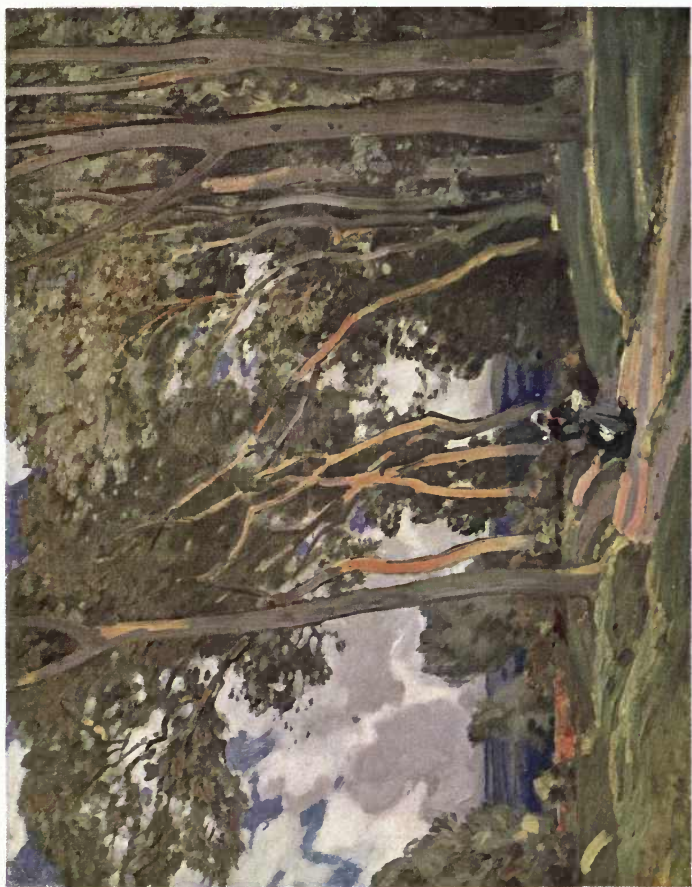
On this dry soil ample rain as well as sufficient sunshine is required to bring the midsummer vegetation to full growth. Henbane and deadly nightshade and mullein and bugloss die down annually to the ground, when they are not purely annuals, and thus depend greatly upon the character of each individual season. Droughty years produce scanty and stunted henbanes; if the year before has been a favourable one, the dry white skeletons of their predecessors far out-top their flaccid stems and shrunken trumpets. Henbane blossoms are creamy white, closely veined with purple; they recall a little the pattern of the garden salpiglossis, and though they are never so large, even in the richest years, they are often grouped in clusters. The plant is sticky as well as woolly to the touch, and has a strong smell like a blackcurrant bush. A large henbane may reach a height of two feet; but its equally poisonous

and more notorious companion, the deadly nightshade, forms by the middle of June a conspicuous rounded bush of three or four feet high, and is all the more noticeable for the fresh green of its broad pointed leaves. The blossoms hang like bells, and their deep purple brown has a peculiar livid appearance which is highly suggestive of evil, as is the henbane blossom with its congested purple veins. Both plants look thoroughly poisonous, as indeed they are. Hyoscyamin is the poison yielded by the henbane, atropine or belladonna that of the deadly nightshade; and both have played their part in crime in modern and ancient times. The peculiar danger of the nightshade is the attractiveness of its large cherry-like berry to small children later in summer. It frequently grows among old ruins, which children like to play in and explore. Like the blackberry it finds among the decaying mortar a suitable calcareous soil, and it is fatally easy when blackberrying to turn from the wholesome to the fatal fruit.

At midsummer the dark blossoms are usually only just opening their covert eyes, and the bush has only just come to its full height. Meanwhile the common woody nightshade is scrambling with its long stringy stems to the tops and flanks of the yew and elder bushes, or, when unable to reach any such support, unwillingly disposing itself as a little standard bush a foot or eighteen inches high. The pretty purple blossom with its spiked yellow centre is much like a miniature potato-flower; for man's staple vegetable belongs to a shy family, and has barely escaped being a poison instead of a food. Woody nightshade is an indefatigable climber, without possessing either the thorns or tendrils or the spiral habit of growth by which most other climbing plants make their way. It simply rests its straggling arms on the twigs among which it climbs, and pushes on a stage

THE PATH THROUGH THE WOODS

By SIR ALFRED EAST, R.A., P.R.B.A.



further. White bryony, with its delicate ivy-shaped leaves and greenish white blossoms, is specially fond of the chalk; and black bryony, which will grow in most soils, finds the light porous rock as nutritive as the Midland clays. Both white and black bryony die down to the ground every autumn, but, unlike the henbane and deadly nightshade, spring from a stout perennial stock in the soil. They are thus less dependent on the moods of the season, though their 'gadding vines' climb furthest and form the most matted screens of verdure in hot, moist years. Wild clematis, which



WOODY NIGHTSHADE

is traveller's joy all through the summer and old-man's-beard in autumn, is one of the favourite plants of chalk and other calcareous soils. Though the lesser twigs die and turn brittle in autumn, the stouter bines are perennial, and cling inextricably among the layers of the thicket.

Mulleins light their fiery torches on English hillsides about midsummer, like the great yellow gentians that tower on the Swiss slopes in June. The line of fire creeps up the torch as the days go on, much as the redder stain mounts to the top of a stem of foxglove in the copse. These upstretched flowers are nature's summer gnomons, and seem

to brood on the passing of time ; there is something deeply impressive and yet satisfying in watching day by day this silent registration of the year. The tallest torch is upheld by the common great mullein, with its flannelly leaves. When the little speckly mullein moth caterpillars are hatched, it is curious to see how deep they have to dig through the leaf's woolly coating before they come to the succulent green. Black mullein has a handsomer individual blossom, with a crimson eye ; but its spikes are usually shorter, although they are more often borne in a cluster. This plant is the black mullein, because the other is so white ; its leaves have no woolly covering, and are actually a rather deep green. It is a rare pleasure to find mulleins flowering in a dense mass. In this respect they are far excelled by the purple torches of the foxglove, which in cleared copses on gritty soils are sometimes massed almost by the acre in June and July. In a cleft on the Longmynd in Shropshire a bed of dry rods was once found in winter where the white mulleins must have bloomed six months before in a dense mass ; but their fire was out, and they gleamed in the valley like dry bones.

One of the most striking contrasts in the colours of flowers is their relative translucence or opaqueness. The mullein's yellow has the clean hardness of the colours in a mosaic pavement ; but the blue of the viper's bugloss, which often branches so luxuriantly on the midsummer warrens, has the liquid depth of a jewel. Like the other plants of warrens and dry gravelly fields, the bugloss varies greatly in vigour in different seasons ; but in a good year it forms one of the most brilliant displays of any English plant, when it covers wide stretches of soil with tall radiating stems of sky-blue blossom. It is one of the plants best loved by the humming-bird hawk moth, which emerges about midsummer after feeding the year before in the larval stage on

the bed-straw ; and the blurred insect darting from one blue tube to another is one of the most characteristic features of June.

Bugloss means ox-tongue, and the broad rough leaves which suggested the name are common to many plants of the borage tribe, including the luxuriant comfrey of the May and early June river-banks. Hound's-tongue is another characteristic plant of the same family, which is fond of a chalk soil. It is not inaptly named ; the leaves, though rough, are smoother than the ox-tongue leaves, and with their central furrow, where the main rib comes, they are not unlike the protruded tongue of a panting dog. The plant has tall clusters of dull red eyelike blossoms. Some plants in this family have the peculiar gift of changing from a similar dull red to blue after they fully expand. The garden lungwort, which sometimes escapes into hedges and copses, is the most familiar example of this curious little trick, while it is also noticeable in the viper's bugloss as the buds open. In the comfrey the same inconstancy expresses itself in the free tendency of the plants to bear flowers of pink or purple or white. Another curious feature of this group is the excessive hardness of some of the seeds. The English name of the gromwell seems due to an obscure confusion of the herbalists ; but the scientific name *Lithospermum*—stone-seed—is thoroughly clear and appropriate, for the little shining seeds are almost as hard as grains of flint, and are actually said to contain a proportion of silica. Gromwell often grows with hound's-tongue, and has inconspicuous greenish yellow blossoms, which make no great show among the flowers of June on the chalk.

Yet not all the brilliance of midsummer on the bushy chalk warrens is due to the brightness of their flowers. In a good year of heavy showers and warm sunshine, the sheer

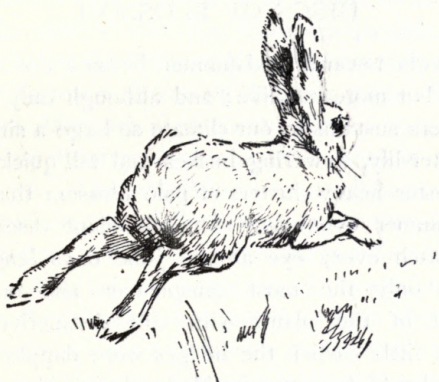
verdure of such a spot is almost more beautiful than the blaze of massed blossoms or the richness of their isolated heads. Rich chalk turf is one of the most beautiful things in the world, and the turf only supplies one element of green in a wonderful variety of verdure. It comes midway in the scale. Almost black are the yews of the down, and yet they have latent greenness in every dark branch under the June sun. The young shoots display it freely; the old boughs are reticent, but verdant at heart. The columnar junipers—they are our little northern cypresses—are also black



JUNIPERS

within, but sparkle with frosted silver where the new shoots shine. And yet both the black and the silver are phases of green, and conform to the verdure of the landscape. Lush elders hung with their cream-white moons are of a brighter green, and so are the hawthorns, now past their flower-time, and the vivid bushes of deadly nightshade. The white bryony hangs in the elders, a little paler and cooler; and paler on the turf gleam the henbane and mullein plants, where the bare chalk strikes whitest of all. When a breeze ruffles the leaves of the thickets, they change into new shades, more deeply contrasted. The whitebeam leaves turn up their silver sides, and catch the eye like a chalk bluff; then the breeze passes, and the landscape sinks together

again, its sharper contrasts at rest. A box-tree in June has half the shades of green in its own boughs, where the young leaves fleck and cloud the old; and some of the most subtle, though not the sharpest contrasts of downland verdure, are to be seen in June, where the box-coverts stand dappled on the old turf of Box Hill, or among the even more beautiful groves of Chequers Park in the Chilterns.





DISCS OF BLOSSOM

WILD flowers towards midsummer become not only more numerous but more massive; and although only the bosom of the waters sustains in our climate so large a single bloom as the water-lily, flowering bushes and tall quick-springing herbage foster heavy clusters of pale blossom that shine in the midsummer evenings. The abundant discs of elder blossom catch every eye as the June days lengthen, but elders are only the most conspicuous and one of the commonest of the plants with this distinctive habit of flower. A little earlier the hedges were dappled with the smaller circles of the water-guelder and wayfaring tree, while the foaming masses of hawthorn blossom are an aggregate of many similar clusters. Whitebeam and mountain-ash drooped larger clusters than those of the two guelder-roses. After the elder has faded the dogwood dots the dusty roadside with a smaller generation of clusters, in keeping with the ebb of summer's life. But in the deepening dusks the succession of disclike flowers is still luminous. The hemlocks and fennels are more enduring than the blossoming shrubs, and produce flower-heads in which the disclike formation is most precise.

These compound discs of blossom are an illustration of

the value of combination. So minute a flower as a single calyx of hemlock or elder would have little chance of thriving in the fierce competition of the copse and hedgerow in early summer. In the first place it would tend to be overshadowed, and deprived of essential light and air; and it would also probably fail to attract the mating insects, unless it had a disproportionately and almost impossibly powerful scent. It is noticeable that the disc-flowers have not on the whole a very strong scent. None of the hemlocks and other umbellifers have blossoms with a scent worth mention, and even the scent of the elder is not comparable, mass for mass, with that of the honeysuckle or the butterfly orchid, or many other flowers in bloom at the same time. The small and scentless blossoms consequently form a league or confederation, and under a united constitution they do more than hold their own. The umbellifers are one of the master races of plants from the time of the blossoming of the cow-parsley round the hedges in the hay-fields to the end of active growth. Such scent as they possess is made more powerful by concentration, but they depend more regularly upon the appeal of colour. Almost all the disc-flowers are whitish, though not pure white; and there is often more body in a cream-coloured mass of blossom than a pure white one when the dusk has fallen. The fennel has blossoms of greenish yellow, and it is noticeable that it is much more frequented by butterflies than any other plants with this form of blossom. It makes its appeal by day, with a richer colour that is effective by daylight; but cow-parsnip and elder and the other disc-flowers are not attractive to butterflies. Some of them are sought out by day-flying beetles, but they are chiefly sought out by the small flies which swarm in the soft dusk. The composite blossom forms an effective signal-lamp, when each single blossom of which it is composed would be powerless.

The formation of the disc-flowers also gives them a solid advantage in the struggle for sun and light. Each disc is large and dense enough to cast a shade on competing stems beneath it, and to divert them in the upward quest for the sun. Growing shoots do not try to penetrate the federation of tented umbels formed by a lusty hemlock-plant. They either go round another way, or simply wither. The hemlock or the cow-parsnip provides the most perfect development of the composite principle of blossom. The heads of bloom are more symmetrical than those of the elder or the mountain-ash or dogwood, and the same regular principle is carried down through branchlets and main stem to the root. The whole structure of the umbellifers is designed to support as many of the flowering umbels as possible in the full eye of the sun, and the umbels contrive in the same way to expose as many lesser clusters of blossom. A simple umbel is a cluster like that of the ivy, in which the blossoms and berries spring on single stalks branching from the same point of the flower-stem. The drawback to this plan is that a cluster, to be compact, must be small; for if the radiating stalks were long enough to form a large cluster, they would be too weak to stand hard usage from the weather. The compound umbel is the typical pattern in the umbelliferous tribe of hemlocks and their kin; and this is an ingenious development, providing strength as well as area. Each of the main stems radiates again into a second whorl, and the composite mosaic of the disc is supported on this series of secondary stems. The downward structure of the plant is almost equally symmetrical, till it terminates in the main stalk and twisted root. The canelike strength of the hollow hemlock or cow-parsnip stem can be best judged in winter, when it is dead and leafless, and stands waiting to be plucked by the hedgerow. It is no longer surprising that

so heavy a superstructure of broad foliage and massive umbels can be safely upheld against the gales and thunder-showers of the stormiest summer. It is extremely rare to find any umbelliferous plant damaged by bad weather.

Elders and all the tribe of flowering shrubs which spread



COW-PARSNIP

discs in the summer hedgerow bear not umbels but cymes or corymbs, which are more imperfect expressions of the same principle. If we lift up one of the lagging clusters of creamy elder flower, we see that the stems which bear the separate clusters of blossom are of very different lengths. The larger branchlets in the cluster are equally irregular. The peculiar ingenuity of the cyme is the way in which the

disc is completed by short and long stems, each lifting a flower-cluster into the nearest vacant place. But the nether structure of the disc of elder or water-guelder is feeble compared with a compound umbel; and the nodding flowers would miss much light and sunshine if they shot on low annual stems like the hemlock instead of being lifted above most of the competition of the hedgerow on the boughs of flowering shrubs. The discs of whitebeam and mountain-ash are slightly different again in internal structure, and a step further from the perfect umbel. Instead of all the flowers being borne on subsidiary stems, however irregular, as in the elder disc, in this family some are carried on the tips of the main stems, which have not learnt that their duty is to delegate the responsibility of flowering, and confine themselves to giving support. This form of blossom is called a corymb, and in the discs of the whitebeam and rowan we see it on the point of developing into a cyme.

The umbellifers extort admiration rather for the perfection of their structure than for beauty or serviceableness in a wild state. On the whole they rank as weeds, while some are highly poisonous. But the cow-parsley in mass forms one of the most distinctive charms of spring, and is eaten by animals without harm. So is the stout leafy cow-parsnip, which swells its gouty pink flower-stems under the trampled shadow of the elms in the July pastures. Hemlock and water-hemlock or cow-bane are the most dangerous members of their tribe. The spotted stems of hemlock distinguish it clearly from cow-parsley, while water-hemlock grows by running water, and is conspicuously the tallest of its family. Much in the same way as the potato is a relative of the deadly nightshade, the garden parsnip and carrot are both members of the umbelliferous tribe, as a glance at their flowers will show. The wild original of the carrot is very common among the dry turf of cliffs and downs; as the flower fades

the disc contracts into a cup, wherein we often see sitting a spider. Wild parsnip is a scarcer native of similar ground, and has an equally tough and meagre root-stock in the wild state.

The other discs of blossom, formed of cymes and corymbs, belong to widely different groups of plants from the umbellifers, as their whole growth and structure indicate. In autumn they provide the birds with some of their richest berries; and most of them, though not the guelders and elders, belong to the same tribe as the apple and pear. They are almost as ubiquitous in English scenery as they are conspicuous. Where the last solitary tree clings to some high moorland dingle, it is usually a dwarfed and woody mountain-ash, which spreads its mealy corymbs above the crow's nest wedged in its crown. Chalk downs are the favourite home of the whitebeam, which has blossoms of a pearlier whiteness, faintly scented like primroses in the soft May weather. The tighter clusters of the guelder-rose open, stiffly erect, by the white tracks in the same chalky landscapes; it is not until they bear the load of the autumn berries that the stems bend to the whitebeam's graceful curve. The water-guelder shows a conflict of taste for the dry chalk soil and for wet streamside hedges; it is happiest where trenching in the water-meadows turns up a white edge of chalk along the stream, and its tastes for once can be combined. Its dull white discs stretch on straggling boughs over the deep grass where the corncrakes chide in the June evenings. The discs of the water-guelder are formed of large barren flowers on the circumference, almost concealing the small inner blossoms which produce the berries. Like the blossoms of the garden hydrangea, these flowers are blind; they have only rudimentary organs in the centre of the corolla; and the stamens and pistils of a flower have so much the appearance of its living eye that the water-guelder looks best at a distance or in the dusk. It is precisely to serve as a distant or

nocturnal signal that this border of infertile blossoms seems to have been devised. The dead flowers—for organically they are lifeless—draw insects to the living by their whiteness ; and thus a comparatively small cluster of vital blossom is enabled to compete with more conspicuous plants of June. The garden box-rose or snowball-tree is the water-guelder with fertility banished from the blossoms, and the barren corollas thickened into a globe. Even in the dusty fringes of towns the outbreak of large circles of creamy blossom on the sparse rods of the elder brings a fugitive luxuriance to the spot ; and over the first-shorn hay-fields in the midsummer twilight the elders hang in the calm evenings like constellated planets, or toss like lamps in the wind. We see no such show of white blossom again, once the elders have faded.





JULY

Doves of the fir-wood walling high our red roof
Through the long noon coo, crooning through the coo.
Loose droop the leaves, and down the sleepy roadway
Sometimes pipes a chaffinch; loose droops the blue.
Cows flap a slow tail knee-deep in the river,
Breathless, given up to sun and gnat and fly.
Nowhere is she seen; and if I see her nowhere,
Lightning may come, straight rains and tiger sky.
GEORGE MEREDITH, *Love in the Valley*.

In early summer moonlight I have strayed
Down pass and wildway of the wooded hill,
With wonder as again the sedge-bird made
His old, old ballad new beside the mill.
And I have stolen closer to the song
That, lispèd low, would swell and change to shrill,
Thick, chattered cheeps that seemed not to belong
Of right to the frail elfin throat that threw
Them on the stream, their waker. There among
The willows I have watched as over flew
A noctule making zigzag round the lone,
Dark elm whose shadow clipt grotesque the new
Green lawn below. On softest breezes blown
From some far brake, the cruising fern-owl's cry
Would stay my steps; a beetle's nearing drone
Would steal upon my sense and pass and die.
RALPH HODGSON, *The Sedge-Warbler*.

THE COUNTRY CALENDAR

JULY has been called, along with August, one of the 'mute months.'
The birds are silent, but the insects are noisy. It is rather one of

the months when things stand still. The leaves on the trees are as they were, only less fresh. The fruits hang ripening, and the corn stands ripening, each in a passive way suffering the sun. July has few distinctions of its own. When it surpasses June it also borrows from it; and its glories of flower and its wealth of insect life are a continuance rather than a beginning. Hay harvest probably drags on, and the corn harvest just does not begin. It is a between time period. In colour, the flowers show very much more red and yellow than prevailed in spring. That splendid tribe of butterflies, the

fritillaries, are a notable emergence of the month. July has its extremes. It is, in volume, the wettest month, for the July showers have twice the weight of water of the April showers; and it is the hottest month.

We get in July the 'first faint, hesitant, elusive hints' of autumn.—'And then he flies away.' The cuckoo gives the first hint of migration, of departure; and other birds, especially the nightingales and duck, seem to disappear. There is silence and retirement, partly because the energy of spring could not last and was exhausting, partly because it is



YOUNG CUCKOO

the moulting time. The duck so moult that they are beyond the power of flight. Other birds, preparing themselves for the great flights across seas, drop their old and grow their new feathers in pairs successively, so that flight is not in any way prevented. But it becomes a bore, and the bushes are preferred.

It is astonishing how prominent a part St. Swithin, whose day is the 15th, plays in weather lore. The most concise rhyme out of many is this:

'St. Swithin's day if it do rain,
For forty days it will remain.
St. Swithin's day an it be fair,
For forty days will rain nae mair.'

The foundation for the prophecy is this, that in mid-July if the wet or westerly type of weather sets in, it is apt to remain. If the dry or northerly type sets in, it too remains. July, that is, has a certain constancy of its own. It is also tolerably constant to a warm spell in the early part.

An old verse, containing a very true fact in economic natural history, may be compared with the cuckoo rhyme :

'A swarm of bees in May
Is worth a load of hay.
A swarm of bees in June
Is worth a silver spoon.
A swarm of bees in July
Is not worth a fly.'

But when all is said of July it is the most gorgeous of all the months, especially in the garden. It is the one month of real summer that is plainly neither spring nor autumn.

Average temperature (July 1st), 61.5°.

Average rainfall, 2.43 inches.

July 1st. Sun rises 3.49 a.m. ; sets 8.19 p.m.



CRAB-APPLE



AMONG THE GRASSES

WHEN the grass begins to sprout spring has come. When the grass begins to wave it is summer. In winter the grass seems scarcely to hide the earth and keep off the barrenness of the stony lifeless framework of the world. In spring the soft greenness seems to announce the creation of life out of matter. In a summer hay-field the richness and fullness of the living principle are firmly established for all time. A hay-field is exuberant of the vigour of growth. You might think of it, as the mice and daddy-longlegs and innumerable moths and spiders must regard it, as a great forest undergrowth that has come up in a flash. The insects hum over it in flocks, like pigeons over a grove. The thousand shapes and colours of the grass-heads almost touch the boughs of trees, which had looked through the winter like umbrellas. The underspace is gone, as if, might one say, the giant trees had waded in up to the hips. Pathways have disappeared. A tumultuous surface of many colours varies its infinite variety by 'shifting the sun anew' where the wind swings and sways the bents. It is opening an eye of the imagination to watch this luxuriance of form and colour directly from above. In such a hay-field the writer once climbed along a curiously horizontal bough of a single elm,

the tips of which had made contact with the grasses. Near the tree, as often happens, kexes had gained some supremacy over the grasses. To one looking down the underspace was imbued with a green light of its own, soft and subdued, belonging to another kingdom. As the eye grew used to this light there became obvious a brown patch, which gradually increased in distinctness, till the form and soft hues and bright eye of a hen partridge on her nest stood clearly out. The sun was hot on the field, though the light was low, and further off the bough you could see the purple clover, and the yellow trefoil, and even blue speedwell glinting in the green blades below the waving heads. Looking more minutely you became aware of the numerous little moths that would not face a light so strong as prevailed above the seed-heads, but moved, in preparation for the evening, upon the lower blades. A picture, such as this, of the abundant life and variety of this patch of the world, quite barren a few months ago, for ever raises a hay-field into a great and wonderful world.

Before hay-cutting and after what a difference in the expression of the country! The nap has grown over the meadows by the slow gradation that nature loves, at any rate in England. It is shorn in these rapid days within forty-eight hours. The grass lies for a day or two in the level ranks. Then the tedders get to work, tossing it up as the paddle-wheel tosses the water out of its quietude and green colour into tumultuous white. Within a week, if the sun shines hot, as even in England it may do, the hay-field is become quite a lawn, bare and shaved and green.

No Englishman will deny the beauty of a lawn in this country of lawns. The English downs are lovely lawns, of which the cardinal delight is the short soft smooth grass unbroken in colour, a *tapis vert* of great dimensions, an old bowling-green for giants, a boulevard in the strict

sense of the word, which, from want of the proper pleasure in a lawn, the French have altered till it stands for an urban street. The lawn grass is as good for food as for tired eyes. A horse would agree in regard to this form of food that the nearer the bone the sweeter the meat. It is the short grass that is richest and most juicy. The bent, which is the stem that carries a seed-head, is not comparable with the green blade. But the bents have a beauty that rivals even garden flowers, and the flower-heads which paint the surface of a hay-field compass as many rich and delicate shades as the feathers of a pheasant. Perhaps the worst meadows in the farmer's eyes are the loveliest. Over all the face of the country is no more delicate effect of colour than a slanting light through the ruddy, tawny heads of dock and sorrel which flourish most in the sourest soil. For a comparison you would have to go to the sunset sky. As if the two had some natural affinity the great moon daisies often grow along with these feather-heads, and as the sun sinks one summer evening the colour of the hay-field shifts from a luminous red or cinnabar into a dull purple and then into a net of stars. The less the light the more the moon daisies come out into prominence, and the more the tints of the bents disappear or merge into a monochrome.

Of all summer bouquets the village children pluck none is more fine and delicate in form or colour than the bunches of hay-field grasses. They are composed, one may say, of mingled flower and fruit. The 'totter-grass'—vernacular in the Midlands for the commoner form quaking-grass—is one of the prizes. Its flower and seed-heads keep up the ruddy colour of the docks and sorrel, and its perpetual movement gives the bouquet at the field the shimmer that keeps the colours shifting in the lightest breeze. But if you look close, and pay such attention to each grass as you would pay to a flower,

the heads are hardly less decorative one by one than they are in the mass. But they want for the most part popular names.

These are more often given to plants or parts of plants that have some curious, for preference some grotesque, likeness to a different thing. The male catkin of the hazel is a lamb's-tail. The female flower is nameless. The seed of the clematis has earned the plant the nickname of old-man's-beard. One of the least graceful of the grasses is called fox-tail, and the likeness to a fox's brush is both close and absurd. The crested dog's-tail, one of the most salient grasses, is still more grotesque. The totter-grass, with its heavy heart-shaped head on the slenderest thread, outdoes the aspen and prompts experiment. But there is no popular, not even an English name, for many of the filigree grasses of most delicate pattern. Daintiest of all, perhaps, are the varieties of poa that fall in a fine fringe, like refined miniatures of the pampas. Most of us are ignorant of these, while we know well the stiff and woolly 'Timothy.' The more grotesque is the more salient here as in



much English popular art. The grasses have evaded also the poets. Tennyson's 'Froth-fly on the fescue' is a great

effort to bring into popular speech one of the most common and useful grasses, whose flower or seed-heads we have most of us seen, not without curiosity, enveloped by the lump of froth that conceals the little grub in summer before it joins the winged multitudes of autumn. 'Twitch' again we all know. Because it is unpleasant to us we give it a humble name. It creeps and crawls and roots itself again and again, like a buttercup, and not at all in the way of a real grass, which is sown broadcast by the lightest seed that is blown. And it is the seed that is the crowning beauty of the grass. The seed has the colour of the ruddy poplar catkins of spring, and gives the full surface of the hay-field a richness of tint that much surpasses, if you look close, even the glory of the corn.

The haysel is a match for the harvest. Of all the feats of colour in the hay none quite equals the lesser plantain, which is the terror of the lawn but a great addition to the meadow. The leaves may rise to a foot in length, and the flower-head to two feet. This is hung with feathery dust of the subtlest gradations of colour—white and fawn and browns that deepen into lilac. For decorative purpose the plantain head could scarcely be surpassed, and it contains a series of tints into which the other grasses all fit. Men like to cut their hay before the bulk of the grasses have ripened and shed their light seeds, but some of the sorts are too early, too quick for the mowers. The dog's-tails still hang their heavy ponderous heads to one side, and their stalwart stems are still too green and luscious to be called bents. The oat-grasses are not much more forward than the winter oats. All about the roots of the tall plants, the sorrels and daisies, and perhaps here and there kexes and moon daisies, the little bird's-foot trefoil is soft and green and hardly in flower, and all the clovers are turgid with fresh moisture. The undergrowth is

rich and juicy and still in growth, nor are most seeds on more barren stalks ripe. But a soft unpalpable dust is

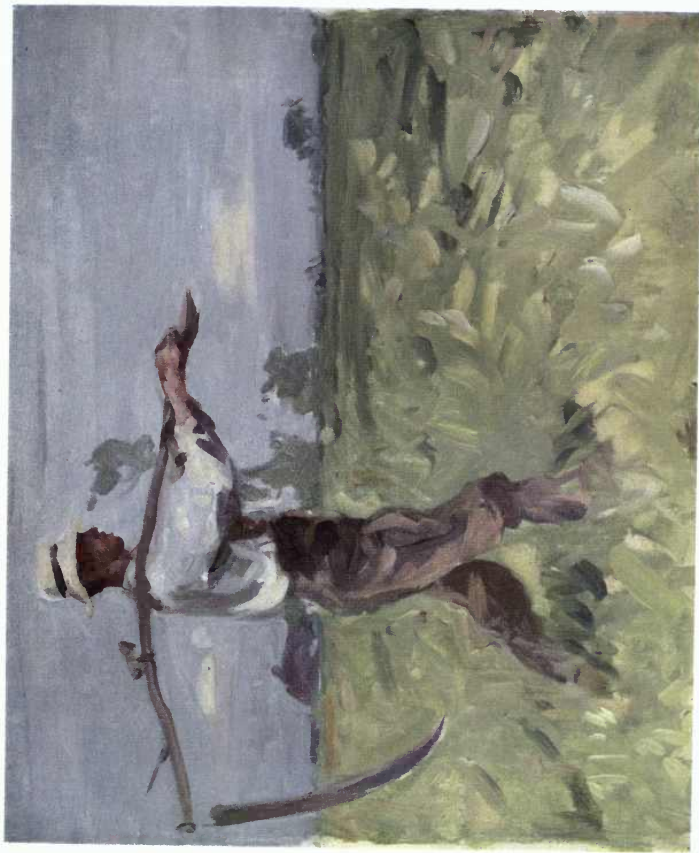
blown across the field, is sowing itself even on the roofs of houses and against the east side of walls and hedges miles away. In every species there are precocious plants which anticipate the scythe and cutter, but the mass of this dust is shed from the fox-tails. Most children, and perhaps older children, have enjoyed the peculiar baby pleasure of stroking off the silky seed from these grey-green heads, which mimic the willowcatkins more closely than the fox's brush.

How many seeds are peculiarly delightful to handle: the soft fox-tail seed which you pull into your palm; the hard dock seed that you let trickle through your fingers; the nut that you squeeze from its patterned sheath; the smooth satisfaction of a

horse-chestnut before it is dulled by exposure. But in a hay-field all your senses are satisfied. Presumably there are



THE MOWER
By HARRY BECKER



as pleasant hay-fields in other lands as in England, but it is certain that the smell of 'new-mown hay' is everywhere regarded as English in a peculiar sense. The phrase is established in the French language and very freely used though no phrase could be easier to translate; and one would say that the words have nothing in them particularly idiomatic. The truth is perhaps that England is sweeter than other countries, and the new-mown hay is more odorous of the season than hay in other lands, where the air is quite robbed by torrid suns of the dampness that is the medium of all sweet scents. And the hay-fields smell sweeter even than the

'Cottage gardens smelling everywhere,
Confused with smell of orchards,'

which Mrs. Browning selected as the final beauty of England's 'ripple of land.' When the grass has lain a day and is becoming hay it is as if all its sweets, which had been in some degree, as Bacon says, 'fast of their smells,' had found expression in a harmony of scent that might be called orchestral. The lawn, sharply contrasted in most ways with the hay-field, also yields its scent, as Matthew Arnold—whose sense of smell was supreme



SOFT MEADOW GRASS

—has accorded. He writes of 'sweet heaps of fresh-cut grass' as well as of 'scent of hay new mown.'

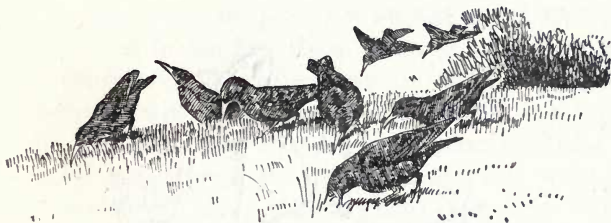
We see a new expression on the face of the country when the hay is cut, but the change is a revolution to the hordes of live things that have made the roots of the grasses their home. If you use the scythe or follow the cutter you will see rise along the swath a perfect cascade of flies and moths. They shoot up into the air in alarm, but fall back quickly as if to examine the extent of the damage. They fall back and disappear wonderfully. You would think that



their homes were quite ruined; but however close the blade cuts in the hay-field there are left hills and hollows, pillars and caves, big enough to make a world for much grander creatures than these hosts of lepidoptera. But they are now more vulnerable. Not seldom the wagtails discover the reaper as the gulls discover the ploughs in autumn. You may see one or two of them following behind, and dancing up and down in the air, as if they were glass balls on the fountain of little wings. They turn and twist and poise with more than flycatcher skill, and seem a different bird from that which we watch daily on the smooth lawn. Behind the mower they do on the wing what on the lawn they do on their legs. The

sudden running sallies, and quick stops, and sharp turns are performed above the ground; and the long tail which looks exaggerated, almost absurd, a Blondin pole of excessive length, while the bird is running or strutting about on fine lawns—this tail takes on the use and likeness of a third wing, and more than a wing, a plane and a rudder, both; with other uses in the delicate art of momentary hovering. The insect food is given the birds in such profusion at this juncture, that they must be as fully gorged as an old trout in Mayfly time, before they have gone the length of a swath.

How open to attack the creatures of the hay-field are



STARLINGS

when the mowers have passed may be in some measure gathered from the change of bird population. Some partridges are routed. It happens in places that nests are cut up, and the old birds will sit so close that they are now and again killed by the blade. There were finches, including it is to be hoped goldfinches, flitting down from hedgerow to the seed-heads. Now, in place of these the starlings descend. They had perforated the grasses in winter for grubs, and now they come to return to the charge more or less intermitted during the period of long grass.

At night the owls have a harvest only less rich than that of the wagtails. A hay-field is full of mice. You might think that they would be banished if not killed by the

mowers, but it is curious how very few the blade touches; and you have to watch like an owl or hawk to catch a sight of them. Under your very eyes they will creep and glide through the rough grass stubble, and little nap of short soft blades, in almost perfect concealment. But when the fear is over, and their playtime comes, they are more visible and more vulnerable. The kestrel and the barndoor-owl have easier hunting; and within a short while the inhabitants of the field that have not grassy nests at the roots of the grasses discover that their home is irretrievably damaged, and are off to corn-field, or wood, or stackyard.





SPOTTED FLYCATCHERS

LEARNING TO FLY

As song dies down in June the abundance of bird life increases; and in the last three weeks in the month the garden shrubberies and other favourite nesting-places are more densely peopled than at any other time of year. The wave of birth has risen to its full height, and the forces of destruction are only beginning to make away with the annual superfluity. In a garden where many birds build, there may easily be twenty-five times as many birds present at midsummer as at the beginning of the nesting season in March and early April. The resident birds have been reinforced by many visitors and migrants, and the parents are outnumbered by their young. The first young thrushes and blackbirds of the April broods are now as large and almost as active as their fathers and mothers; and the stock of the young birds of the year ranges from these lusty marauders of the fruit-beds to the last young wrens.

But owing to the inertness of most young birds even after they have left the nest, it takes some time to realise how thickly the bushes are peopled, and how unseen eyes are gazing from every tree and tussock of undergrowth. They are gazing, but not as a rule watching us; and this vagueness of attention is one reason why the bushes can

be so full of young birds without our noticing them. If the younger fledglings had yet learnt fear of man and domestic animals, they would fly from us, and all the copse would be in a scurry, and the thickness of its population be manifest. But when a young thrush or greenfinch or water-wagtail leaves the nest without disturbance, it still regards man without alarm; anxiety is left to its parents, which often do their utmost in vain to wake it to a sense of the perils latent in gardeners and exploring house-dogs. While they screech and flutter a few yards from the object of alarm, the young bird sits perfectly calm within a few feet of it. Silence is eventually restored by the departure of the intruder, if it is dog or man, or often in a more disastrous manner if it is the cat. Young birds seem to have no such instinctive fear of cats as monkeys are said to have of snakes; they will wait quite placidly for their doom. This is not the numbness of fascination; it is merely



the absence of perception. When our attention is attracted to a young robin by a sudden cry from some bough close to our head, it is often evident that the little bird has a very vague idea of what we are, and sometimes overlooks us altogether. The round staring eye does not focus a moving figure, or appear to distinguish it from the surrounding

shrubbery; it sees men as trees. If the bird is half startled by the noise of a body pushing through the bushes, it will shift its position on its perch, or sometimes flutter to a new one, but still without discovering the intruder by sight. It is curious to watch the sudden dawn of consciousness in the eyes of a young bird when it does first appre-

hend us as a detached and coherent body, distinct from the surrounding scenery. Even then it usually displays a spectator's curiosity rather than any kind of alarm.

The sudden explosive calls which burst intermittently from the inner shades of the garden shrubberies at midsummer are not expressions of fear, but a blind demand for food—the primitive germ of all language. Young thrushes and blackbirds utter a metallic squawk; young robins a kindred but shriller cry. Before

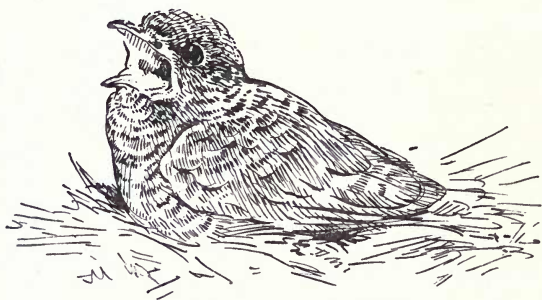
they leave the nest broods of young starlings utter a rhythmical strident chorus which rises as they hear the parent bird's approach, and dies down again as it departs with its low note of satisfied activity. Broods of white owls under the church roof raise a louder and harsher tumult of the same kind; sparrows in the ivy cheep more shrilly; and young martins in the eaves make a murmuring stir. Some of the noisiest of all woodland birds as they gain their feathers are little woodpeckers.

Young green woodpeckers shout from their hole, in some rotten beech or oak bough, so loud that they can be heard for a hundred and fifty yards. Their cry is more like that of the adult great spotted woodpecker, or the wryneck, than the free laughing note of their parent. One of the brood often climbs to the mouth of the hole, and



YOUNG GREAT SPOTTED WOODPECKERS

peers in the entry as it calls. Young great spotted woodpeckers make a loud but more confused din, more like the burden of the starling's brood; it is curious to see the boldly pied woodpecker cling beneath the hole, and feed the young heads clustering in the door. Young cuckoos pursue their puny foster-parents with a petulant cry too thin for their burly bodies; it seems as though they had stolen a young hedge-sparrow's or meadow-pipit's voice, as well as its heritage. The more we listen at midsummer, the more the whole world simmers with the voices of callow nestlings



YOUNG CUCKOO

and fledglings; life rises in them to hymn the longest day, and only too quickly dies down as the light declines.

Nature quickly sets to work to select her chosen few from the multitude of her offspring. Among nearly all birds the worst enemy is stormy weather. In a wet, cold May and June so many eggs and young birds perish in the nest that their numbers are more than decimated before the time for the general emergence upon the world; and then the flood of life at midsummer is greatly reduced, and the garden shrubbery may miss that haunted week or fortnight when every bough has eyes. Cats, rats, and owls

destroy myriads of young birds every year; but still more perish through wind and weather. Hunger combines with cold and wet to starve them, for the insect food which predominates in the diet of most nestlings and fledglings is scarce and hard to come by in stormy weather; and even the most active parents can bring them least to eat just when they need most.

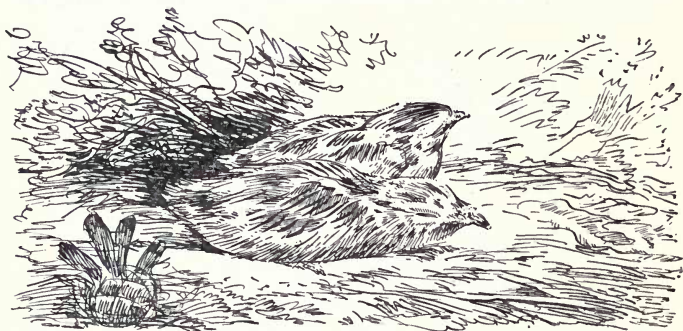
Young birds, such as partridges and moorhens, which leave the nest almost as soon as they are hatched, are far more alert than the vacuous little thrushes and robins, but



YOUNG PARTRIDGES

they have not much more fear of man. We have seen a little dabchick paddle straight across a river to a man standing on the bank, much as a very young lamb will run to a stranger, from the impression that anything alive and moving must be friendly. Besides terrestrial enemies young water-birds are exposed to the greed of pike. Each pair of moorhens probably produces an average of about twenty young in the season; for they nest from March to August, and in that time bring off two or three broods, and lay from six to thirteen eggs. Yet the moorhen, though an abundant, is not an increasing species; and the residue over the annual wastage of the adult birds is sacrificed annually to cold weather and predaceous enemies. There is no percep-

tible relation between the number of eggs laid by any species of bird and the obvious risks to which it is exposed. Pheasants may lay a dozen eggs or more, plovers lay four, and the nightjar only two. Yet all these eggs are laid on the open ground, and young nightjars are born more helpless than either young plovers or pheasants. Young birds nursed to maturity in holes, in banks, or trees would seem to be safeguarded against half the risks of infancy. Yet the kingfisher lays eight eggs, the blue tit ten or a dozen, or

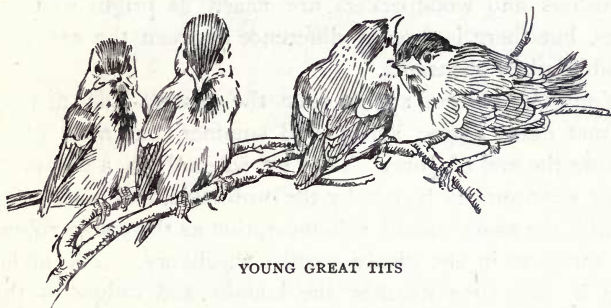


YOUNG NIGHTJARS

even more, against the woodpigeon's pair; and while tits are stationary, and kingfishers perhaps declining over the country as a whole, woodpigeons have prodigiously multiplied within living memory.

The education of the midsummer fledglings goes on apace; they soon become worldly-wise and distrustful of humanity. Before the mock orange-blossom has ceased to drench the walks with its heady odour of the solstice, the eyes have vanished from the bushes. Already thinned, the nimbler troops of young fare forth with their parents to wider feeding-grounds; and so, like the faintest movement of the

ebb-tide in a brimmed sea-channel, the autumn migration is already distantly begun. Mixed troops of old and young birds appear in the new-cut hay-fields, pecking at the seeds of the fallen flowers, or feeding on the insects laid bare in the swaths and stubble. Plumage grows hard to distinguish, though not so hard as when the old birds are in full moult in July; and some of the young ones wear curious and freakish liveries. Young willow-wrens, for example, flit among the currant-bushes in suits almost as yellow as a tit's or wagtail's; and in spite of their insectivorous reputations they do not always spare the fruit. It seems more natural to see young blue and great tits in bright suits of yellow and green. With



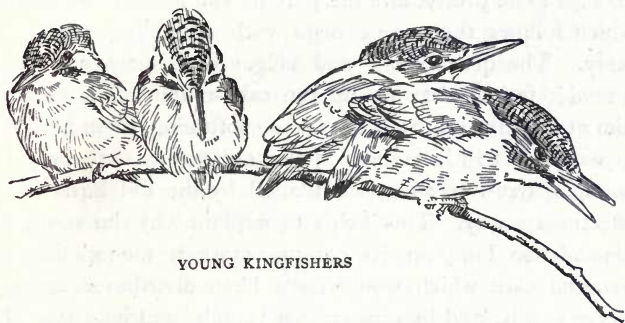
YOUNG GREAT TITS

them the chief point worth notice is that they adopt their parents' gay colours so early, whereas many other young birds do not gain the full adult plumage for months or even years. The first plumage of young robins is a dull brown, flecked with tawny spots, and few of the young birds which are brought up in open nests, whether in boughs or on the ground, present a close likeness to the adult plumage in their first summer. More uniformity is observable in the case of birds which nest in holes. Even the young wagtails, which are usually nested in open and unsheltered cavities, have a plain family likeness to their parents. The little pied wagtail newly

strayed from the nest is fascinating in its immature parti-coloured suit ; though it has the blurred markings and rather impure colours which are characteristic of all young birds. The young blue and great tits are like smudged copies of the adult birds, though the likeness does not bear exact comparison ; and young woodpeckers and kingfishers also wear the bright colours of their clans. In a broad way we seem to see here the working of a principle of natural selection, which weeds out bright colours among the young hatched in more exposed situations, and allows them finer development when the little birds are nursed in sheltered holes. The same principle roughly holds good of the hen birds. Hen tom-tits and kingfishers and woodpeckers are nearly as bright as their mates, but there is a great difference between the sexes of blackbirds and pheasants.

Young kingfishers appear from the nesting-holes at very different dates during spring and summer, but most often towards the end of June. They sit solemnly in a row on a rail or outstretched bough by the waterside, and wait to be fed with the same vacant self-absorption as the young robins and thrushes in the shady garden shrubbery. All about them in fine June weather the boughs and sedges of the river teem with life. The air swarms with insects, and with birds busily devouring them. Life and death jostle each other with doubly concentrated fierceness at this time of year. If happiness depended on length of days, it would be a dark world for the majority of these young birds and dancing flies ; but mankind is too apt to view nature by his own standards, and to demand for all alike the fullness of his threescore years and ten. The little kingfisher which perishes in a rainstorm after a week of bright June weather by the waterside is no fit object of pity because its day was so brief. It saw the sun, and felt the stir of life, albeit per-

haps quite unconsciously, and its existence was not in vain. Most of the pity evoked by the natural incidence of death among animals is really a form of egoism. Men are reluctant to recognise that their personal views and tastes are not a universal law; and this intellectual pride is often reinforced by the objection to face death in nature because it hurts our own feelings. We sometimes read letters in the newspapers demanding the removal of tramps and beggars from the streets, not out of any consideration for the welfare of the vagabonds, but because it is painful to passers-by to



YOUNG KINGFISHERS

see them in their wetness and rags. This is simply selfishness in a thin veil of philanthropy, and it often finds its counterpart in the attitude of men towards nature. We cannot huddle the forces of death out of sight, as we can the broken men and women on the Thames Embankment; but we invest them with a sense of horror and injustice which is not truly theirs.

Such thoughts rise naturally in the heart of the June day, but do not cloud it for any one who has learnt to face them fairly. If the best use of life is in busy activity, as we mostly now hold, young birds, at any rate, do not long waste their time. Day by day the sandpipers follow their parents

more nimbly, skimming by the midsummer stream, where the water-grasses rise tall around the sand-spits; and the young finches, watching on the bough, grow fewer, and turn into busy hunters in the fields. Gradually the young birds learn to feed themselves; usually they seem to learn readily after the first few days, by imitating their parents, but sometimes the children are backward, and the old birds have to coax them to peck at some insect tit-bit, instead of feeding them from beak to beak. Birds never appear in a prettier light than when the fledgling is itself old and clothed enough to be pretty, and the parents still feed the spoilt child which follows them, and begs with trembling wings and body. The quarrelsome and vulgar cock-sparrow becomes a tender father, chewing up the cake-crumbs that we throw him at tea-time on the lawn, and so softening them before he gives them to his young. It is noticeable that only one young sparrow is as a rule tended by the old birds in this affectionate way. This helps to explain why the young one depends so long on its parents, since it monopolises the parental care which would have been distributed among a larger family, and becomes rather 'spoilt' and helpless. But it also illustrates the swiftness with which the forces of destruction act upon nestling and fledgling birds. Broods of young sparrows usually run from three to six; and yet, by the time that they should have been fit to fend for themselves in the outer world, we often see only a solitary survivor.

Birds' flight is by some regarded as an instinctive gift, while other naturalists have given fanciful accounts of the care with which young birds are taught to fly by their parents. The truth seems to lie between the two views, and the readiness of young birds to fly seems much greater in the case of the smaller species. Every field naturalist or

bird-nesting boy must over and over again have startled a fledged brood of blackbirds, or linnets, or water-wagtails from the nest for the first time, and seen them flutter in all directions from the bush or stump. They are ready to fly, and fly they can and do, though not far or strongly; and this may be fairly called an instinctive power, though it needs practice before it is perfect. Practice chiefly comes in the case of these smaller birds by imitation of the parents; as the water-wagtails flit from stone to stone, and beach to beach, in finding food for the young, the young ones follow them. We seldom see small birds coaxing their young to fly, by fluttering before them in the air, or taking flight just ahead of them, and looking back to see if they are following. But from time to time we do see little devices of this kind among larger birds, which seem to know that they are heavier, and have the same instinctive fear of a fall as men and other flightless animals. Alpine choughs can be watched making many cackling attempts to lure out a brood of young from a precipice hanging above a snowfield; and though the adult choughs frequent the top of the Matterhorn for scraps from the climbers' lunches, the young ones show little readiness to take to the air. The efforts of the old birds to make them fly may fairly be described as teaching, though of a rather clumsy and helpless kind. The larger the bird the more it seems to need the stimulus of example, if not of deliberate parental encouragement, to learn to use its wings. After one has watched many birds the impression is gained that while the smaller kinds, such as thrushes and finches, would learn to fly if they were left entirely to themselves—if they were suddenly deported, say, to some desert island—the larger species would not, or at least would proceed by very slow stages, and would take more than one generation before they reproduced their

ancestors' skill. Vultures are among the finest of all fliers; but an interesting account of the difficulty with which a young adopted vulture learnt the art was contributed to a French journal by the late Captain Ferber, who was himself killed while flying. It is worth quoting at some length, as one of the best of the observations on this subject, conducted



ALPINE CHOUGHES

by men with a personal acquaintance with the problem: 'Some time ago my friend, Captain Detroyat, wrote to me: "My brother-in-law, M. Sala, and myself have just succeeded in catching a young vulture in the Pyrenees. He is less than six months old, and the spread of his wings is already 2·2 metres. But he is quite unable to fly, and he is not even come to the point of

progressing by flighty jumps. What shall we do? Shall we tie a string round his neck, and train him on Archdeacon's principle by towing from a motor-boat, or shall we push him into the air from the 'pylon' of the Aero Club?" I replied (says Captain Ferber) as follows: "The case is a most interesting one, and I should imagine that what is the matter with the bird is that he has not had an opportunity of being taught by his parents. You be his father and

photograph his attempts. But don't tie him to a motor-boat. It might be bad for his health. You might push him off the roof, and if he flies it will show that his instinct suffices. If he does not fly, it will be plain that he needs a rational course of instruction."

'Captain Detroyat did as recommended, and the result of his observations was as follows: "On the 15th of September the vulture, who answers to the high-sounding name of Coco, weighed 9 kilogrammes, and measured 2.2 metres from tip to tip of his wings, with a maximum width of .5 metre. This is approximately a square metre of surface. According to the shepherds who brought him in, and by plotting out a curve of the rate at which his weight increased, it was probable that the date of his birth fell in the previous April. He is unable to fly, and can hardly toddle.

"'Coco' is not altogether wild. Indeed, he is so little wild that it is impossible to frighten him enough to make him run. At the end of September he tried his wings several times, very much like a recruit going through his 'extension motions,' on the top of a pot full of flowers to the very great damage of the latter, but without daring to fly to the ground. One day he was sufficiently venturesome to attempt gliding from the top of a table or seat with his wings spread out like a parachute. After that his progress was made by practising flying jumps. This period was very long. In spite of the efforts of his adopted father, he could not be induced to start and practise gliding from the top of a 2-metre wall which surrounded a field. He was so unenterprising that he was finally pushed off a roof, but to every one's great surprise it was then found that 'Coco' really *could not* fly. He fell like a lump after having spread his wings in a vague and undetermined sort of way. I was

unable to believe that this was really the case, so I tried again. The second time he fell head down on the gravel just about five metres from the spot vertically under the point at which he started. Unfortunate bird! I heartily begged his pardon, for he was really very much afraid, and in consequence he had a heart attack, and was very ill the whole evening afterwards.

“ By the 4th of October he was getting on nicely, and was practising from the top of a hen-house, where he tried his wings for a long time, and ultimately glided down from the eminence to a distance of 15 metres, where he landed like a big chicken. Next he was taken out into the middle of a big field without trees and incited to run like Santos Dumont at Bagatelle, during which time he got gradually more courageous.

“ He commenced by jumping on his feet and beating his wings at the same time. These jumps became more frequent, and increased in length and speed without greatly increasing his height according as the speed he got up permitted, till finally he got up sufficient speed in his last jump to leave the ground definitely, and to continue gliding along at $1\frac{1}{2}$ metres above the surface. In this way he covered 30 metres at the run, and then 100 to 150 metres flying, exactly like Santos Dumont. He had come to the point at which he was proceeding from flight to flight.

“ Another series of experiments which he carried out consisted of jumping into the air 3 or 4 metres. To induce him to do this, we placed him in a small yard which was walled in on three sides by buildings, the fourth being closed up by a wall of $2\frac{1}{2}$ metres in height. He disliked remaining in this little courtyard, and, after two or three jumps and beating with his wings, he succeeded in rising high enough to get on the top of the wall, from which he glided down into the field.

How did he get out of this narrow space when he found it so difficult to rise from the ground in an open field? Possibly some current of air between the buildings assisted him, or perhaps necessity made his efforts more violent. The point has not been decided.

“Finally, on the 13th of October he had become a ‘master.’ He flew 200 or 300 metres through the air and returned to his point of departure, *i.e.* his pen, without allowing himself to be tempted away by his wild brothers in the mountains. At this date he weighed 10 kilogs., while the stretch of his wings was 2.55 metres. Gradually his absences from home increased in length, but he always came back without becoming in any way wilder.

“Unfortunately, he had not the dread of mankind possessed by his wild brothers of the mountains, and one of those brutes with a gun, who must kill everything they can get near, succeeded in approaching him as he was sitting on a rock, thinking no harm of any one, and shot him dead. The ‘sportsman’ was rather astonished on approaching the dead vulture to find a rose-coloured ribbon round his neck.”

The comparative unreadiness of the large birds to take to the air as compared with small ones is very interesting when taken in connection with the fact that the biggest birds do not fly at all. The archæopteryx, or earliest fossil bird that can fairly be called a bird and not a reptile, is about the size of a crow; and we must take it that from this stem birds increased in size, as well as diminished, until they came to a point at which their young could not be got to fly at all. We usually speak of the ostrich or the great auk as having ‘lost’ the power of flight, but it would probably be truer to say that they failed to acquire it. The explanation of the flightlessness of the largest birds is not easy. It does not seem to be due to the mechanical difficulty of supporting a given

weight by a physically practicable wing surface; expert opinion holds that the problem ought theoretically to be easier with a larger bird than with a small one, since in the smaller bird's wing there is so much more waste margin to the area. One plausible explanation is that since the power of the living engine must be supplied by food, it would be impossible for an ostrich to eat enough to make good the waste of the extremely powerful muscles which depress the wings of birds in flight. The failure is thus one of the digestive processes, in spite of the fact that the ostrich's digestion is not upset by bits of metal. But the reluctance of the young vulture, and even of the young choughs, to trust themselves to the air suggests that the real reason of the flightlessness of the largest birds may be found in the familiar perils of the law of gravity. The danger of falling is greater for big birds than small ones; while the newly-hatched duckling can drop safely from a tree, such a fall kills the young rook. Possibly there came a point in the development of the larger species when they feared to practise flight at all, or when all those who did try it in their unskilful youth perished, and the remainder became hereditary pedestrians or divers. It may be some consolation for the loss of human life in learning to fly that it is not always a safe or simple process even for birds. Birds, indeed, are too intelligent and adaptive a race to possess the sort of security that comes of living by instinct.



CORNFIELD FLOWERS

THERE are no weeds in a virgin wilderness, and the briar and the thorn are as truly the children of nature as the vine and the fig. Weeds came into being when mankind began to till the earth; and they are simply the plants which compete persistently with the crops on cultivated soil. To the farmer in his strictest moods every plant in a cornfield is a weed except the wheat; but the weeds of English cornfields include some of the brightest, as well as the most delicate, of our wild flowers. Scarlet is the most brilliant of all colours, and the only scarlet flowers found in this country are both blossoms of the corn. The corn poppy blazing among the swelling ears of corn in July has a shy counterpart close to the ground in the little red pimpernel. But even the pimpernel tends to decline from the true brilliance of scarlet, and to bear flowers of a duller red; while the small corn poppy, though it is so like the more abundant species that it is little more than a dwarf variety, often bears blossoms which are nearer rose than true scarlet, and recall red window-curtains faded in the sun.

Poppies and corn marigolds and the hemp-nettles and most other cornfield flowers are attracted by a broken and

friable soil, and are therefore found among the corn. If England were all wild land, they would be far less numerous, and would only be found on the banks of torrents, the bare and rain-washed flank of hills and cliffs, and other spots



CORN MARIGOLD

where for one reason or another there was a stretch of bare grit or gravel on porous soil. Many of them can still be found in the old places, just as house-martins nest here and there on the face of a rock; but the right soil is formed so seldom without the aid of man that many of the common cornfield flowers would be scarce plants if it were not for cultivation. Marsh plants tend to decline in a civilised country, because man sets himself steadily to drain and transform their haunts; but under the same process plants of well-drained and broken

ground thrive and multiply, because the process of tillage turns every piece of arable ground into a congenial home.

Cornfield plants also receive the largest accession of foreign immigrants. Corn is imported in increasing quantities for food, while seeds of many kinds are purchased

NIGHT IN THE VILLAGE

By SIR ALFRED EAST, R.A., P.R.B.A.



1900 CA.

abroad for English fields and gardens. Other seeds are introduced accidentally, in the litter used to pack foreign bales and parcels, in fodder, and in other ways. The seeds of foreign cornfield plants come in with the corn, and fall from the railway trucks in which it is transported, or about the doors of granaries and warehouses. In such places, especially along the permanent way of the rail, they find the dry and broken soil which they need; and railway lines are a frequent place for finding exotic cornfield weeds. The seeds imported among more varied merchandise have the same opportunity of distributing themselves as they are jolted on their way by rail; but our imports of foreign corn and foreign farm and garden seeds are the chief means of distributing foreign weeds.

Since cornfield flowers like light and broken ground, it is not surprising that they are found in greatest variety on sandy and chalky soils, and mostly avoid the heavy clays. Once a stiff clay land has been brought into good cultivation, it is easier to keep it free from weeds than most other soils. Even when it is allowed to become very foul from the farmer's point of view, there is nothing like the same variety of weeds as on a lighter soil, though they may be stronger and more abundant. The common plume-thistle blooms and seeds thickly amongst the straggling corn; coltsfoot spreads its broad leaves, and if the state of the field is very bad the dismal tribe of docks competes in monotonous variety. Once the coltsfoot blossom is over, in early spring, there is little to delight the eye among the wild plants of a cornfield on the clays; for even the plume-thistle is the most commonplace in habit and colour of all its tribe. On lighter soils the presence or absence of lime makes its usual striking difference in the character of the weeds. The brilliant golden corn marigold abhors lime, and is as un-

familiar on the chalk and limestone soils as it is abundant on many grits and sands. Blue corn-flowers prefer a sandy soil without lime, and so does the purple corn-cockle, and the little branching spurry, which is one of the most familiar though unobtrusive of cornfield flowers. Yellow charlock and white wild radish prefer one of the calcareous soils, having the appetite for lime which marks the turnip tribe; and charlock abounds especially on the chalk soils, which are usually lighter than those on limestone. The pretty pink convolvulus is a very tolerant weed, and will thrive in any soil that is not too wet or heavy; but it particularly loves the sandier lands, finding in them the perfection of porous lightness which it only partly enjoys on the loams spread over the chalk downs. It can make itself very happy in looping and twisting about the grasses and knapweeds on a rough bank; but the stems of corn form perfect natural props for its aspiring bines, and it clasps them as tightly as the elm is clasped by the ivy.

Broad blood-red stains of poppy are most abundant in June and July on the sandy soils; but they also form one of the great sheets of colour which are the peculiar glory of the chalk countries. The chalk soil itself is of the most exquisite richness and delicacy after rain. The white underlying rock blends with the red upper loam in varying proportions where the plough has shorn it, until the bare fallow is flushed and dappled with roan. After a wet night at midsummer, a bare chalk fallow is as beautiful in the distance as a field of sainfoin. Then there is sainfoin itself, with the tints of clouded rose in its massed blossoms. This is so firmly established on the chalk that it often appears as a cornfield weed. Crimson clover spreads a deeper and purer stain; it is curiously lucent at dusk, and glows on into the midsummer twilight as long as there is any light at all. It is a

favourite summer crop of the light chalk soils, and not a wild cornfield flower, except for a stray bloom here and there; but its crimson is inseparable in the landscape from the contrasted stains of poppies fragrant with scarlet, and charlock massed yellow as sulphur against the sky. The magnificence of these sheets of colour is almost incredible; and to any one who revisits the chalk countries after absence they are almost as astonishing as ever, after the comparative dullness of the colours even at midsummer among farms on other kinds of soil. Nature shows a complete indifference in bestowing her glories on the thrifty and the unthankful crop. The clover and the charlock and the poppy alike excel the glories of Solomon, irrespective of the part they play in the economy of man.

‘The sleep-flower sways in the wheat its head,
Heavy with dreams, as that with bread’

—but if its splendour of colour were only as portable as the grain, that pure dream of scarlet would sell dearer in cities than any opium.

Besides the supreme stains of charlock and poppy, the colours of other cornfield flowers are splashed on the landscape at times with a heavy brush. Corn-flowers dapple the fields on sandy soil with their deep but brilliant blue. The same lands are often stained golden yellow with the corn-marigold; and purple corn-cockle and tall white campion, as well as the scarlet poppy, variegated a crop of vetches or almost hide a growing field of roots. Mayweed, or common camomile, covers many arable fields with its coarse green tufts and large daisy-like flowers; but it is too low-growing to compete successfully with the rising corn, and is commonest in root-fields and among garden crops. It has no exclusive taste for any one soil, and when it appears on chalk it conspicu-

ously lacks the peculiar grace of growth that all the chalk plants share in greater or less degree. When corn-flower and corn-marigold and poppies and some white flower like campion or mayweed are thickly mingled in a field of vetches at mid-summer, their pure, fresh colours in contrast give a peculiar sense of gaiety to the scene. The filmy and brooding purples of later summer are still absent, though every day the earliest field scabious may open on the grassy balks with its signal of the year's decline. The mixture of blue, yellow, white, and scarlet tells of the longer days, and summer still light-hearted and waxing; and we enjoy the June scene while there is time. A little later, when the midsummer burst of blossom is over, the first small flocks of goldfinches come to pick the ripening seeds from the fading corn-flower blossoms. Their crimson heads and striped golden wings flash as they flutter at the bending flowers; and the contrast of their own bright hues with the blue blossoms is one of the most beautiful spectacles in the summer fields.

All these blossoms are conspicuous for brilliance and mass; but there are many pleasant cornfield flowers which must be sought before they can be enjoyed. They bloom shyly among the roots of the corn, in the shadowed and shifting sunshine. Heart's-ease or field pansy is one of the most attractive of these smaller plants; there is a suggestion of a little catlike face which makes the blossom quaint and fascinating. It is very variable in colour, and produces almost endless combinations of purple and yellow and white. This is a distinct plant from the mountain pansy of Wales and the north, which grows on the open turf, and has a rather larger blossom, with purer though still variable colours. The small-flowered field pansy is another common cornfield species, with dwarfed blossoms which might be

taken for deformed specimens of the larger kind. Pansies are a form of violets, unless we choose to say that violets are a form of pansies; and these ill-developed blossoms of the small field pansy have a suggestive likeness to the unpetalled blossoms of the sweet violet, which produce the seed. As the cornfield pansy recalls the widely different scenes where the mountain heart's-ease blooms on the lofty turf, so the little blue scorpion-grass suggests the forget-me-not by the June rivers. The scorpion-grass is plainly a kind of forget-me-not; but it is pinched and almost minute in growth, to suit the more arid conditions of the sandy or chalky cornfields where it grows. The whole growth is sparer, the blossoms are smaller, and of a less full and limpid blue, and the leaves and stem are covered with the dry bristly down which so often helps to protect plants growing in hot, dry situations from the thirsty beams of the sun, by checking too free transpiration through the vegetable pores.



Venus's comb and Venus's looking-glass are a dainty couple of cornfield flowers often found not apart on chalky soils. Venus's comb is one of the chervils and cow-parsley tribe, and has the typical finely cut leaves and unusually small clusters of white blossoms. These expand on fruiting into a bunch of long-pointed seed-vessels like the teeth of a comb; while, when regarded separately, they have given the little plant its other name of shepherd's needle. Venus's looking-glass is more fancifully entitled; for a name which

might very well fit the round shining seed-heads of the garden honesty has been given to a little campanula with purple starry blossoms. The special feature of the plant is its large, swollen seed-capsules, which are as fully developed when the flower first opens as they are in most plants when it fades.

Mouthed or lipped flowers are represented among the smaller cornfield species by several attractive little plants. Of the snapdragon tribe, in which the lip of the flower is tightly closed, there are two minute examples in the least toadflax and the fluellin. The least toadflax is a wiry, bushy dwarf, often only some three or four inches high; its flowers are of the typical tight-lipped pattern, with the lower jaw yellow and the rest of the blossom purple. Fluellin is a creeping plant with long stems, and broad leaves set alternately on the opposite sides. The blossoms are spurred as well as jawed, like the toadflaxes; and small as they are they are conspicuous from the sharp contrast between the deep purple or crimson-brown of the upper lip and the yellow lower one. Often the leaves are sharply angled, like an arrow-head, and this makes the plant more noticeable among the corn or late summer stubble; but they are often smoothly oval. Sharp-leaved fluellin and round-leaved fluellin are frequently separated as two distinct species; but gradations between the two forms can be found so freely in the same field, and even on the same plant, that they can hardly be regarded as more than very inconstant varieties. As for open-lipped or 'labiate' flowers, the most striking cornfield representative of that ample tribe is the large-flowered hemp-nettle, which grows among the oats and barley in Scottish glens and wet Welsh valleys. It is a large yellow dead nettle, splashed with purple, and a more handsome flower than the yellow nettle, or archangel, of English hedges in May. The

narrow-leaved hemp-nettle is a very characteristic plant of chalky cornfields in the south. This is a little branching plant, usually about six inches high, with clusters of rosy flowers marked on the lip with a white or yellow spot. It is usually as neat and compact as the common hemp-nettle of the hedges is lax and straggling. The difference of habit is so great that the resemblance of the corn hemp-nettle to the better-known kind is often masked. Closely allied to the hemp-nettles are sundry cornfield species of red dead nettle, which distinguish themselves from the common red nettle of summer gardens and winter rubbish-heaps by a sparer and smaller growth.

As midsummer passes, and the corn reaches its full height, the deep purple blossoms of the greater knapweed begin to spread their flat fringes a little beneath the swelling ears. Simultaneously the first lilac flowers of the field scabious open a little higher and nearer the light. Each of these cornfield flowers has a meadow counterpart. The black knapweed, which country people call hardheads, is a very common weed in the pastures throughout later summer; and the small scabious blooms on the down from midsummer onwards, while later summer brings the devil's-bit scabious in rough or clayey pastures. But the field scabious and greater knapweed are each the largest and most graceful of their families; the greater knapweed has a clean-cut leaf, and a general distinction of colour and outline which the scrubby 'hardhead' lacks. But they are not wholly welcome when they appear in the corn, even to the nature-lover with no direct interest in the cleanness of the crop. Their purple blossoms mark the gradual shortening of the days; and though they make a new and graver contrast with the tints of beeswax kindling in the ears of corn, they dispel the bright midsummer harmony that we noticed in the vetch-

fields of June. The day soon comes in July when the first globe of thistle-down is seen travelling on the wind across the field; and although no messenger could be more light and fugitive, none gives a more certain signal of the irrevocable wheeling of the year towards harvest and autumn decay.



YOUNG SPOTTED FLYCATCHERS



PURPLE EMPEROR

BUTTERFLY FLIGHT

IN July the woods and downs still keep much of the freshness of midsummer among their flowers and verdure, although the garnished hay-crop has fallen, or is fast falling, and the foliage of the forest trees has caught a deep bronzed green from the sun. As earlier and later in the year, the butterflies are in harmony with their time. July has no species so exquisitely tinged with kindling freshness as the orange-tip of May; but the deep red and sepia of the peacocks and red admirals of the August and September gardens would be even more untrue to its mature but still sanguine richness. Now the purple emperor sails in the high sun of the dog-days round the oaks in the heart of the woods, and the pure white stripes of the white admiral flicker in the shadows arched with honeysuckle. There is no hint of deepening autumn languor in the motion or the colour of those beautiful wings as there is in the *Vanessæ* of early autumn; and if the orange-tips have vanished with the cuckoo-flowers, the marbled whites with their cool chequered wings of milk-white and umber come forth for the first time, and float about the yellow fennel-heads by the paths on the downs and wolds.

The flight of the male purple emperors round their chosen

oaks is one of the proudest and most graceful spectacles in summer life. It differs from the flight of any bird. Birds soar and glide in high air, regardless for the time being of any perch or stay ; and for power and grandeur the flight of a great hawk excels that of any insect, as is only due to its size. But the peculiar beauty of the purple emperor's flight is the way in which it is linked to the large contours of the tree's upper boughs, and in particular to a few favourite



THE HAUNT OF THE PURPLE EMPEROR

perches. From these it leaps high aloft, sweeps and circles round a friend or rival with the ceremonious grace of the tournament, rides on outstretched wings as the *Vanessæ* ride round the autumn dahlia-heads, and again stoops flashing to its perch. All is still for a few moments, and we only hear the solemn drone of the innumerable insects of the sunshine. Then the purple emperor is off and up again, quickly followed by another from a hitherto unnoticed perch ; as they flick their wings against the sky over the oak-crown, the purple iridescence and pure white spots and bands start momentarily into sharp relief. Another beautiful

movement is when they mount across the high folds of the boughs, sweeping in and out of the knolls and depressions of the foliage as a swallow skims over the undulating mustard blossom in the downs. So the proud game of flying goes on through all the hot hours in the July woods; and the peculiar relation of the butterfly's flight to the lines of its favourite tree seems gradually to shape the tree before our eyes, like a fine piece of sculpture, and adds beauty to the oak as to its owner.

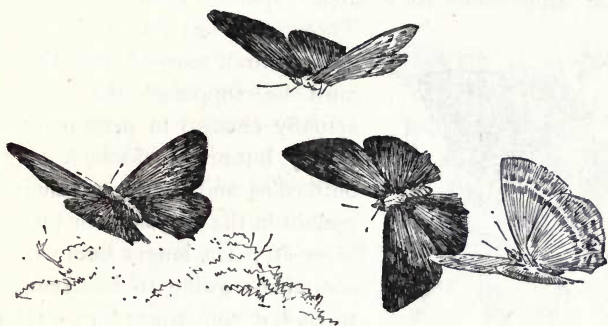
Purple emperors are not bred on oaks, as are the little purple hairstreaks which play at being purple emperors in the same weeks. The eggs are laid, and the caterpillars live for nearly a year on the sallows, which in many damp and clayey oak woods lift their brittle and lowly boughs among the undergrowth. Nor when the butterflies emerge do they always set their thrones upon an oak; a chestnut is fairly often chosen, and occasionally some other tree. But usually it is the king of trees that is chosen by this royal butterfly, and there seems a natural fitness in the choice. The brilliant bluish-purple gloss is a prismatic or iridescent colour, and at certain angles the wings appear dark brown, though finely decorated with the white bands and splashes. The empress, though larger, has no such gloss; she is not a brilliant butterfly, though she is a distinguished one with her large contrasted markings. Nor does she sport in flight about the oaks with the males' activity; she rests much longer on her perch, which is sometimes much closer to the ground. In dull weather she may sometimes be found almost torpid on some branch at the edge of a wood or woodland ride. The taste of these royal butterflies for carrion is almost a classical example of a lapse from magnanimity, but it is not so fixed a weakness as is often supposed. When they come to the gamekeeper's gibbet, or settle upon filth on the

ground, it is usually in dry woods in droughty summers, when other moisture is rare. Like blues and common whites, in the July heats they will suck spilt water or oozing earth when they can find it; and if they can feed in this way, baits of carrion are usually set in vain.

White admirals and purple hairstreaks might be imaginatively regarded as the purple emperor's queens and princelets. There is much of the 'royal imp' about the hairstreaks born in purple and merrily skipping about the oak boughs; while the flight of the beautiful white admiral has a double portion of the emperor's grace, though it lacks some of his power. These two butterflies are closely related, and their brown pattern freaked with white is much the same; but the admiral is smaller, and has no purple gloss. It haunts woods rich in honeysuckle, on which the caterpillar feeds; and such woods are among the most beautiful, for the honeysuckle hangs looped from gnarled old boughs, and climbs in masses among the undergrowth. The white admirals come stooping and sailing among the shadows, gliding down the ladders of sunshine, and following the contours of the foliage with the same exquisite appreciation as the purple emperor. Purple hairstreaks have only such grace as is inseparable from every light and active butterfly. They are middle-sized butterflies—larger than most of the blues—and the wings of the male are of a dark purple-brown, with a tinge of purple less brilliant than the emperor's but more constant in varying lights. The female in this species is the brighter; she has a large panel of brilliant purple-blue in the middle of each upper wing. The under side of each sex is cool grey, banded with brown, white and orange, something after the manner of the blues. The hind wings are tailed, also like one of the rarest blues; and the purple hairstreak is altogether a very distinguished-

looking little butterfly. It appears irregularly, but very abundantly in certain years in its special haunts, which are warm and sheltered oak woods, or copses with oaks as standards. It plays in flocks about the oak boughs in bright weather, mimicking on a small scale the soaring of the purple emperor, and bickering with almost the spirit of the small copper.

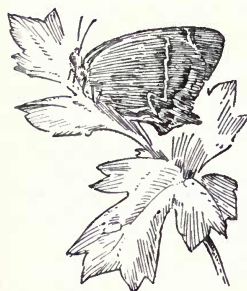
The hairstreaks are a tree-loving race, and the white-letter hairstreak, which appears more locally and irregularly



PURPLE HAIRSTREAKS

in July, is specially attached to the wych-elm. It is not always found haunting this tree. A few days after emergence some hairstreaks have a way of migrating in a flock to a different level in the woodland; the purple hairstreak, for example, may come down from the upper boughs of an oak to the top of the ash saplings beneath it. So the white-letter hairstreaks may be found fluttering round a hazel or some other bush in a hedge, and summer after summer may see them in the same place. None the less they have been bred on a wych-elm, and a tree of this kind will generally be found not many dozen yards away. The

white-letter hairstreak is a comely brown butterfly with white stripes on the under side forming a large zigzag or W. Several years may pass without a single specimen being noticed in some familiar haunt, and then, some July day, the brown butterflies are seen hovering about the well-known bush again. Great fluctuations of numbers are common in the case of many butterflies, and usually correspond with dry and wet years. But the white-letter hairstreak sometimes seems to thrive worst in the most sunny seasons, and its close attachment to a single spot is peculiarly marked.



WHITE-LETTER HAIRSTREAK

Though we see no specimens for two or three seasons at a time, it must be supposed that enough actually emerge to perpetuate the colony, but are overlooked. Some butterflies and moths occasionally remain in the chrysalis for months, or even years, longer than usual—sometimes owing to low temperatures, but sometimes for no reason that we can see. Possibly the white-letter hairstreaks are liable

to these curious suspensions of animation, but real evidence is lacking. In the case of wild butterflies it is much easier to register the appearance of an additional brood—as often happens in long, warm summers—than to detect if a season is skipped. Only the most minute and thorough observation can safely establish a negative conclusion in such cases.

The marbled white provides a good example of the way in which many kinds of butterflies multiply in genial summers, and diminish in wet ones. With the increase of numbers goes an extension of range, especially in the case of the butterflies of more roving habits. Female butterflies have

a provident instinct leading them to choose unoccupied plants for their eggs; and when there are many mothers of the flock, they tend to scatter over a wide area when they are butterflies of naturally vagrant mood. After a cycle of warm dry summers the conspicuously chequered wings of the marbled white are often seen on dry slopes many miles from their usual strongholds. The last time when their migration became marked was about 1900 and 1901; then set in a series of predominantly wet, cold summers, unfavourable to all butterfly life, and the marbled whites sank back again to the cradles of their race on the dry chalk and limestone hills. Many butterflies are more brilliant, but none more pleasant to the eye, or racier of their own particular soil, as they hover with chalk-spotted wings on the thymy lip of the white chalk-pits.

In July the chalk-hill blue comes out to reinforce the common blues, diminished a little since June; and he too seems to have the chalk soil in his blood, for the blue of his wings is densely filmed with milk-white, like the blue of the palest summer sky. He is larger and stouter than the common blue, and is chiefly found on the same chalk and limestone hills as the marbled white. In him we see once again that characteristic veiling of the clearest early summer tints which so many flowers and insects display after the longest day. With the mauve scabious comes the filmy tinge of the chalk-hill blue; the azure speedwell has passed, and the common blues are growing less numerous and more ragged. The flowers of



MARBLED WHITE

the succory now opening are of the most exquisite pale blue; but they too show a declension from the downright and confident blues of May and June, and a reversion to April tenderness. August will bring a second and often a more numerous brood of the holly blue; and this too is a repetition of a spring feature, and a kind of relapse beyond the days when the early summer tide ran most strongly. Most of nature's blues become adulterated with purples and lilacs as the year goes on; some return to their delicate beginnings, but in one way or another the colours after the solstice are changed.

While the chalk and the flowers of the chalk have their blues and marbled whites, the heaths and fragrant July heather gain the lusty flapping graylings. The grayling is the largest of our English browns, and has in a supreme degree that casual indifference of flight which is conspicuous in the large meadow browns either in fair or foul weather. The grayling does not like foul weather; he prefers the days when the heat-mirage quivers over the hill, and the air from the naked sand of the Long Valley streams parched across his strip of Government heather. Spectator of innumerable sham fights, his gift of taking cover is inherited and incommunicable. He is a large and conspicuous insect as he flies, but his underwings are so streaked with dark and light grey that on most backgrounds of sand or stones he is one of the hardest butterflies to discover. His utilisation of this feature is peculiarly well marked. Orange-tips and common pearl-bordered fritillaries are good examples of the way in which butterflies make themselves inconspicuous at rest by tucking themselves inside their chequered lower wings. The grayling does this too, but does more; he leans over till his wings are almost flat on the ground, and even the erect outline of a perched butterfly is lacking. Possibly this habit

may have arisen from the grayling's persistent habit of basking; for a wing surface inclined to the sun's rays secures more warmth than one standing vertically. But the posture certainly seems to add to the butterfly's inconspicuousness; and if it has protective value, it would not be less effective for having been developed out of a desire for warmth. Possibly the many lizards on the sunny heaths haunted by the grayling are foes which it is worth while to deceive.

Graylings are not always found either among heather or on sandy commons; they flap and bask in July and on into August on many rough stony hillsides, sitting among the stones as on the sand. Most of the browns like basking on dry ground; but in this respect, as in others mentioned in the chapter on June butterflies, the small meadow brown is an exception.

It is essentially a blossom-haunting brown and it is specially fond of the blackberry blossom, which comes out in its own season of July, and with its conspicuous bloom and rich nectar draws even the purple hairstreaks from their oaks. Though more local than the large meadow brown of the pastures, it is a very common butterfly in most parts of the south and west of England; its brown and ruddy orange wings with their little black eyelets are part of the associations of the typical English lane. They mingle with the large meadow browns in the pastures and along the rough banks spotted with knapweed blossoms, and meet the



GRAYLING

gorgeous pacing fritillaries on the blackberry blossom in the woodland clearings.

Early July is the heyday of the largest members of this beautiful tribe. They appear not long before the end of June, and are seldom seen in the southern woods in August, although the dark green fritillary still flits in some of its more northern moorland haunts. Dark green and high brown and silver-washed fritillaries are all characteristic butterflies of the woods and heaths, and do not frequent gardens, where the *Vanessæ* are so thoroughly at home. The dark green is the representative of the tribe in the north and on the moors, while the high brown and the silver-washed dwell in glades of the southern woods; but their territories overlap in some parts of the country, especially where the same district gives the high brown its woodlands and the dark green its open heaths. These two fritillaries are very much alike when seen upon the wing. Both are large butterflies, with wings of the bright amber-brown which seems distilled from clear summer sunshine, and the characteristic darker chequerings like those on the fritillary or snake's-head flower. But when we see the dark green alight and fan its wings on some thistle-head beside a mountain sheepfold, we see that it is both greener and darker than the high brown of the woods. The wash of green is conspicuous among the silver spots on the under side of the lower wings; and the green and silver insect makes an exquisite contrast with the purple thistle, or the heather on which it often settles on the moors. The high brown and the silver-washed make a more delicate display on the blackberry blossom in the woodland clearings; their lighter and brighter brown harmonises with the pink and white flowers. The silver-washed fritillary is the largest of the tribe, with longer wings that almost deserve to be called pinions, as it floats down through the sunshine over

the oak boughs and alights on the sweet bloom. The brown in its wings has a redder shade; and while the under side of the other fritillaries is spotted with silver, this one is more abundantly striped and splashed. The silver-washed and high brown fritillaries are the largest butterflies which appear at this time of year in the woodland clearings, except for the peacocks and an occasional early red admiral, or the large cabbage white. But

their season is brief; and their impetuous flight and their fondness for frequenting the bramble-bushes that attract many other insects soon destroy the freshness of their wings. Blundering bumble-bees or impertinent small meadow browns or coppers jostle them on the blossom where they sit; and they dash off with an indignant flight that tears their wings



FRITILLARY

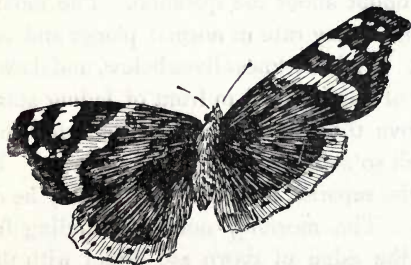
on the little hooked thorns set beneath the clusters of bloom. By the end of July the silver-washed in particular is often torn and shabby, for it is the fondest of the blackberry's nectar. The high brown ranges more freely about the sunnier copses, and sits basking on the earth coated with thin grass, or on ground covered with chips and dry leaves, as the newly emerged brimstones do in spring.

On wet or overcast days in July a new small butterfly is

found drowsing with closed wings on the heads of tall grasses. This is the small skipper, which follows the large skipper a month later, and is the last of its family; it is familiar on the grass-banks by the ripe cornfields of late July, and on hot breezy days buzzes among the scabious and knapweed flowers almost like a bluebottle. It is a sturdy little creature, with nut-brown wings of long and angular shape. The male has a black streak on each upper wing, like the large skipper. The under sides of the closed wings show grey and silvery as the butterfly sleeps, and the colour agrees well with the grass-head drying under the July suns. But the small skipper is by no means invisible to the human eye, nor presumably therefore to those of birds. If one wished one could sometimes walk along the turf bank dividing unenclosed ploughed fields on a cool and drizzling day in July, and pick one skipper after another from the grass-heads with the finger and thumb. Folding their wings upright like most other butterflies, they are far more conspicuous than the dingy skippers which rest on similar dry grass-heads in May and June, and have the mothlike habit of resting with their wings folded along their backs. The distinction between moths and butterflies is an arbitrary one, in spite of its convenience; and in the family of skippers we get very close to the day-flying burnet moths. The scientific name for butterflies is *Rhopalocera*, or club-horns, while moths are *Heterocera*, or all-other-kinds-of-horns. But one of these kinds—the bandy-sticklike antennæ of the burnet moths—approaches very nearly in shape to the antennæ of the skippers, in which the swelling at the end is long and gradual, instead of round and sudden as in the feelers of a white or a blue.

Towards the end of July the second and more abundant brood of wall butterflies begins to emerge, and sports among

the blossoming thyme. May saw the appearance of the first annual generation, but the wall is associated more closely with later summer. Now, too, in a 'clouded yellow year' the first specimens of this delightful butterfly generally begin to show themselves, though some may have been seen as early as June in the clover-fields along the Kent and Sussex coast. They, too, become commoner and more widely spread in August; and from their wandering habits they are often noticed over a wider and wider area as the month goes on, though they are not necessarily newly hatched specimens. They will linger about the late clover and in the scabious fields until the revolving year puts the memory of the fritillaries in the wood-clearing far behind us, and the shadows muster in the red admiral's autumnal wings.





YELLOWHAMMER

DYING MUSIC

WHEN summer is at the full song scarcely ceases for any hour in the twenty-four. 'The earliest pipe of half-awakened bird' is very early in the morning. Which bird is the very first to hail the morn is under some dispute, if the barn-door cock be ruled out of the competition. But to some of us there seems little doubt about the question. The most famous of the singers is, at any rate in normal places and occasions, as early as any. While darkness lives below, and dawn is no more than a glint of hidden gold in front of fading stars, the larks are high above the tree-tops, and at no other moment does the sound fall so softly in so gentle a cascade. Heard from quite close the separate notes of the lark may be called harsh and rough. The morning notes descending from unseen singers on the edge of dawn are liquid with the music of another world, where no night is. Meredith must have heard the lark at these hours, though there are some lines in his 'Lark ascending' which suggest a well-risen sun.

For singing till his heaven fills,
'Tis love of earth that he instils,
And ever winging up and up,
Our valley is his golden cup,

A WOODLAND GLADE

By TOM MOSTYN



And he the wine that overflows
To lift us with him as he goes :

He sings the sap, the quickened veins ;
The wedding song of sun and rains
He is, the dance of children, thanks
Of sowers, shout of primrose banks
And eye of violets while they breathe :
All these the circling song will wreath.

A very early bird which has much more music than he is often given credit for is the starling. Soft whistles and whisperings and little bouts of song, imitative of thrush and lark, may be heard in the hollow elms well before dawn, and in many English homes the tune is the most characteristic of waking songs. For the starling enjoys the neighbourhood of houses only less than the sparrow, which wakes us at any hour when light is once indicated.

When dawn is obvious the whole choir starts ; but notice is given, the gong is rung, by blackbirds and that most humble persistent little singer the hedge-sparrow. But these two early birds differ as widely as any two so far as seasonal singing goes. You may hear the hedge-sparrow as early as the first week of February. The blackbird is as late to begin as any native bird, but when he does begin he is supreme and dominant. There are houses even in the nearer London suburbs where sleep to the deepest sleepers is quite impossible after a certain hour in the morning. The Jubilate of many blackbirds is much too jubilant for that. Of course all birds are morning singers. They prefer the dewy hours just after dawn for their activities. They build then and feed then and sing then with the greater energy. But singing is general till sunset. After sunset a few of those we may call the day singers still refuse to take the hint of twilight. The thrush is the 'longest' of our singers

in most ways. It sings in November and in July. It begins in good time in the morning and takes few rests during the day. Often you may hear its still energetic song an hour, sometimes two hours, after most of the rest are silent. It sees the stars up as well as the sun down. It is in the choir at vespers. Its rival is the robin. But the robin's song at these late hours has become little more than a chirrup on two notes, a song sung only to show that the singer is awake. Between the robin's last call and the thrush's good-night halloo there is no interval of silence. The night singers are already at work, and their company is not limited to the nightingale. The swallow often sings in the dark, and the sedge-warbler and the cuckoo are as regular at night as the owl, if song is allowed to describe the wild tu-whit of the barn-door or the monotonous cry of the little owl.

When summer opens some birds in song may be heard all round the circle of day and night. But the period is soon over. It ends almost abruptly. The night songs first cease, then the midday songs, and finally a robin's chirp, or a short impetuous burst from the large-hearted wren, are the only birds singing in the garden; and you may travel a hundred miles along the road without hearing any other note than the depressed monotonous refrain, 'Little-bit-o'-bread-and-no-cheese' from the yellowhammer, or a very wheezy and short bar from the corn-bunting. We notice this ending of the song-time less because another music takes its place. As the birds drop into silence, the hum, the murmur, the buzz of insect wings, and the grating of the grasshoppers' legs take their place. 'The poetry of earth is never dead,' wrote Keats, and the sound that set him to writing that admirable sonnet was the scrape of the grasshopper and cricket. Almost like the insect note is the croon and murmur that may be heard from a few of the birds. The

turtle-doves in the elms seem to utter a noise that suggests some organ very unlike a throat, if it is not quite an insect noise. But Tennyson quite appropriately connected it with the

'Murmur of innumerable bees.'

The insect hum is no substitute for the music that is stilled, but it keeps at bay the silence which is one of the most unsummer-like of attributes. Music, in the strict sense of the word, is not to be found even in birds' songs, much less can it be extracted from the hum of insects. Nevertheless, we get great pleasure from the unmusical murmur, which especially belongs to summer evenings. A summer night would hardly be a summer night without the sound of some great bold cockchafer dashing out on his thunderous course, regardless of obstacles. We may call him a night-singer, like the nightingale. He takes up the chorus dropped by the bees. Among the bees the latest is the bumble. Long after the hive-bees are at home, the bumble is abroad foraging, and making, it seems, a double noise now that she is alone. With great punctuality she waits as a rule for about an hour after sunset, rolling about till then in her clumsy way over the thick rose-petals or any flower she fancies. She will sometimes tumble into a poppy-head, and roll there with a high-pitched angry buzz, till she is covered with the slaty pollen, against her will. Her rather slow and vagrant course and sleepy hum at this hour is in strange contrast to her fine intention when the hour for departure has struck, when the condensing dew or darkening light announce the end of day. Then she shoots off with a deep and purposeful hum, as determined on a rapid and straight course as the cockchafer or the migrant bird.

All these insect sounds have their distinctions, very

apparent when you listen for them. The hive-bees themselves have many notes. If you put your ear to the hive you may catch the note of domestic work, low and even and murmurous. The angry note is high and sharp and quick. The morning murmur of the workers busy about the flowers is like neither of these. There are day sounds and night sounds. But in late summer the bulk of the music is of one quality. The season's sounds are not vocal but mechanical, if that may be considered a true contrast; and to some ears seem almost as if they came from another kingdom, from things that grow with roots in the soil. There are, of course, birds which make mechanical music almost indistinguishably from vocal. The snipe's tail feathers are an Æolian harp responsive to the tempest of the bird's descent. No one has yet fully decided how the lesser spotted woodpecker makes his trill, but even these sounds are different in quality from the grating of the grasshopper's leg, which serves him for fiddle-bow, or the vibrant shriek of the gnat. When August comes a sort of mechanical murmur has quite taken the place of the liquid jollity of the first spring music. You might now almost mistake the drawling greenfinch and the monotonous bunting for tree and hedge insects, if not for the grating of a bough.



THE WAYS OF A TROUT

TROUT have less majesty than salmon, but more homeliness. While salmon and their fellow-migrants, the sea-trout, are particular in their choice of streams, and sufficiently scarce to make them celebrated among anglers, brown trout of more or less weight make their home in the obscurest parish brook, so long as it is sufficiently brisk of current. The largest brown trout are lake fish; but even in the New River in the north of London a trout was caught a few summers ago which weighed seventeen pounds. The size of trout depends on the plentifulness of food, and that to a great extent on the area of water in proportion to the number of the trout. This New River trout, like others which occupy known stations in many streams flowing through towns, had the monopoly of a large supply of casual offal. At the other end of the scale are the troutlets no bigger than minnows which one can find by diverting the water of some tiny but perennial rivulet draining a small hollow among the heathery hills. Though there is much dispute whether various races of trout should rank as distinct species, no one would question the specific identity of these dwarf trout of our English brooks with the famous denizens of the Hampshire and Derbyshire dry-fly streams. The whole race of

trout and salmon in Britain is in a very fluid state, without the clear distinctions which Nature has by this time imposed on most groups of creatures.

Trout differ from the so-called coarse fish by spawning in the winter, and reaching the height of health in early summer, when coarse fish spawn. At this time they are far better able than in winter to stand the rush of the lively streams which they haunt, and may often be seen cruising on the gravel where in winter or early spring we may look for them



A HAMPSHIRE TROUT STREAM

in vain. After the excitement of spawning time, when in shallow chalk streams we can see the male fish chasing each other off their 'redds' or nesting-places in the gravel, they lie half-torpid in their shelters, of which every stream holds many. Roots, rocks, and holes in the bank give them the protection from the current which they always require when resting, and especially during their lethargic period in winter. They feed little until spring begins to produce a supply of flies, and grow dark and wasted. A course of flies is said to fatten them more quickly than any other element in their mixed diet, and by the time that they have gorged on the March browns and duns and Mayflies of spring and early

summer they reach the pink of condition. The phrase is often literally correct, for the flesh of well-conditioned trout in many streams and lakes is pink like that of a salmon. A midsummer trout will weigh half as much again, length for length, as one caught at the opening of the fishing season, which is usually fixed too early; and its lusty vigour makes it one of the most attractive of creatures, either above or under the water.

Brown trout vary greatly in colour, as is implied to some extent by their alternative name of yellow trout.



LOCH SHIN

But the range of colour is still more various. It corresponds very closely with the nature of their haunts. Yellow trout is the commonest name in many parts of Scotland, and corresponds to the peat-tinged water of most of the streams flowing from Scottish moors. In such streams, and even more in many moorland lochs, the trout have rich golden-brown bellies, darkening to brown on the back, and variously spotted with red-brown and black. Very different is the livery of a trout from the pale green water, transparent as a pane of glass, in some stream from the granite hills, or from clear sandstone rock with quartz sand. Here the trout are almost as silvery as sea-trout, and spotted with bright scarlet, like sprinkled holly-berries.

Trout may vary almost as greatly within a few score yards of each other in the same river or lake, and the controlling difference may be of human origin. In one Welsh stream in our recollection, where most of the trout run moderately dark, those caught in a long open pool formed by a mill-weir, with a clear sandy bottom, gleam as bright as whiting in the creel. To some extent the trout has the power of altering his colour to suit his surroundings by closing or opening the pores in the skin which display pigment.



A WELSH TROUT STREAM

Part of the attraction of every trout-pool is in its mystery. Its life is separated from our own by the element which is natural to fish but alien to ourselves, and the size and number of the trout which it harbours are uncertain. The largest fish only appear very occasionally to feed, and spend most of their time in hollows among the roots of the willows or behind the camp-sheathing of the streams in the water-meadows. Gradually we may form an estimate of the trout which live in a deep pool by watching what fish appear in the best feeding-grounds at different times of the day. Every trout has his own holt or hiding-place, but the more open

parts of the pool are usually a public feeding-ground, where the large fish feed when they wish and the smaller fish when they dare. At times, when the smaller trout are actively feeding, we may be sure that the monarchs of the pool are lying torpid. Only in the height of the mad rises after May-fly, or some other favourite fly, are all the trout in the river seen rising together, and then the sight is a wonderful one. The whole stream heaves and boils; and suddenly we discover what an unsuspectedly large population of trout



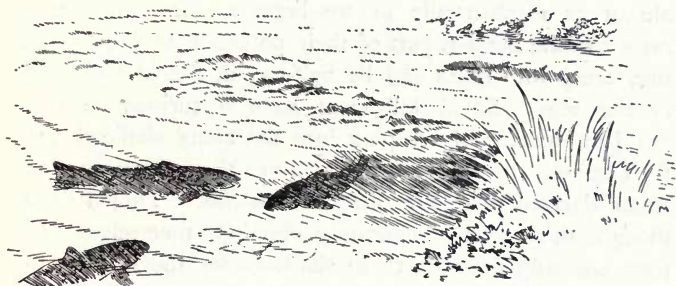
THE LODDON

the stream really contains, though for weeks only a few may have been seen rising. This frenzied activity often lasts only for two or three minutes, while the swarm of newly-hatched fly floats down the stream. The calm of the stream returns, and the revelation of the life within it seems almost a dream. On hot summer evenings the trout sometimes rise with almost equal activity after sunset, and for a longer time. Often there seem to be no fly to excite them, but close investigation shows a swarm of minute black midges. The trout are rising at these black specks in a manner detested by the fisherman, who has no artificial fly small enough to counterfeit this minute insect. This rising at black midges

is known as 'smutting,' and is a frequent feature of life by the trout-streams in June.

Great respect is paid to age among trout; for age means size, and larger size involves the power to devour. Great lean old trout with hooked jaws and discoloured skins feed chiefly on smaller members of their own kind, and their ugly appearance is set down to their cannibal diet. It is more probably simply the effect of their age, though it is true that the older a trout gets the more seldom it will rise to a fly. But trout of all sizes feed on smaller brothers when they get the chance. The chance, on the other hand, must be an obvious and easy one; and trout do not race about the pool after each other like sharks. So long as the juniors keep their distance they are usually safe, and they may feed on the good gravel shallows when the seniors are not hungry. By watching a good trout-pool from a bridge when the fish are still active in early summer, we can see how the whole life of the pool is a balance of tyranny and recognised custom. As the duns float down, or as we drop them in for experimental purposes, first a smaller fish darts up from some open station and seizes the fly. After this has happened once or twice, it excites the attention of a larger fish. Out he lolls from beneath a floating mat of weed, and away the smaller fish scurries, back to his own inferior position at the tail of the pool, where he gets his better's leavings. If the big fish is hungry he may keep his position for some time, and snap up or at least investigate and reject whatever flies may come within his reach. If the weather is hot, and he is torpid, he will soon drop back from the current into his holt. But the first little fish is rash if he returns again; for this activity on the part of the pool's lord has stirred up another trout, or perhaps two or three, of the next size to the biggest. He, or they, now take up their station at the

head of the pool, and if the first little fish is so foolish as to come back while they are there, one of them will lunge savagely at him, and he will have to scurry for his life. If the second-sized fish are first attracted by the flies floating into the pool, they will abscond as swiftly as the little one when the lord of the pool makes up his mind to come out. As usual in nature, it is well understood who is master, and we never see among trout anything like a stand-up fight among equals. Good holts descend from owner to owner,



A HAMPSHIRE MILL-RACE

like heirlooms; if the trout in occupation of some comfortable eddy or hollow in the lee-side of a rock is caught, next day his place is often taken by his next junior. What trout like in summer is a station just outside the full rush of the stream, but in sight of the current which brings down the food. When they are not out feeding, they lie in their holts with their attention more or less alertly fixed on events outside. They do not dash out to the middle of the feeding-ground to seize the smaller fish which eat when they are reposing; but, on the other hand, the smaller fish do not tempt them by passing too close to the mouth of their dens.

Trout have no eyelids, and it is disputed whether they

ever actually sleep; but they certainly have periods of unconsciousness which are indistinguishable from sleep in other creatures. Once in Hampshire, after casting for some time at a trout from behind without any result, the writer next cast at it repeatedly from in front, and finally waded into the river and touched its tail with a landing-net before it suddenly dashed off in alarm. This was the more curious as the fish was keeping itself in position with its fins on an open shallow with a brisk current. Probably this slight action of the fins is so habitual that the trout performs it almost as mechanically as we breathe. In winter trout retreat to the deepest part of their pools; in severe drought they creep into holes and lie half-torpid, almost like tench in the mud. Small hill trout have a curious habit in hot July weather of creeping into the stony shallows until their spines are almost out of water; they scramble away when alarmed more like lizards than fish. They look as though they were deliberately sunning themselves; but they probably frequent these shallows for the sake of the brisker play of the current across them when the stream is shrunken and stagnant. It is a quest not for sunshine but for oxygen.

Trout have many foods, and varied habits of feeding. The rings of the rising fish which abound on a lake or river on a summer evening are seldom seen on many other streams through long weeks of spring. Partly this is due to the trembling water of the rougher streams, which tend to conceal surface rises; but it is largely a sign that the trout are feeding under water, on minnows, fresh-water shrimps, and various other small aquatic creatures, including flies in their immature stages. In the life of the water-flies on which trout feed the stage corresponding to the pupa or chrysalis in moths is not helpless and inert, but active; and these

nymphs—as they are called—as well as the larvæ are freely devoured by trout beneath the water. Sometimes we see the undulations produced in a pool by trout which are not rising and causing rings, but twisting and rolling beneath the water in an obscure but methodical way. The trout are then groping about either for nymphs rising to the surface in order to shed their skins and fly off as duns, or on larvæ at the bottom. The simultaneous behaviour of all the



HAMPSHIRE WATER MEADOWS

trout in a pool in this way betokens a large rise of nymphs, most of which they devour before they reach the surface. This trick of the trout is most frequent in cold springs and summers, when they seem never to acquire properly the habit of feeding on the surface. It is very exasperating to dry-fly fishermen, whose strict rules forbid them to fish except for fish plainly rising on the top of the water. The presentation above water of the tail instead of the head of the fish as it grubs for larvæ is even more painful to the purist fisher, who imputes to his fish a code of procedure

as scrupulous as his own, and to whom the very foundation of his cult is that the trout of dry-fly streams feed habitually on floating flies.

To inspect the diet of trout when they gorge themselves in a flood, which scours all kinds of food from the floor of the valley, it is not necessary to clean one's fish oneself before they are cooked. Often when a trout is landed part of its most recent meal is still sticking out of its mouth. Earthworms form the staple of the feast at flood-time; the rain and rising waters flood out the worms and wash them downstream to the fish watching in the eddies. But besides worms trouts' mouths shed at such times a strange medley of beetles, caterpillars, fish-spawn, and young fish, and the remains of the harder and tougher flies such as 'creeper' or nymphal stonefly. The rapid digestion of a trout is not fast enough for its appetite; it will sometimes come for the fisherman's fly with the tail of a smaller brother still sticking out of its mouth. Astonishing, too, is the size of the trout which are swallowed. In a Hebridean loch the writer has caught with a sea-trout fly a plump and healthy brown trout of about fifteen inches, from the mouth of which when landed there protruded the headless and tailless spine of another trout, which before digestion began must have measured at least ten inches, or two-thirds of its captor's own size. Yet in spite of such a crocodilish feat there is nothing treacherous or repellent in a healthy trout, as there is about the lean and slinking pike. The trout has the inspiring vigour of the mountain torrent, and the clean brightness of the chalk or limestone stream; the activity of its chosen waters passes into its firm yet rounded flesh, and it is far less of a murderer than a fighter. Large trout in slow and easy waters may grow comparatively dull and lethargic, and on the whole the smaller the trout the keener is its spirit. The

prick of a hook is quite insufficient to daunt an active and inexperienced trout, so long as the tender tongue or gills are not injured. A fish which carried away the fly at his first meeting can sometimes be caught again in a few minutes with the fly still fixed in his lip. Only salmon parr, which need to grow much faster, are more muscular and voracious than young trout.

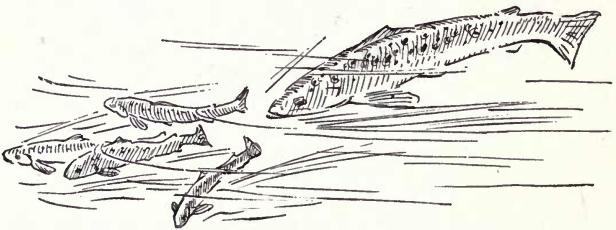
By watching a pool or lakeside carefully day by day, it is possible to acquire a fascinating knowledge of the movements and probable size of the trout which it holds.

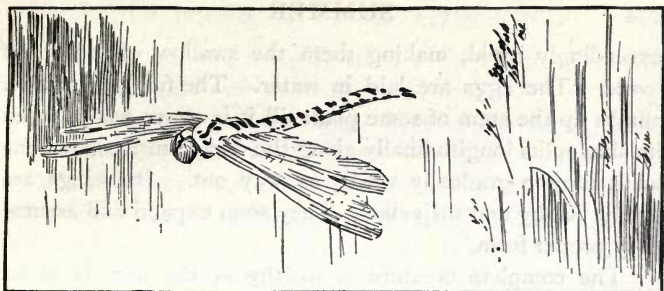


AMONG THE WEEDS

Where the stream spreads level on the ford, we see the heavy arrow-head line in the water as the large trout come up to the shallows to feed for minnows at evening, or perhaps see one lurking in a cart-rut, or gliding on the pale chalk road. Some trout in lakes and open pools cruise regularly round and round on the same track for a certain time each day; their line in the deeper water is much less conspicuous than the ripple ploughed by trout moving on the shallows, and needs careful watching before its recurrence is clear. Prone observation on the bank of a trout-pool for half an hour often reveals much life which is hidden on a casual inspection; half-transparent shapes detach themselves from the waver-

ing shadows on the gravel or by the bank, or glide forth and stand fanning in the current. But the deepest fascination of trout and of trout-fishing is that there is always so much more to learn. We cannot tell why trout feed so fitfully and unaccountably, or whether they can see the colours in the lures which we dress for them, or perhaps regard them all as varying shades of grey. Only the flash of light from some bright substance is unmistakably attractive to them; for the rest we are still in doubt. But behind all these practical problems of the fly-fisher for all lovers of trout and of nature, there is the primal fascination of the unknown life in the pool.





THE DRAGON FROM THE POND

OF all the smaller more particular things in nature that have been crystallised in verse or poetry, no event has been more successfully translated into words than the emergence of the dragon-fly. Tennyson delighted always to play the part of the populariser of science. With his short-sighted eyes he peered close into things, and he took pains in books too to find out exactly what happened. Perhaps sometimes he forgot his poetry in his science. Rather unkindly, but in a spirit of admiration, Mr. A. Mackie in a charming article once printed several Tennysonian passages about the dragon-fly alongside a paragraph from a scientific treatise. The difference between the two was little more than a difference of words, though doubtless the word makes all the difference.

'To-day I saw the dragon-fly
Come from the wells where he did lie.

An inner impulse rent the veil
Of his old husk ; from head to tail
Came out clear plates of sapphire mail.

He dried his wings ; like gauze they grew
Through crofts and pastures wet with dew
A living flash of light he flew.

So Tennyson. Now Mr. Davis, zoologist : 'Their flight is

exceedingly rapid, making them the swallow of the insect world. The eggs are laid in water. The full-grown larva climbs up the stem of some plant till it is above water, when its skin splits longitudinally along the dorsal surface, and the adult dragon gradually works its way out. Its wings are at first flabby and shrivelled. They soon expand and assume their proper form.'

The complete creature is worthy of the miracle of its second birth. No more splendid thing emerges into June than the dragon-fly, nor any which has more of the glory of summer. When they first appeared we all compared the monoplane with a dragon-fly; it was the first comparison that sprang to the mind and eye; and soaring flight is perhaps the dragon-fly's master of attribute. There is no spectacle in nature more wonderful, no 'crowded hour' more glorious, than the first of the flights. Not once or twice the writer has watched them emerge from a certain liliated pond. The pond indeed was so thick with lilies that you could scarcely see the water. If one watched at the due summer dates you could make almost sure of seeing the brown masked ugly grub labour up the stem, as if even this splendid resurgent life were hardly worth while. The man of science and the poet have both watched, and if they were classical they have perhaps recalled the Virgilian lines which fit exactly this ponderous difficult crawl,

'Sed revocare gradum superasque evadere ad auras
Hoc opus, hic labor est.'

'But, ah, to win the upper air,
What labour and what work is there.'

The process is well known; it is common to all metamorphosis in one form or another. The case splits, the imago pushes its way out, and in this case uses the old case, as the clematis

uses its old stem, as a stepping-stone to higher things. But the flight is what we are concerned with. The crowning marvel is the growing of the wings. You see growth. A damp, crumpled thing, like tissue paper crumpled up, not only unfolds and loses its crinkles, but actually grows; and when it is grown it sets into diaphanous crystal, like our breath on the window, taking the most delicate shape and the most effective. Within twenty minutes the pinions are waved a little, gently stroke the air as if the insect were half afraid that the wing was the weaker and might be abraded by the invisible gases. But the test is enough. After a moment's brooding an ecstatic spring is made. Your eyes must be sharp to follow the green shape between the glint of silver from invisible wings. Perhaps with the wisdom, certainly in the manner of the monoplane, the line of flight becomes at once high and bold; and the quickest sight loses the creature somewhere over the boughs of elm or oak.

The miracle is brought home by contrast. The emergence is not a certainty. Among the grubs that crawl to the surface some are either a little wounded or bruised, or the process of growth has been arrested in some way. The wings are caught in the sheath or not smoothly disengaged, and the creature waits for the marvel of the perfect wing in vain. It struggles for the flight, but either tumbles or blunders on broken wing to the grass. The miracle has not happened as Ibsen says of a mental state.

This flying dragon is a dragon indeed, as terrible as any in the fairy stories. Some of these perfect winged insects of spring and summer live a life as nearly as may be ethereal and unmaterial. The Mayfly does not feed at all. The mouth exists, but is not developed to the point of use. Though some butterflies, more gorgeous than the dragon-fly, descend

to batten on foul meat or rotten fruits, the race of moth and butterfly live for the most part on the nectar of the flowers which they rival in shape and colour, and the ethereal semblance is maintained. But the dragon-fly is never anything but a dragon. It 'grapples in the central blue,' as Tennyson foretold of the aeroplanes; it hawks and destroys, with a power that is equal to its impetus of flight, and has all the fierceness of the flesh-eater.

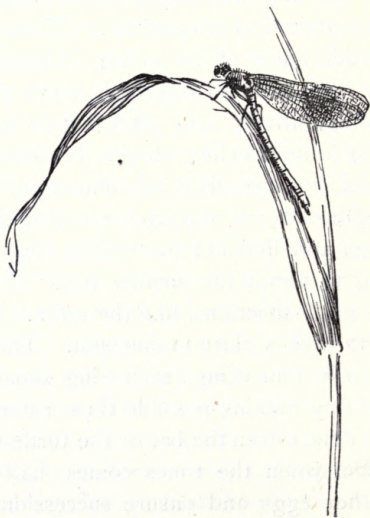
It is, perhaps, alone in its fury. Nearly all insects are insatiate eaters in the grub state. They resemble a biennial plant, such as a carrot, which in its first year makes a great store of food, that suffices for the plant in its second or flowering time. The dragon-fly grub is a great devourer while at the bottom of the pond, never descends into the sleep of the chrysalis, and in his last state is if anything more destructive than in his first. He is as he looks. The commonest dragon-flies, those most of us think of as the proper presentment of a dragon-fly, is usually an *Æschna* or one of the *Libellulinæ*, which are big in structure, and coloured in curious greens and yellows, with black lines that half suggest a snake. The eyes are fairy-story eyes as big as saucers in comparison with the head, which is all eyes and mouth. They flaunt their aggressive colours, their war-flags; and yet just now and again they might be selected by some zealot in protective coloration as a splendid example of his thesis. In a certain Midland garden they used to love hanging on the boughs of deodar, and to the scheme and colour of it they fitted so perfectly that though you saw them pitch you could scarcely find them. It is so too when they survive beyond the summer. Often you may find a pair careering madly about the hedges, and stopping at intervals on the thorn boughs just losing their fresh green. It is odds that if you did not see them alight you would pass within inches

without noticing them. But such a likeness is, of course, mere accident.

In general the whole form of the creature is salient, and it abides in the memory with the force that it strikes the eye. A caricaturist would probably fasten first on the eyes, but after that on the legs. They are set on in an odd group in front of the wings, and are obviously quite useless for the purpose of most legs. They are impossible legs for walking. They are admirable for hanging the insect up on a branch; and it seems to the writer, though naturalists dispute it, that they form a sort of net for catching the flies on which the animal feeds. At any rate they are admirably fitted for the purpose and—'great is juxtaposition.' They are placed in a group, all within reach of the mouth. Though the dragon-fly loves now and again to top high trees and take long flights into comparatively arid places, it is a lover of the water, as it was in its crawling stage. It loves the water, as a swallow does, because flies are numerous. On streams where the dragon-flies are numerous you may see floating on the water wings and limbs of the victims clipped off in mid-air and falling to tempt the smaller fish. They seem, too, to have some local affections, like the robin. You may find them for several weeks close to one spot. There they hawk on their wonderful four wings, each wing separate from the other, perhaps thus making possible those astounding dashes and turns that defeat even the bat or the turtle-dove. There, too, the female, when the times comes, half sinks in the water to lay her eggs and ensure succession in the same place.

The dragon-fly is a dragon, but it has also the spirit of the air. The sunshine, which makes its splendour in our eyes, is life to this fly. When days are dark the meshed wings are closed, and the dragon sulks in its tent, suspending

its greed as well as its flight. And we must remember there are dragons and dragons. Some of the tribes are as gentle and pretty as butterflies. The sky-blue flies, that add much beauty to many Berkshire streams, have not the tremendous energy or dash of the yellows. The 'Demoiselles' are delicate creatures against which no charge of cruelty can be levelled. But it is of the yellow snake with silver wings that we think when we call the fly a dragon, or even, in the American idiom, the 'devil's darning-needle.'



DEMOISELLE



THE TURNING TIDE

EVEN in the luxuriant fullness of the end of June there are hints that the year is turning towards its decline ; and as the sheer sunshine reaches its height in July, these warnings to the watchful eye increase, and signal in a sort of secret code the still distant oncoming of autumn. The mere shortening of the day seems almost negligible, when even the equinox is still remote, and any more definite suggestion of autumn darkness is precluded by the lingering evening glows which are at their richest in July. But one of the inexhaustible interests of the naturalist is to notice the earliest growth of each season's features, while they are still latent and obscure ; and autumn can be seen germinating in the shade of summer, like a seedling oak or sycamore in the depths of a tangled shrubbery.

The turning-point of summer declares itself both by positive and negative signs, and both can be so easily overlooked that there is keen zest in observing them. It is much easier, for example, to note the date of the first singing of the blackbird or garden warbler than of its last strain ; the birds give no warning of farewell, and we need to listen

carefully and regularly for the song which marks the end of their season. Even the positive signs of change, that tell definitely of autumn waxing, and not simply of spring departing, are of a kind that is usually missed. Every one notices the brilliant scarlet bunches of rowan berries when they weigh down their stems in late September, but few mark their slow growth and the gradual kindling of their colour through the months after the blossom faded in May, when they seem lost in the dull green of the summer foliage. It gives a strangely quiet and steady sense of the onward movement of the year to watch week by week the progress of these unregarded berries which will make so conspicuous a show in days to come. In July they are already large, but still hard, and at one stage in their development they display a singular neutral tint which includes both the unripe green and the ripe red. To combine these complementary colours might seem impossible, but it is achieved by the mountain-ashes in July. Hawthorn berries and rose-hips change colour with equally few to mark them; but their gradations of colour are often less precise, and they transform themselves into succulent bird-food more suddenly on autumn's near approach. But even in July there is an anticipation of the autumn pillage of the ripe berries. Wood-pigeons are very experimental in their diet, and sometimes turn at this time of year to the clustered green berries of the whitebeam, which yield their kernels in autumn to the great tit.

Wood-pigeons do their best to cheat themselves and us out of the knowledge that the year is passing; they murmur their spring rhythm until late in September, and occasionally have eggs and young in the garden firs up to the end of August. But most birds have now finished nesting, and the empty nests hidden in every bush and hedge are one of the most significant signs of the season. Sometimes they are

colonised by birds of other species, which roost in them; young birds still fresh from their own nests will often pack at night into a mossy wren's or greenfinch's nest which they light upon in the hedges at dusk. They are an alien breed, and emphasise the nest's forsakenness. Still more marked is the estrangement of the year when, as sometimes happens, a mossy abandoned nest is occupied by a swarm of bumble-bees and filled with their lumps of comb. This is the occasional habit of the small greyish social bumble-bee which also makes its nest under a dome of moss in woods. A snake coiled in a hedgeside blackbird's nest is hardly a more startling discovery than a buzzing swarm of bees in a nest which a month before was the home of wrens. Occasionally some specially attractive hole in a tree is colonised in late summer by a pair of stock-doves, after it has been used earlier in the year by jackdaws or tawny owls. This is a more legitimate usurpation than that of the bees; but it, too, marks strongly the ageing of the year, with the contrasted recollection of the earlier brood now vanished into the world outside.

Up to the time of the blossoming of the elder and wild rose just before midsummer, the flowering trees had the fresh pink and white blossoms of spring. Now there comes a change, and the sweet chestnut and lime which scent the July lawns relapse to flowers of green, unable, as it seems, to prolong the vernal colours beyond their time. In fine July weather the catkins of the sweet chestnut are almost as sweetly scented as the flowers of the lime, and they colour the tree more conspicuously with a rich silky gloss, visible from afar in the sunshine, and glimmering like water under the flaws of the summer breeze. Both the breeze and the innumerable insects of July appear to play their part in fertilising the sweet chestnut's flower. The male and female

catkins have a mixed character, between the type of wind-mated flowers like those of the poplar and hazel, and insect-fertilised blossoms like the lime's. Chestnuts have also a third type of catkin which is bisexual, and in all this they offer a strong suggestion of a transition between the broadcast method of distribution by the wind and the more precise intervention of bees and flies. The mass of scent and colour in the boughs is provided by the long ropes of the male catkins, which towards the end of the month wither and strew so thickly the shadowed ground below. But if we look more closely we see less numerous and more naked stems bearing little green burrs near their base, and more stunted downy tufts above. The tufts are the bisexual catkins, and their function is now almost obsolete. They do not produce nuts, and in the male purpose of fertilisation they are almost superseded. The burrs are the female flowers, which will turn, when fertilised, into the prickly shells of the ripe October chestnuts; they have the prickliness already outlined, even at this early day and in their infant stages. As these burrs swell in late July and August, the tree disencumbers itself of the now useless catkins. The quickly falling ropes are in time to be swept into drifts on the path by the rains of the usual wet week in early August. In the mixed heaps of gravel and litter swept up by the gardener week by week, dead chestnut catkins are now most numerous, as dead ilex leaves were a few weeks before, in June. The strings of bisexual catkins surmounting the little burry nuts wither and shrink to a mere tag, but do not always fall. They are sometimes found still clinging to the full-grown chestnut when it falls or is gathered in October.

The stems of chestnut catkins stand erect, and thus add to the gay and summery appearance of a tree in rich flower in July. Lime-flowers are pendulous, and the glow of pale

honey-colour that they give to the blossoming tree is less vivid, though they shed a richer scent. The wafted fragrance of the chestnut bloom is like the distant odour of a bluebell copse, but the sweetness of the lime-flower is individual. The blossoms are richly dewed with nectar, and they are very attractive to bees, though often mysteriously fatal. The deep hum of the bees in the garden limes sets the seal on perfect July weather, like the peaceful conversation of the rooks in the elms on an April morning. The flowering of the limes leads in the supreme season of beauty in the garden, when the desire of distant wandering seems to vanish with the departed spring, and the tallest and gravest plants are in bloom.

One sign of the increasing heat of later summer is the peculiar twisting of the lime-leaves, which seem to avoid the full heat of the sun. Instead of spreading a horizontal surface, as most leaves do in our climate, they turn up their edges to the sky, so that the pale under sides are visible, and the tree becomes silvery and chequered. This is a very frequent device of limes in July and August, especially in hot summers; and in the hotter and drier climate of North America it is common among other trees. It is not attractive from the human point of view, for although the pale upturned surfaces of the lime-leaves have a cool gleam, the edges turned to the sky let in the sunshine beneath the tree, and rob its shelter of its coolness. The eye marks this obvious deficiency in shade, and the garden wears a hotter and more feverish look in the sun. Coolness is largely a matter of suggestion, and great spreading leaves like the sycamore's, or the broad canopy of cedar boughs, has as much to do with the sense of ease in a July garden as the actual reduction in the temperature. There seems no particular reason why the lime should adopt this evasive trick;

the nearest parallel is in the loose-hung leaves of the poplar, which turn on their flattened stalks in every wind, and fan themselves for coolness. But the lime has possibly a trace of susceptibility to heat, which its wide use as a shade-tree would not suggest. At any rate, one of the characteristic secret warnings of summer's decline, both in town and country, is the fall of the first red lime-leaves, crisped by the sun. In the country these fluttering signals are seen late in August, about the time when the lime-hawk caterpillars also leave the boughs. In the arid London summer this fall of the leaf may begin early in July.

The secret ageing of the year is to a large extent concealed by the luxuriance of July vegetation; while the green surface of the thickets and belts of undergrowth swell broader and higher, inside are the dead bones of spring. If we happen to push inside the matted screen of July plants, and use the opportunity for examination, we may often rediscover buried strata of the year's history, as archæologists disinter successive Troys. So much has happened since the primroses bloomed that they have passed out of reckoning, and it gives almost a shock of surprise to find their tufts of leaves sprawling lank and bleached beneath the shadow of the summer undergrowth. Snowdrops are hidden here too, with leaves equally long and overblown, and tall stalks drooping with large green seed-capsules. Bluebells trail lax and anæmic, with their plump seed-heads alone showing signs of healthy life. In all the flowers of spring there is the pallid sickness of the shade, and the almost subterranean fostering of the vital spark. Nor are the plants that eclipsed the primrose and bluebell themselves in much better case. The cow-parsley and wild parsnip are now almost as far from the light as the victims of their own shadow; their flowers are over, and their leaves droop faded from the tall central

stock. Above them spreads the darker July canopy of goose-grass and bindweed and tangled climbing persicaria and bryonies and woody nightshade, dense enough when looped between the shrubs or branches of the hedgerow to keep out all but the heaviest rain. The soil beneath the violet and primrose leaves, which in April was fertile and plastic, is now hard and crumbling to the touch; in the July heats even the moss is as dry as tinder. It is a dead city of nature, except for that promise of life in the sappy seed-heads. There seems no movement or change or any share in the life of the season outside. The dry earth is silvered with old snail trails, traced weeks before, while the earth was still damp and spring-like; and often the tented space includes a thrush's anvil-stone, littered with fragments of shell where the bird came to break up its prey before the spot was sealed in shadow. The thrushes will not trouble to push through the thick screen of foliage to reach their earlier feeding-places when summer has submerged them. They choose new stones in the open shrubbery paths. In the world outside there are still many stages of summer and harvest before autumn sweeps all away; but in the thickets the growth of the year has already brought itself to a standstill by its own luxuriance.





THUNDER AND LIGHTNING

IN lands devoid of volcanoes thunder-storms provide the most impressive suggestion of the primal fiery chaos out of which the earth as we see it was evolved. Great thunder-storms in England are rare—so rare that one may hardly be seen in a lifetime; and lesser disturbances very frequently follow the same paths, while the country outside them is comparatively immune. Both river valleys and ranges of hills attract the summer type of thunder-storm which is commonest in English latitudes; and half a dozen storms may travel in a summer along these thunder zones, while the country five miles away may remain sunny and waterless on each occasion. Thunder-storms thus have a double aspect; for although they are alarming and dangerous when severe, they often bring welcome rain in a time of drought. Partial thunder-rains have often saved the hay or root-crop in a single parish, or even on a single farm, while a mile away the crop perished or became practically worthless for want of moisture.

Thunder-storms are produced by a violent contrast in the temperature of neighbouring masses of air; and although the air itself is invisible, we can often see the conflict traced in the shape of the thunder-cloud. The towering and rounded white clouds called 'wool-packs' or 'thunder-pillars' mark

the sudden volleying ascent of a column of warm moist air to the cooler heights, and its consequent condensation. They perpetuate the momentary form of a volume of steam shot from the funnel of a railway engine. Such clouds are not always accompanied by thunder; but when these unstable exchanges of the atmosphere are in progress thunder-storms are very likely to occur, especially in sultry and windless weather. Then, in the absence of a steady breeze to carry off the heated air from near the earth's surface, it rises into the colder air above; and, in some way not clearly understood, owing to this displacement the upper layers of the atmosphere become highly charged with electricity, and flashes of lightning burst forth between layer and layer of cloud, or between the cloud and the earth. The thunder-storm goes on until the accumulation of electricity is evenly distributed again. By this time, in a normal and wholesome thunder-storm, the air is freshened by an inrushing current, and probably by the electric discharges themselves; vegetation is revived by the rain accompanying the storm, and by the peculiar tonic quality in the air after it has passed. The massive cumulus clouds have broken up with the redistribution of the air currents, and the whole aspect of the heavens is changed; either there is a clear blue sky, or, if the rain has been heavy, there is often a cool grey canopy of mist which remains till evening, and dissolves in the course of the night.

Summer storms take place most often in the afternoon, when the heat is normally greatest, or at any rate there is the largest accumulation of heated air brooding over the earth. Between three and five o'clock is the commonest time, and then a serene and refreshing evening may follow. The proverbial gibe at the English summer is really a testimonial to its good qualities; for if we could always have 'three fine days and a thunder-storm' the crops and flocks

would be adequately watered with the least possible inconvenience to man. But thunder-storms are an effect, not a cause, of bad weather; and in seasons when the weather is thoroughly broken they sometimes follow each other in constant succession for weeks. The sky remains misty and livid, the air is dead and clammy, almost all day and all night the thunder is growling uneasily round the hills; and every second or third day somewhere about the country there is a savage tempest which strikes sheep and cattle dead as they stand under the elms and poplars in the meadow, and sears the trunks of the oaks.

Long and varied lists may be collected of the unaccountable arbitrariness of lightning in its onsets on human beings—how it will kill two men in a group of half a dozen, or pick up another and drop him yards away, dazed but unhurt. Fortunately in our climate deaths by lightning are exceptional among human beings, although horses, cattle, and sheep suffer more often owing to their habit of clustering under trees to escape the thunder-rain. The danger is notorious of standing close to so probable a conductor of the lightning-flash as an isolated tree or group of trees. It is sometimes said that the safest place in a thunder-storm is close to a tall tree, yet not too close; but the delicate question of exactly how close is safe has not been satisfactorily determined. In a broad field or on an open road the human figure itself may become the most natural lightning conductor; so that both extremes are perilous. Any prominent tree may attract the flash, irrespective of its kind; and the common statement that the beech is never touched by lightning is certainly untrue. Beeches are less often struck than oaks or elms, but that is because they grow far less often isolated in fields and hedges. They also prefer a dry situation; and lightning is attracted by water in the soil, which

helps to account for the large number of poplars which are smitten. The explosive force of the lightning-flash is often astonishingly shown by the distance to which fragments of wood are hurled. When the flash passes down the trunk the wood is rent into long strands, and the tree is rather burst than merely struck or gashed. The layer of sapwood is shattered, so that a tree severely struck often dies in the course of the next year.

The gloom of a thunder-storm by day is often one of its most appalling features, especially to animals and birds; but the play of the lightning is seen most perfectly at night. Then the spectacle is more beautiful, and less awful; we see not only the overmastering flashes, but every crackle and shimmer of the electric discharges; and distant nocturnal storms are among the most attractive of all the year's displays. For all its violence at close quarters, the sound of thunder does not carry more than twelve or fifteen miles; and the play of lightning at such a range by night may be as easily visible as though the storm were in the next field. A thunder-storm is a supremely beautiful spectacle when, as sometimes happens, it rages in a mass of cumulus cloud sailing at a good round pace through a clear sky lit by a large moon. Constant flashes illuminate perpetually varying lines of cloud, silhouetted in dark curves against its glow, and delighting the eye by the magnificence of their airy scenery. Beneath the Surrey Downs we have seen such a storm pass silently in a July night, apparently following the crest of the hills not three miles away, though actually it was five or six times as far distant, and drenching London with torrential rain. The so-called summer lightning that flickers after dark in a sky often clear of cloud is the signal of storms still more remote. With a local canopy of cloud near the horizon to reflect it, lightning can be seen in this way at

a distance of at least a hundred miles. At forty or fifty miles' range the display is vivid, and we may stand in the calm though sultry night and watch the flicker of several storms in opposite quarters over far-distant counties. The sense of distance gives a kind of awe to the scene, and close at hand the nightingale sings fitfully between the flashes.

Apart from the soundless display of distant storms, lightning and thunder are inseparable. We see the flash before we hear the crash, because light travels far more rapidly than sound; and we can reckon the distance of the flash by the interval at which we hear the thunder, and its length by the time which the clap of thunder lasts. The ratio is one mile for every five seconds. Lightning flashes of three miles in length are not uncommon; and their shape, which can be accurately registered by photography, is very variable, and depends on the local resistance of the air, or the occurrence of solid particles which divert the path of the discharge. It follows the line of least resistance, like a crack in a film of drying mud. This linear formation is particularly well marked in the case of what is commonly known as forked lightning. The zigzag line which stands as the conventional form of lightning in popular imagination is scientifically accurate in a certain proportion of flashes, which impress themselves even on a naked eye by their bold and definite shape. But photographs show that lightning more usually takes a veined or rootlike form, sometimes very intricate, and of great beauty, though very unlike the sharply refracted outline of the occasional zigzag flash. The spark of fire heats the air, and the rush into the vacuum so caused sends out the rumbling crash of the thunder.

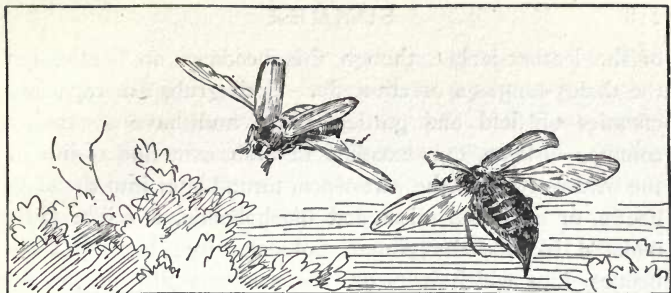
Fireballs or thunderbolts are in many cases incandescent meteorites flying from outer space and finding a target in the earth, but some of them are genuine electric discharges.

As contrasted with lightning they usually move with uncanny deliberation, floating along so slowly that they have sometimes been followed by a curious crowd. They usually end by exploding, sometimes gently, but sometimes with destructive violence. Genuine fireballs as part of the phenomena of a thunder-storm are seldom seen; most of the reports of their observation are due to a confused and startled impression of some particularly near and vivid lightning-flash.

Our occasional thunder-storms in winter are more closely connected with sharp changes of weather than the storms brewed locally in summer by the heat of the sun. The conflicts of temperature which cause them are produced by eddies and squalls, especially the line-squalls which advance rapidly across a wide front, and leave the air many degrees colder behind them. Turbulent south-westerly weather in autumn produces yet another variety of thunder-storm, due to the same fundamental opposition of varying temperatures. On stormy October evenings, with a wild, warm air drawn from far southward on the Atlantic, there is often a flash of lightning and a crash of thunder in the clouds racing swiftly to the east; and sometimes an autumn thunder-storm rages for some hours at night. These storms are part of the gale, and have not the independent solemnity of summer storms, which so frequently work up on a different current to the air prevailing on our level. They occur most frequently on the outskirts of a great cyclonic depression, and at night; and the reason in both cases is the same. On the edge of the cyclone the warm Atlantic wind meets the colder air of our autumn climate, and at night the temperature falls, so that the intruding air meets with a sharper contrasting chill. Such storms often sweep past so rapidly, and amid such roaring of the gale, and play of starlight and moonlight in

the broken sky, that both thunder and lightning are apt to be overlooked, and autumn thunder-storms are believed to be rarer than they are.

All weather broods closer on the sea and on mountains than on the lowlands between them, where we mostly live. Mountain ranges are the seat of the thunder-cloud, and their summits and pinnacles are natural points of discharge for accumulated electricity. Even on the crests of our English mountains tingling ears and humming points of walking-sticks sometimes give warning of keen electric activity, and if there is any sign of an approaching thunder-cloud it is wise to descend to safer levels. In the Alps one can stand above the evening thunder-storm of the valleys, and watch the turmoil in the earth-cloud from the cool clear air above. This Olympian delight is rarer in the lower hills and cooler climate of these islands, but is not unknown. It is exciting to stand on a low coast when one of the autumnal thunder-gales comes driving in from the sea with a rack of flashing cloud, and a dense curtain of rain and hail pouring from its lower edge. The storm races so low that there sometimes seems hardly room for it to clear the houses, and though this impression is exaggerated a tall church spire might be well within the layer of cloud. If it is hardly yet dusk, tumult and horror seize the birds in their orderly retirement to their roosting-places; gulls wail, and sweep on wide erratic planes, and rooks and jackdaws tumble cackling into unaccustomed cover. If night has fallen the lightning bites an intense whiteness from the belt of surf, and flashes a mysterious glimmer from the yellow sand-dunes. The sheen of lightning on sand is almost the most unearthly of earthly illuminations; in the heart of green England a distant summer thunder-storm at night turns the sandy wastes by Aldershot to the likeness of a landscape in the moon.



COCKCHAFERS

CHAFERS AND CLOCKS

THE humming of the midsummer cockchafers round the garden trees marks for human ears and eyes the high-water mark of the beetles' year. Other beetles are signals of well-marked seasons. The first lush April growth brings the big black oil-beetles climbing on the hedge-banks; warm July nights would not be complete without the light of the glow-worm, nor August and September evenings without the dor-beetle's heavy drone. The multitudinous effervescence of summer in the oak woods—that sound which almost more than any other tells of the fullness of life—owes much of its volume to the myriad minute beetles which rustle their wings and scrape their wing-cases as they creep and fly. But the June cockchafer is one of the largest and most gregarious of its order, and fitly stands for the type of its kind. The smaller July chafer is often more abundant, but its inferior size goes against it in popular esteem. It appears a month or six weeks too late, and has the effect of an anticlimax. The larger cockchafer is also well known in its larval stage to every countryman, though not so many know the connection between them. The fat subterranean grub of the cockchafer shares the name and the reputation

of the leather-jacket, though this becomes no beetle, but the daddy-longlegs or crane-fly. Both grubs are rapacious enemies of field and garden crops, and have secured a common ill-fame, only excelled in their own line of life by the wire-worm. If the wire-worm turned later into the stag-beetle, or even the misnamed black beetle, it might fairly make a bid for the pinnacle of celebrity; but the click-beetles, into which it turns, are undeservedly obscure for insects with such a curious trick of motion. The claim of the cockchafer to represent beetles, as the linnet or the robin might represent birds, is also based on satisfying qualities of shape and colour. He is neither dingy, like the devil's coach-horse or the dor-beetle, nor ostentatiously brilliant, like the soldier or sailor beetles, or the yellow-banded grave-digger. His clear brown wing-cases and shepherd's plaid markings on the abdomen make a design which is modestly effective. His form has the proper rotundity of a beetle, typified in the Egyptian scarabæus, and yet there is a touch of individuality in its lines. It has no extravagant growth of horns, like the stag-beetle, nor the sprawling misshapeness of the devil's coach-horse; but its antennæ are finished in neat filigree, and its legs are effectively hooked.

The tribe of cockchafers are vegetable feeders in the perfect as well as in the larval stage; but many beetles are carnivorous, and these perform a great service to man. Some kinds, like the devil's coach-horse, hunt actively for other insects, or slugs and snails; the ladybirds rid us of greenfly; and other species, such as the burying-beetles and the dor-beetle, dispose of carrion and other decaying filth. Beetles play a large part in the destruction of old dead trees, through which the larvæ of many species eat their way; and in primitive forests it is important for the dead trees

to be felled and broken up in order to give room for their successors, and all the life which they in their turn support. On the whole the varied appetites of beetles are useful to man; but certain beetles become great pests, usually owing to the specialisation of man's interests in directions which they cannot be expected to understand. Furs, for example, to the dermestid-beetles are simply animal remains, and it is their natural function to destroy them. The same is true of bacon and cheese, which are attacked by beetles of the same family. The death-watch beetle lives by destroying dead wood; he does not know that we regard it as valuable furniture. The notorious Colorado beetle wins detestation and renders itself liable to rigorous punishment by devouring potato plants, but no one would object if it selected instead the poisonous members of the potato's family. Weevils also bear a hated name, but many of the species are unobjectionable browsers on wild plants.

The stag-beetle is the largest British beetle, and one of the largest in Europe, though it is outstripped by the monsters of the tropics. Its 'horns' are forked extensions of its massive jaws, and have apparently no special use, except to add more power to the jaw by their weight. If the stag-beetle were a common insect, it would be almost too noisy for our quiet English woods. It is as insistent to the ear as a hornet when it takes to wing, and it is always a striking event of a midsummer day to see it come sailing round the crown of an oak with the heavy steadiness of an aeroplane. Its inordinate pomp of noise, and black horns stuck abroad, give it as grotesque an air as the flight of the purple emperor round the same boughs is light and graceful.

Beetles are in fact not eminent fliers, though most of them can get from place to place well enough at a pinch.

They are pre-eminently miners rather than fliers, whether they burrow in the earth, in decaying wood, or in carrion. It would be impossible for a butterfly, or even a bee, to drive galleries in any of these substances without damaging or defiling its wings past remedy. For combining such a life with the power of flight, beetles have had to develop the horny sheaths to their wings which are their distinguishing mark among



STAG-BEETLE

insects. More terrestrial than aerial, most of them are bulky and bullet-like in build, and in order to support this bulk in the air they need a large spread of wing. The wings cannot therefore be merely covered by the wing-cases, or they would be too small; they must be folded up, almost like a tent in the bag which holds

it. Once the packing-up is finished, the beetle can push its way through almost anything without injuring its gauzy membrane. The hard wing-case wards off all stains and scratches. But this protection is not secured without a penalty. Unfolding the wings for flight and folding them up again afterwards are both rather laborious and complicated operations; a beetle cannot flick into the air as easily as a butterfly, but must make considerable preparations. They suggest a sailing vessel starting from a quay. The awkwardness of a beetle's flight is largely due to the now

useless wing-cases, which have to be lifted clear of the wings, and seem to offer considerable resistance to the air. Beetles not only take flight laboriously, but seem to alight with an obvious sense of relief; many are very awkward steerers, like barges in a tideway, and have difficulty in fetching up where they wish. For this reason they dislike windy days, and perform their voyages in still weather. The air of adventure and difficulty with which they fly has its own attraction; most wild creatures seem to perform their functions with such effortless perfection that there is something very human and comprehensible about the beetle's awkward endeavours. It is very interesting to watch the packing and unpacking of the wings beneath their horny coverings, and the beetle's solemn dive into the air when its wings are ready to be spread is an anxious moment. Like parachutists, they often fling themselves free, trusting to the help of the air to spread out their supporting membranes; and there is often an interval of doubt whether the creature's wings are going to sustain it, or whether it will bump down on the ground. At midsummer in the thickets it is very pretty to watch the life of the little golden green beetles which abound in the grass and on the sprays of foliage. Their colour and the neatness of their shape make every movement attractive, and these adventures as they sail and crawl from leaf to leaf are numerous and complicated.

Even the water-beetles can fly well enough when they wish to shift their quarters to other streams, though normally they spend all their stages of growth in the same dike. They are among the most voracious of the flesh-eating beetles, and devour tadpoles, and any other water-creature that they can catch. The water-boatmen which scull their way to the surface of ponds and dart down again after apparently taking a good look at the intruder are not beetles,

but a kind of bug, akin to the flat-backed shield bugs which are often found seated in summer on heads of umbelliferous and other plants. Their main family characteristic is the possession of a beak for sucking instead of jaws. Water-boatmen swim on their backs, and propel themselves with their hind pair of legs, which are enlarged to serve as oars. Their trips to the surface of the water are not mere sallies of inquisitiveness; they must come up periodically to breathe. Water-scorpions and pond-skaters belong to the same beaked tribe. The voracious water-scorpion, which is common in slowly flowing ditches, has the forelegs strongly developed to help it in catching its varied prey, and holding it for the beak to suck. Pond-skaters are surface-feeding insects, and altogether more attractive. All through the summer their light forms dart rhythmically in parties over the surface of ponds and quiet streams; they are one of the most animated forms of summer life, and as welcome on the river as the monkey-flower, or the song of the sedge-warbler. Another conspicuous summer insect of the same tribe is the frog-hopper, which lives in the foam-bubbles hanging to the stems of sorrel and other herbs in May. It blows these clots of 'cuckoo-spit' from the sap sucked out of the plant; if we search inside them, we shall find the tender green insect, sheltered from the sun in its tabernacle of moist bubbles. In June and July, when the 'cuckoo-spit' has evaporated from the grasses, picnickers and campers meet the frog-hopper again. It is characteristic of this tribe of bugs not to show such marked and astonishing changes of structure as butterflies, for example, undergo between the egg and the winged insect; and the adult frog-hopper of the dry summer pastures is easily recognisable as the mature form of the soft green creature in the 'cuckoo-spit.' It is larger, tougher, and less vividly green; but it

has the angular shape accentuated, while its tilted attitude combined with its huge powers of leaping account for its name of frog-hopper. It is a perfectly harmless little leaper, though superfluous in a tea-cup or salad-bowl.

Not many of our beetles have any active weapons of offence, like the stings of wasps and bees, or the proboscis of gnats. But some can exude an acrid liquid which is presumably a defensive weapon against birds and other predatory creatures, and the smallest species can cause considerable inconvenience if they find their way into our eye. The bombardier-beetle fires his charge in the shape of vapour or spray, and with an audible report; fortunately he is too large to get trapped in the same way, or he would be a startling capture. The devil's coach-horse squirts out a malodorous greenish liquid which is probably unpleasant to the taste of birds, while its erected tail and jaws give it a very fierce and desperate air. More curious still for the uninitiated is an encounter with a click-beetle. In this case the change from the larva is complete; the writhing wire-worm has become a smallish but shapely beetle with a large rounded thorax and tapering wing-cases. When disturbed it will probably turn on its back and 'sham dead,' or avoid any provocatory movement. A sudden click or spasm will then throw it into the air; it will alight on its feet, and equably pursue its business. On the under side of the click-beetle there is a spike or peg on one side of the central joint, and a socket on the other. The spike fits into the socket when the beetle chooses, and when it forces it out again the elastic action throws the beetle bodily into the air.

The glow-worm is a wingless female beetle, and her power of signalling seems plainly correlated with her inability to fly. Like Hero's lamp her light is a signal to her

lover. There is some excuse for calling her a worm, for she is a very plain creeping creature, and has not much of the true beetle air, owing to her complete lack of wing-cases. Even the plant-bugs, with their curtailed shards, are more beetle-like than she. She is a dingy grey above, while the lower segments of her abdomen, from which the light proceeds, are pale and mottled. She lifts the tip of her abdomen when she shines, as we can see by examining her with the rival light of a wax match. The glow-worm is our English firefly, but, unlike those southern beetles, only the female glows, and she is stationary. The light varies much in colour, apparently with the warmth of the weather; but in the dampest nights, when the glow-worm sets her lamp, it is still stronger and steadier than the phosphorescent shimmer of the millipede. Millipedes stand to centipedes as centipedes to creatures with the normal pair or two of legs. They are packed with threadlike legs on both sides of their long thin bodies, and they walk like the movement of fine water-weeds in a current. The two families are not now held to be very closely related, and though neither rank as insects millipedes are perhaps the more insect-like of the two. Millipedes shelter under logs and in other moist places, like wood-lice, and can be sometimes seen shining on the walls of damp sheds. Probably their light is also a signal, and they badly need some such guide; for their eyes are very much atrophied, and they feel their way by constant use of their little antennæ.

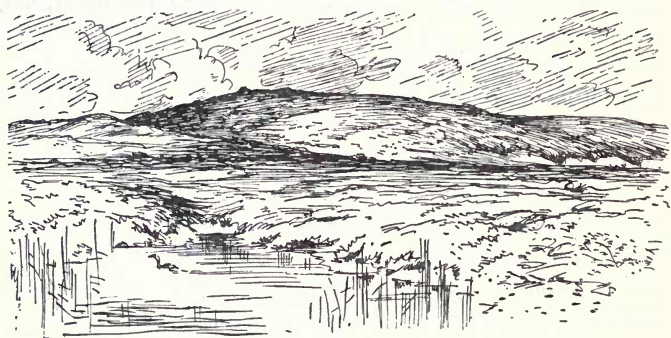
It is a curious speculation whether the droning-beetle hears the noise of his own flight, and the taps of the death-watch make this seem less improbable than might be thought. There is little room for doubt that the death-watch beetles signal to each other by their well-known clicking, much as the female glow-worm uses her light. The

vibration caused by the taps of these small creatures must be so slight that it seems very unlikely that they feel the shock, as a trout can feel a footfall on the bank of the stream. The only alternative is that they can hear. Certain beetles also produce chirping sounds in the same way as grasshoppers—by rubbing one part of their anatomy against another; and there is a strong supposition that these too are the call of mate to mate as well as a method of pleasurable expression, like the song of birds. It seems possible that the hum of the beetle is not a mere accompaniment of clumsy flight, but serves a definite purpose of communication.

The work of the burying-beetles is a remarkable development of the carrion-feeding habit which is common to many species. Burying-beetles are much smaller than a dor-beetle or a cockchafer, and they work in small parties, or even singly, so that they have not the ants' advantage of combination on a large scale in performing their remarkable feats. For it is a very remarkable feat for three or four beetles to bury the body of a creature so large in comparison as a field-mouse or a lark. It is accomplished by burrowing beneath the body, and clearing out the earth at the sides until it sinks into the cavity. Then the spare earth is carried back above it, and the burial is complete. Before this stage, however, the female beetle has accomplished the main object of the whole undertaking, and laid her eggs in the body, which serves as food for the young. A party of burying-beetles at work upon some dead waif of the meadows is a common spectacle when the hay is cut; and the task of the conspicuous yellow-banded insects is interesting, though slightly unsavoury.

The common dor-beetle is associated with the evenings of late summer, though other species are occasionally seen flying at other times of year. Its heavy drone carries far in

the silence of the August and September dusk ; and often the air at that reposeful season is so quiet that we can hear, if we stand still, the beetle rasping its way through the underground tunnel which it bores beneath animal droppings. The under parts of the dor-beetle are often thickly infested with bright red mites, which make a striking contrast of colour with the dark blue of their host. These mites are closely related to the similar parasites of cage-birds. At first sight it seems that the beetle is carrying a brood of



newly hatched young. If it did carry its family on airy excursions, the voyage would be not so strange as that actually achieved by the larvæ of the oil-beetle. It is not for nothing that this soft, fat beetle frequents the sunny banks where the April flowers blossom most freely. Hither come the wild bees, and they are the destined hosts of the youthful oil-beetles. They are hatched as active little six-legged creatures, and wait on the newly opened blossoms for the visits of the bees. While the bees are grappling with the blossom for nectar or pollen, the beetle larvæ seize hold of them, and are carried back to their nests. There they feed on the honey which belongs by right to the young

A SUFFOLK FARMSTEAD

By HARRY BECKER



bees, and after a remarkable series of transformations reappear on the spring banks to browse on the young shoots as wingless adult oil-beetles. Many small beetles are parasitic in the nests of birds and animals, but they are seldom seen except by naturalists who take the trouble to search for them.

In fine, hot summers, a little before the time when the small July chafer buzzes round the tops of the trees, the beetle known as the bracken-clock appears abundantly among the bracken on the moors. This is a small round coppery-red species also known in the south of England as the hazel-fly. It feeds on both plants. It is a favourite bait with fishermen, both alive and imitated with cock's hackle; and it is at least one of the wild originals of that mysterious but celebrated artificial insect, the coch-y-bondhu. Both for trout and anglers its fame is greatest on the open hills of the north and west, where there are few trees to breed other common vegetarian beetles of the lowlands, but bracken grows in deep beds to the very brink of the mountain tarns. In these tarns there are often trout both numerous and heavy, which have developed fitful appetites in their bleak haunts, where the food supply is irregular and usually scanty. The warm summer weather stimulates them to unaccustomed activity, and the same weeks bring the bracken-clocks. They rise in the wind from the bracken, and fall in the gusts that eddy about the rocks round the tarn; and the tarn trout make holiday, and gorge upon them as the lowland trout do a few weeks earlier on the Mayfly. The angler finds the same exceptional opportunity in this glut of a favourite food, and to him in his dreams of the waterside the bracken-clock is a cherished symbol of high sport in clear July weather on the hills.



WILD WALL-GARDENS

IN the midst of the summer luxuriance of vegetation there is a curious attraction in the miniature gardens of dwarf plants which are fostered here and there where either soil or moisture is deficient. When the lack of sufficient moisture is the cause of the dwarfing of the plant, these Japanese gardens of nature are usually found on dry crags and pinnacles of rock, or the copings and crannies of dry walls. Elsewhere, by the sides of springs and in stony dripping lanes, moisture is abundant, but there is no depth of soil; and here there arises a fairylike flora of another class, in which flowering plants are largely replaced by ferns and liverwort and mosses—miniature representatives of an older vegetable kingdom.

The richest of these dwarf-gardens are to be found on the top of old brick or soft stone walls enclosing an ordinary garden; the wild wall-garden is a miniature copy of the garden tended by man. It is often a delightful surprise to find how nature has been quietly mimicking us, like a grave child; for there is enough of the artificial human element in these dwarf-gardens to temper the absolute simplicity in wild nature with an artfulness which is at least fairylike. The

old builders of the larger garden helped to found the lesser one when they built the fruit wall giving shelter from the north and east; and they supplied the original stocks of many of the miniature growths when they set the lawns with spreading wych-elms and shady sycamores, and planted thickets of holly and yew. These trees and shrubs, and various garden fruits and flowers like the strawberry and the snapdragon, have formed year after year the nursery for the wild garden on the wall; so that the continued care of man has been needed for its maintenance, though it has been given perfectly unconsciously. This unconscious tendance prolonged through several generations kept up a steady annual sowing while time softened the fabric of the wall, collected a thin layer of soil in the joints and crevices, and nurtured a handful of the seeds which were strewn summer by summer on such an uncertain bed. We may notice in June or July the wall-flowers and snapdragons splashing the brick with crimson and purple, or the thorny arch of the wild rose swinging its pale pink blossoms against the sky; but only a purposeful examination is likely to reveal the minute variety of the plants and flowers in the wild wall-garden, and the haunting strangeness of their wild yet man-loving growth.



Some of them are sown by the wind, more by the birds that raid the garden, and a few by the wild animals. In the soft steady breezes of late spring, when the seed-pods of the

ripe wych-elm stream all day long from the boughs until the garden gutters are filled with their yellowish spangles, we can see how the wild wall-garden gets planted with some of its forest trees. It is the same in early autumn, when the sycamore keys spin their oblique downward flight; if a sycamore stands thirty yards to windward of the wall when the keys are falling, some of them are almost certain to alight on its crown. The likeliest landfall for dropping seeds is where the upper courses of the wall narrow in a shoulder to the coping; and here, if there is a thick rind of moss and the winter is wet and mild, in spring there will often be a heavy



SEED-PODS OF THE WYCH-ELM

sprinkling of little green sycamores parting their two seed-leaves from the embryonic stem. Those survive which can twist their rootlets into a crack between the bricks or stones, so as to suck a steadier supply of moisture; and here they develop a gnomelike growth of swollen and crooked limbs supporting a scanty crest of spreading leaves, so lowly that to the eye beneath they are lost among the weeds of the wall. If a young sycamore finds its way into a deep crack, it will sometimes start growing with its normal lusty angularity; but this is not the proper mood of the wall-garden, and soon brings disaster, for the serious fissure is revealed, and all the fairyland of many years' growth is swept away by the trowels of the clambering masons. Secretness is the essential note of the wild wall-garden; again like fairies or

children, the plants must play their game without the prying eye.

Wild birds sow most of the little trees and shrubs in the wall-garden; and even they act unconsciously, like the human gardeners that planned its first foundation. By the selective genius of the spot berry-bearing plants are especially favoured. Here grow both the wild strawberry crooking its neck over its red drooping fruit, and the garden strawberry already becoming a dwarf, but still flinging out its



runners in its own manner, and colonising fresh cracks between brick and brick. Raspberries grow sparingly and uncomfortably on the crests of walls; the arid site finds out their native preference for cool thickets and the wet northern hills. But gooseberries and red and white currants all thrive; they grip the stones with roots like eagles' feet, and ripen their fruit to a liquid glow in the warmth close to the wall. Little apple saplings lift their cool green leaves, but seldom attain flower or blossom. But among the garden fruits the wild berries of the shrubberies and thickets ripen in season; any berry that is loved by the birds gets its chance of joining the wild garden. Little hawthorns with muscular

spiny stems lift half a dozen green berries slowly turning to red in the summer heats; elders open a creamy cluster in June, that shines briefly upon the crown of the wall like the wild rose blossoms that vanished a week or two earlier. Small yews clamp their roots among the stones, but these do not produce flower or fruit; for fruiting an ampler growth is needed than they can attain on the scanty soil of the wall. Birds sowed the berries, and birds come again to feed on their produce. When the bullfinches and flocks of titmice



begin their autumn wanderings, they pause upon the crest of the wall to strip the scarlet hips of the wild rose; and the blackbirds warily watching till the coast is clear for a descent upon the July strawberry-beds peck impatiently at the dwarf red berries beside them, which whet their zest for the richer spoil below. The hazels and oaks that sometimes foster a growth of a few inches in the crevices of the wall are probably sown by mice or rats, and not by birds. Nuthatches and spotted woodpeckers will carry off nuts from the garden, and rooks acorns in much the same way; but none of these birds have the habit of resting on the garden-wall, as the marauding blackbirds do, or of hiding their booty in its

crevices, as the rooks will in the turf of the open fields and downs. But field-mice climb old walls freely, by the help both of fruit-trees and ivy; and they are great hoarders and forgetters of the food harvested in their nocturnal wanderings. Rats sometimes form regular runs to the tops of walls, especially when they are helped on their way by inner crevices and fractures; and they too are liable to drop or forget their booty, or to be killed before they can reap the results of their care.

The soil of the wall-garden is partly produced by the decay of the mortar and softer brick or stonework under frost and rain, and is partly a vegetable mould formed by decaying mosses and lichens. The mixture of this kind of leaf-mould with the calcareous weathering of limestone walls forms a soil which though scanty is kindly, and where both sunshine and rain are abundant the wall-garden throughout the summer is delicately gay. The thoroughness and secrecy of nature's system of seed distribution are emphasised by the sureness with which wall-flowers appear in course of time on an old garden-wall. Their small heavy seeds are certainly not wind-blown to each new site; we can only judge that they are carried by birds, like the currant and haw. Several of the finches, which feed variously on seeds in late summer and autumn, may well be distributors of the wall-flower; but there is no positive knowledge of this link in the garden chain. In their freedom from the control of the gardener, wall-flowers in the wild wall-garden tend steadily to return to their ancestral type, like London pigeons. The lemons and freaked scarlets disappear, and the stalwart tufts of the wall deepen to orange-brown and crimson. A native of dry cliffs the wall-flower thrives better on its spare new soil than such plants as the elder or the apple-tree. Its blossoms shoot dense and lusty, and shed a warm tide of scent in the

June wind fanning from the trees; but the exceptional drought of the wall keeps them sparer of foliage than when they shoot on a cliff, which has generally some percolation of moisture from the earth above or behind. They thus conform to the dwarf habit of the wall-garden, and are true to the scale of the spot, although within miniature surroundings; and with their dense stringy growth they have the



WALL-FLOWERS

stature of a flowering shrub rather than their herbaceous growth in the setting of a garden-bed. Snapdragons make mouths upon the wall, thriving like the wall-flower on stony perches; and here and there on old walls the spurred valerian flowers in bushy masses at midsummer, and draws the whirring hawk moths. Ivy-leaved toad-flax has a flower mouthed like the snapdragon, but is as delicate in all its parts as the snapdragon is lusty. This toad-flax is almost more the child of the wall than the wall-flower; clambering from crevice to crevice among the mortar it keeps a perfect

proportion in all its parts, whereas the wall-flower is apt to over-develop its flowers at the expense of proportionate foliage. The minute yet individual toad-flax blossoms are the most perfect expression of that miniature and fastidious beauty which is characteristic of wall-gardens, especially wild ones. As we trace this little plant wandering at the gaps of the wall, we lose our accustomed sense of scale, and enter mentally into a fairyland of new dimensions; it is the same as when we watch the ant toiling with its treasure of a crumb through the jungle of the grass-roots, or see the little gilded beetles of June launch themselves from the edge of the violet leaves like boys diving into a stream.

This toad-flax is said to be an exotic plant, but perhaps with no better reason than the Cheddar pink of the grey college walls at Oxford. The story goes that this pink was brought to England by the Romans; but the pink family are fond of rocky bluffs, and there seems no sure ground for doubting that its headquarters on the Cheddar cliffs are an original haunt. Pinks can endure a hot and thirsty site by means of their stringy growth and protective sun-livery of pale grey-green; stonecrops, which abound on old walls, store up water in their fleshy capsules of leaves against the fiery days. Both white and yellow stonecrops

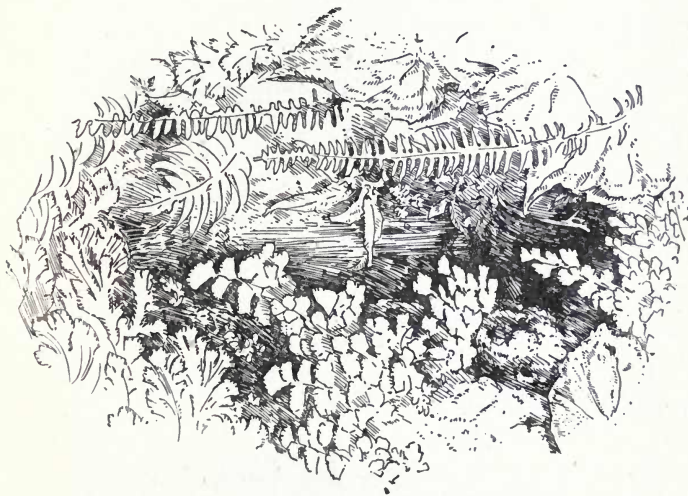


IVY-LEAVED TOAD-FLAX

delight in the tops of old crumbling walls. They are heavy plants, growing in thick mats, and cannot easily find a foothold on the perpendicular faces, as the toad-flax does. Both give a sense of jewelled coolness to the wild wall-garden under the sun; the starry yellow blossoms do not faint from the sunshine, but flash it back, and the white stoncrop has a snowy coolness. Yet for all the store of water in their oozy leaves they cannot endure too great heat, and perish suddenly in an exceptionally fierce July. Their cool green rugs draping the stones change in a very few days to the hot russet that we know in the first-fallen leaves of the limes—the unwholesome and unwelcome hue of vegetation not failing in its natural decline, but burnt up prematurely.

These sun-kissed wall-gardens make a strong contrast in the summer heats with the verdant but almost blossomless rock-arches where trickling perennial drops nurture a vegetation exempt from winter, frost, and summer sun. Here, too, as in the drier wall-gardens, there is a fairylike touch—a sense of something stranger, if hardly more exquisite, than resides in our normal roses and violets. In these wet wall-gardens the touch of strangeness is given by the preponderance of the strange old cryptogamous plants—the ferns and liverworts and mosses—over the blossoming plants that seem to look frankly at one, and to belong to an earth which knows man. These scaly liverworts seem alien survivals in the human epoch; they seem cognate with the giant lizards, and even to-day beneath the lowest bulge of their green scales there will peer up the spotted throat of the eel. Yet the film of uncanniness in such spots is thin and dream-like; it does not mar the essential delicacy of their beauty, or stain the purity and coolness of the falling water and the air. Fern-seed is proverbially magic stuff, and in these

secret gardens there is good store of it. The stone-fern and lady-fern hang together at the mouth of the little grotto, or at the drier edge of the dripping wall; and close to where the water springs there droop the long polished leaves of the hart's-tongue, and the delicate fronds of wild maiden-hair, brushed with spray-drops by the wing of the wren.



WILD WATERFOWL

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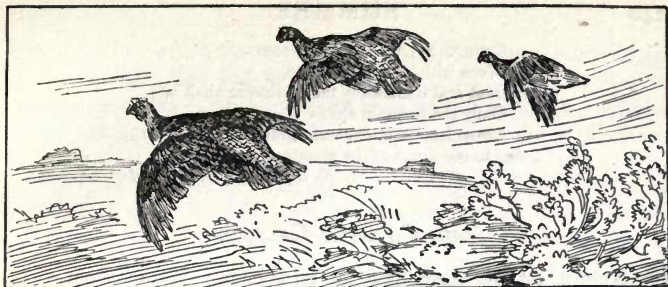
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AUGUST

'Yonder in the heather there's a bed for sleeping,
Drink for one athirst, ripe blackberries to eat ;
Yonder in the sun the merry hares go leaping,
And the pool is clear for travel-wearied feet.

Sorely throb my feet, a-tramping London highways,
(Ah ! the springy moss upon a northern moor !)
Through the endless streets, the gloomy squares and byways,
Homeless in the City, poor among the poor !

Oh, my heart is fain to hear the soft wind blowing,
Soughing through the fir-tops up on northern fells !
Oh, my eye's an ache to see the brown burns flowing
Through the peaty soil and tinkling heatherbells.'

ADA SMITH, *In City Streets.*

'The red grouse is scattering
Dews from his golden wing
Gemm'd with the radiance that heralds the day ;
Peace in our Highland vales,
Health on our mountain gales—
Who would not hie to the Moorlands away !

Far from the haunts of man
Mark the gray Ptarmigan,
Seek the lone Moorcock, the pride of our dells,
Birds of the wilderness !
Here is their resting-place,
'Mid the brown heath where the mountain-roe dwells.

Come then! the heather bloom
 Woos with its wild perfume,
 Fragrant and blithesome they welcome shall be;
 Gaily the fountain sheen
 Leaps from the mountain green—
 Come to our home of the moorland and lea.'

J. W. C., *British Sport Past and Present.*

THE COUNTRY CALENDAR

ON August 1st the close time for birds ends. You may not shoot grouse till the 12th, or partridges till September, or pheasants till October, but for the great host of birds it is presumed that nesting is over and the young are in their full powers when August opens. Perhaps some day other birds, especially duck, will be protected a little later, till grouse day. It would be an advantage. For summer is still summer, and the young still young. The sun shines hot and the nights are dewy cool.

The greatest change of the year, in regard to the face of the country, comes in August. It is the harvest month; and with the fall of oats and barley and wheat, and the ranging of the stooks on the stubble, the expression of rural England quite changes. The substitution of bare stubble for standing crops alters the way of life of many birds, and yet more of rats and mice. The little harvest-mouse, almost the smallest of all our mammals, which makes a tiny nest for its miniature self on a corn-stalk unbent by the burden, is often carried off to the stack where it lives with countless field-mice and some rats, quite pleased with the new quarters. When the truce ends on August 1st, migration begins. A few cuckoos went in July, and migration is in some sort a process without abrupt beginnings; but we may say that migration becomes an obvious thing in August, only less noticeable than the migration of men and women from London to Scotland. The swift goes, the cuckoo goes. In vegetation it is the most slumberous month of the year. The tide of growth is stiller than in July, and the activity of autumn change has scarcely begun. At the seaside, to which so many gravitate by natural desire, it is rather different. Deep-sea fish come nearer the shore, and the life of the pools about the beach is richer. There is growth too in the seaweeds, and spawn covers their surface and floats on the water in amazing prodigality. The downs have some of the freshness of the seashore. In August we see many more of the

small blue butterflies, the large blue, the holly blue, and others, than in any month. The bell heather is now at its best, and the close grass of the commons is dotted with harebell and potentilla. Mushrooms are among the gifts of the month, especially in Western England.

Lammas (loaf-mass) day, the 1st of August, may be said to begin the festival of corn harvest; and new wheat is still called Lammas wheat. As for the poets there is Burns's 'Upon a Lammas night, beneath the moon's unclouded light, corn rigs are bonnie.' There is a phrase too about 'Lammas floods.' The only other day in the month that has any popular name is the 24th, which is a favourite of the more hopeful weather prophets. It is said to cancel St. Swithin:

'All the tears St. Swithin can cry,
St. Bartlemy's mantle wipes them dry.'

Or again, less prettily:

'If the 24th of August be fair and clear,
Then hope for a prosperous autumn that year.'

There is said to be a regular succession of weather during the first half of the month: wet days followed by cold days followed by heat.

The average temperature: August 1st, 62.2°; August 31st, 59.9°.

The average rainfall is 2.35 inches.

August 1. Sun rises 4.24 a.m.; sets 7.48 p.m.

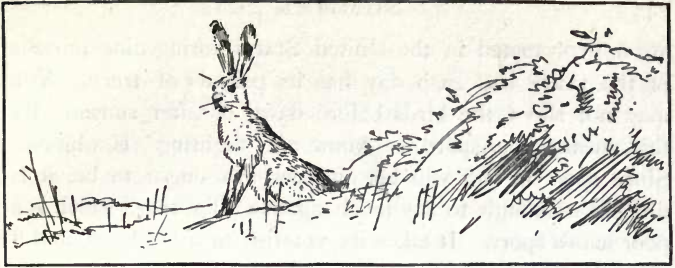
August 31. Sun rises 5.12 a.m.; sets 6.48 p.m.



CHAPTER

small but important, the large part of the body, and where there
is any more. The last section is now at the end, and the class
of the common is divided with the first and second. This
is among the first of the most important in Western
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THE ENDED TRUCE

FOR six months the game-birds have had freedom to build and breed unmolested. The sound of the gun has been rare. It is true that even in May rifles, if not guns, are busy here and there. It is still a common form of sport to shoot the young rooks soon after they make their first tentative crawl along the elm boughs; and rabbits, which breed at most times of the year, are shot in most seasons. But for the most part the spring and summer make a six months of truce, regarded more or less faithfully towards most birds and many mammals. In summer the truce is deeper than in spring in some regards. In the rough hill countries a May fox will be killed now and again; and the harriers and beagles are so often afoot in late spring that a protest against the hunting of heavy hares may be raised with pardonable iteration. In mid June foxes and hares, and some of the vermin, are tolerably safe from man. But in August the truce is formally broken. Happily many birds are now protected all the year. We are their permanent friends; and in England the list of these perpetual allies is steadily increased by the County Councils who concern themselves with the subject. Perhaps it would be better if in almost all respects the truce were longer. The duck, which are the first victims in England, and may be shot on August 1,

are now protected in the United States during nine months of the year; and each day has its periods of truce. You may not shoot the birds before dawn or after sunset. By this means the sport we know as 'fighting' is abjured. Since sport is and will be, and perhaps ought to be, it is difficult with logic to say much against 'fighting,' which is a poor man's sport. It takes its votaries to wild places, and it can only be practised with success by those who study the habits of birds as well as the swing of the gun. It needs a good eye and a shrewd sense of nature. But the 'fighting' of duck and birds of their sort is a daily migration to and from feeding-grounds and sleeping-grounds; and on this head is open to the protests made by those fine naturalists and sportsmen, Mr. Millais and Mr. Selous, against the shooting of caribou in Newfoundland. The sportsmen, so-called, sat on the line of migration and shot unhunted animals in cold blood. Such killing is not of a sportsman's sort. The evil of 'fighting' is that it interferes with the instinct of the bird and its scheme of life; and because it does this, it drives the birds from their native haunts, if frequently indulged. Yet there are strange wild places even in England where some sort of 'fighting' is a real sport. Even as early as August you may feel that the real hunting time has come if you stand some evening with a gun behind any slight obstruction on one of the South Welsh marshy moors. The curlew with their wild call come sailing in from the sea, and as they pass you can see even after sunset their long bent beaks clear against the violet sky. The heron calls. The green sandpiper rises with a snipelike call. A shot from the far end of the water sets a group of coot on the wing. They fly over you with the straight directness and impetus of a bullet before they swing on the first arc of a circle that will take them higher and higher, till they are

above the reach of shot. You had not thought the slow and sleepy coot—a sort of moorhen, after all—would make such pace and reach such height. Here the peaceful summer is clean forgot, and a wilder season begun, though elsewhere August is heavy with heat and summer sleep.

But this is not the scene of which most naturalists and sportsmen think when August comes. By what strange calculation the 12th became the day of the grouse no man can tell; but it is a better day for the shooting of grouse than the 1st of September for shooting partridges. It is very seldom that the grouse are not strong on the wing, and few birds seem to develop wing-power quite so quickly. Pheasants are hatched a month before partridges, and



YOUNG GROUSE

are not strong fliers even by October 1st when they may be shot, though they seldom are. They are the slowest to develop. Young partridges top the grasses in low flight at as young an age as the young moorhens slip over the surface of the water as if they were balls of fluff blown by the wind. But the grouse are even quicker than the partridges to attain real power of wing; and, of course, the young are very early fliers. One of those sights, not in themselves perhaps remarkable, which make a permanent impact on the mind, and remain ineffaceable, was a grouse's nest almost alongside an eider-duck's on a little isle in a West Highland loch. The young from the one crossed the water, and the young of the

other took the water as if they were akin to air and water from their birth. The shooting of grouse is one of the most attractive of all sports beyond doubt. It is amazing at a first experience to watch the coveys, flying as if they were in a picture with set wings, appear over the heather ridge, grow to a vast size in your eyes as if on a sudden, and then vanish behind you like a streak as if they had been dissipated into the moorland, and returned to the heather from which they were created. As so seen you are conscious chiefly of a shape endowed with singular momentum tearing past you like a shell in action. You note no colour. It is very different to flush a cock grouse as you walk across a moor with or without dogs. Every colour on his handsome body leaps to the eye, and you think what a splendid bird he is, too splendid to kill, belonging like the heather indis severably to the hill. He does, in fact, so belong in a very real sense. The red grouse is the one exclusively British bird. The one food on which he flourishes is the purple heather, and if the succulent shoots are not there at the due season he dies, as the young wild-duck die, when hatched before the insects have multiplied. He seems, too, to keep something of both the rich and dusky colours of the heath: he is subdued to that he works in. The willow grouse of other countries and the ptarmigan, that love the heights, change their heather colours for the snow colours. But the grouse is always constant to the tawny shades of the moor.

No signal of the seasons is obeyed with such headlong promptitude as the coming of August. Under the dark and grimy canopy of glass on a North London terminus you may infer the season with more certainty than most expert naturalists in the country. The war with the grouse is the occasion, but no one who has ever escaped from the stale

heat of a big town one August day, and awaked the next morning within call of the grouse, will believe that sport is the master cause of this exodus.

‘What is it steals the sportsman’s heart?
It is the conscious pride of art.’

No one can with honesty deny the power of sport over English people; and grouse-driving probably comes first in attractiveness and reputation. But August is a period when



an elemental force drives us away from towns to the sea or the moor, which has the scope and range of the sea. And the pleasure of a first day in the haunts of the grouse, whether the birds be few or many, is like no other change. Everything is changed and the scale of things is brightened. We may see a golden eagle ranging the slope, and happily the eagle is becoming once again a frequent bird. You may see the red deer, the wildest and shyest of all animals in the world. The tiger is tame compared with him. The smell of the bog-myrtle, where the dry moor degenerates in a hag,

sets going by its single influence a new train of thought. The moors are the right place for the human tribe in August; but they are perhaps even better worth a visit in July, and without a gun. The few birds that live in coveys are peculiarly worth observation; and you may see such a struggle for life and survival of the fittest as does not appear in the south. The grouse no doubt flourishes very much more than the partridge, which only preservation keeps alive. But the grouse has to exert more intelligence. She may, as we know, be forced to the device of carrying water to her young in the sponge of her breast feathers. The broods are hunted by the eagles as no partridge is pursued by sparrow-hawk or owl. An eagle, and indeed any mountain hawk, hunts with much method and persistence. You may see them quartering a hillside in a pattern of flight that would make a parallel diagram. They have the 'eagle eye,' yet even so they will pass within a few yards of a grey hen on her nest and not distinguish her from the inorganic stuff in which she disappears. But the eagle is a bitter enemy. His natural prey is the grouse, and a good many fall victims, yet the toll is very small; and if the year is free from disease, and that little parasite of the heather not overmuch encouraged by the weather, the multiplication of the coveys is amazing. Doubtless vermin are rarer in Scotland, as in England, than they were. In the country-houses of the north you will often find stuffed specimens of the wild cat, a real tiger of a cat, distinguished from its tame descendants by the even rings of the tabby tail. But it is some while since a real wild cat was seen in the Highlands, save for one or two in their last retreat. The marten is as rare as the polecat, which has disappeared in the south with astounding completeness during the present generation. The stoat is still busy, and when he becomes ermine, as

he does not in the south, he accounts for the death of not a few mountain hares, disguised for defence as he is disguised for attack. But the eagle is more destructive, and perhaps harder to avoid, even than the stoat; and native himself, he chooses in preference the native bird for prey.

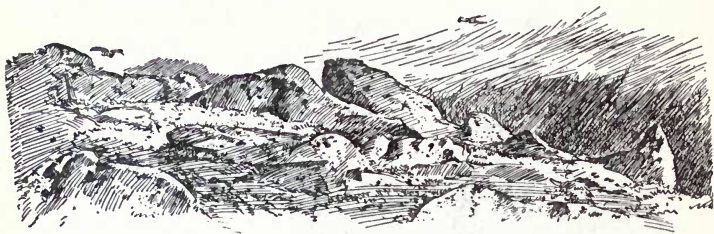
To a naturalist, at any rate, there is no change of air so stimulating as a change of flora and fauna; and did the grouse flourish in Surrey, as Lord Onslow and others hoped



they would, the 12th would not be the 12th in Surrey as it is in Skye. One desires to be 'up to the hips in heather,' as Christopher North says; and to get the taste of the season there is no better recipe than his.

— 'But let us off to the moor! . . . Towards what airt shall we turn our faces? Over yonder cliffs shall we ascend, and descend into Glen Creran, where the stony regions that the ptarmigan love melt away into miles of the grouse heather, which, ere we near the salmon-haunted Loch so beautiful, loses itself in woods that mellow all the heights of Glen Ure and Fasnacloigh with sylvan shades, wherein the

cushat coos, and the roe glides through the secret covert? Or shall we away up by Kinloch-Etive, and Melnatorran, and Mealgayre, into the solitude of streams, that from all their lofty sources down to the far-distant Loch have never yet brooked, nor will they ever brook, the bondage of bridges, save of some huge stone flung across some chasm, or trunk of a tree—none but trunks of trees there, and all dead for centuries—that had sunk down where it grew, and spanned the flood that eddies round it with a louder music? Wild region! yet not barren; for there are cattle on a thousand hills that, wild as the very red-deer, toss their

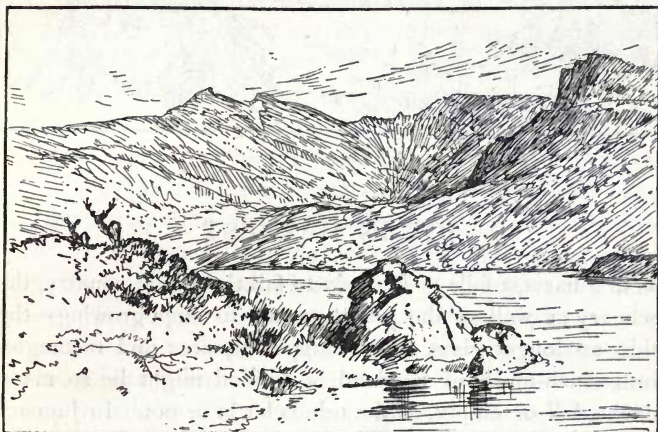


‘THE STONY REGIONS THAT THE PTARMIGAN LOVE’

heads as they snuff the feet of rarest stranger, and form round him in a half-alarmed and half-threatening crescent. . . .

‘. . . All these are splendid schemes—but what say you, Hamish, to one less ambitious, and better adapted to Old Kit? Let us beat all the best bits down by Armaddy—the Forge, Glenco, and Inveraw. We may do that well in some six or seven hours—and then let us try that famous salmon-cast nearest the mansion—(you have the rods?)—and if time permit, an hour’s trolling in Loch Awe, below the pass of the Brander, for one of these giants that have immortalised the name of a Maule, a Goldie, and a Wilson.’ How

much naturalist and nature-lover, how much mere sportsman, went to inspire Christopher North to his ecstasy, who shall say? And such mixed feelings drive most people on the northern migration.





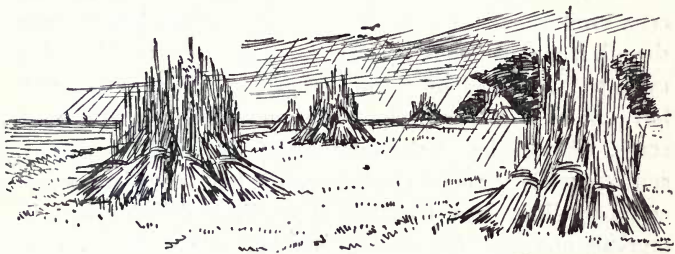
JOY IN HARVEST

WHEN harvest falls or is ready to fall the whole country, the scenery as well as the plants, seems to stop growing—the tide no longer rises. The dapper squares and rectangles into which much of England is divided might be so many docks, full or empty, as the tide is let in or out. In January the floor of the dock is covered with a green weed that has changed little in appearance, except to thicken somewhat, since November. As the suns lengthen the green grows and deepens; the tints are bluer and whiter. In place of weed there is shallow water in the dock. By the end of July as much water has been let in as the dock will hold. It is up to the edge. The corn almost makes the enclosing rim of the hedgerow to disappear. What were ridges, making each field into a pool, are lines almost flush with the inner square, and contiguous fields may seem a plain. In the fen country, where perhaps harvest is most splendid, for the crops are heavier and the spaces wider, the lines of division, being not ridges but indentations, disappear quite. Where the dikes are you see no more than a shadowy dip,

and the divided farms and fields become a great plain. On the uplands, as over some of the spacious Berkshire downs, the coming of harvest time is a growth of colour only, an emergence as in the daffodil's flower from green into gold. But everywhere in field, on plain and over down, the ripening of harvest puts an end to all sign of progress in the seasons. Nature takes a rest, watching for a while the prospect from the hill she has climbed before she goes down by another, a more precipitous route, to a second spring.

Every additional day of age adds to the risk that the corn crop runs. It can stand sharp and prolonged frost, though it may suffer if at all 'winter-proud.' It will endure even to be grazed by a flock of sheep. Wet and drought have no very apparent influence on the crop at the early stage. Scratching larks may make as untidy a mess of some patches as hens of a henyard, but the plant suffers curiously little; and even when starlings descend in their myriads and nip off a certain number of shoots, the plant will continue to tiller and send up a sheaf of stems from one root. But when the straw is long and the ear heavy, the wheat becomes tender and vulnerable. A July thunderstorm will have as much effect on it as the wind on a smooth sea, and leave it frozen into great scoops and waves. A much 'laid' field will resemble a contour map with its ridges and table-lands and sloping valleys; and you will be able to trace the passage of the storm even on the stubble after the crop is cut and carried. It is now doubly liable to attacks of both weather and animals. Even so unlikely an animal as a vixen with her litter will make a mess of it. The sparrows can conveniently perch on it, and it is only to the harvester that such a laid crop is difficult to manage. Even if he can drive his machine through it, and the weight of the laid and

tangled straw does not defeat the binders, he is not through his troubles. One of the master qualities of the wheat is its readiness to grow; it germinates 'if you look at it,' as a farmer used to say in the west country where rains are in excess, and it will grow without waiting to be sown. On occasion you may find much of it sprouting before it is cut, and while the ear is erect enough to be well clear of the ground. But it is in the stook that the mania for germination chiefly appears. If the rains have been lasting and the sunlight rare, a great part of a sheaf may



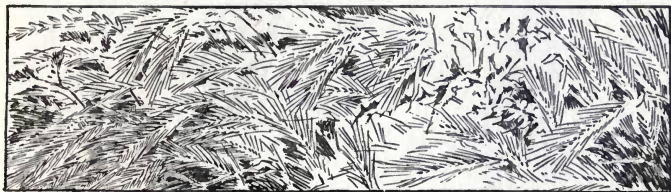
SPROUTING STOOKS

be so fastened together by the bonds of the growing shoots that the ears are inseparable. Almost every grain in every ear will have germinated and begun to grow lustily, feeding on the starch stored in the grain. Sometimes, especially in the west, you may see across the stooks a green film so vivid as to recall the verdure of a rice-field; and this home of tidily garnered wealth, neat as a room at the mint, grows as desolate as the thatched roof of a mouldering barn.

Such an untidy mouldering appearance may fall even on a standing crop if the season has been very wet and mild. Now and again the clover that should bide its

time till after harvest will shoot up and top the barley stems, as now and again weeds will top a Canadian crop. Instead of the graceful company of drooped heads, bowing to the season in level ranks, a muddle of contrary growths intervenes, and harvest and haysel uncomfortably commingle.

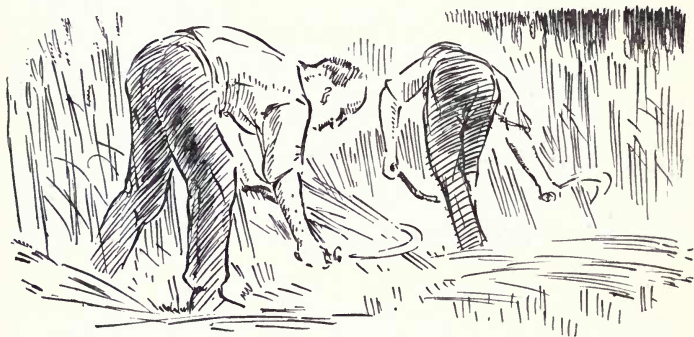
But, year in year out, the acres yield their three or four quarters if no more of grain, and the corn defeats its enemies if it suffers in the contest. The cutters-and-binders go through it, and the harvesters pitchfork the sheaves into stooks. It is told in a country place how a new landowner, of little



WILD BARLEY

country knowledge, was fretted in his energetic soul at the waste of labour and time, as he said, of stacking up corn sheaves in stooks in the field. He gave orders that the sheaves should be carted straight to the ricks as they fell from the cutters-and-binders. His orders, which made a good tale in the village, were of course disobeyed. If there were no need to let the corn dry and mature awhile in the sheaves to complete the ripening of the time of growth, harvest would lose a part of its most distinctive beauty. Few pictures appeal to the eye more impressively than the stubble aisles divided by the pillars of the stooks spaced with a regularity almost architectural. The scene keeps at the flood for a little longer the high tide of the year. Harvest is a shorter, a more

sudden festival, than it once was. We are robbed now of the sight of the gleaners, women and children who pitched a tentless camp on the stubble plain and went about, like sparrows at nesting-time, picking up straws, all busy, till even the midgets carried to the camp little snoods of corn, gripped tight at the neck, with a stiff bunch of ears for head and the straws stretching out in an extending circle like a long-waisted gown. The sequels to this scene are gone too. You no longer find half a cottage room packed



close with the little sheaves rising from the floor till they were pressed tight against the ceiling; and the joy of 'the gleaning loaf,' a bread sweet beyond comparison, is a forgotten thing.

Harvest is what harvest was, nevertheless. Perhaps it is a merrier festival than it used to be and hardly less elemental. Doubtless the sickle is of a comely pattern, and the swing of the body to the scythe is a rhythm no dancer or athlete surpasses. But in Saxon days, up till the coming of the machines, the first thing you thought of in harvest was the labour. How 'mortal men 'did 'swink and sweat' to

THE BEAN HARVEST

By HARRY BECKER



level these ears. They became for the time, as Jefferies said, gold-miners, sacrificing everything in 'the fierce race for wealth,' though the wealth was but lesser poverty. It was a cruel race too. If, in a team of mowers, setting out to mow in echelon, one man could not maintain the pace he was derided, and often worked himself almost to death to keep up with the heavier and stronger. There are old villagers still living who remember one or two such days as the very summit of endeavour, glorious but deadly.

What has succeeded this human process? One August day in the Midlands when the fields were white and golden, and the harvest hour had struck, an old farmer who had learnt new methods called his men out into the yard. 'There are the machines,' he said. 'There are the horses. There are the fields. I will give you £1 an acre to cut and carry and stack.' With wonderful dash and impetus and a quiet cheeriness the men set to work then and there. One man took a scythe, as of old, and cut a space round the gateway of the first field and alongside the rougher hedgerow to give the machines a start. The teams and the binders followed and flicked out the bound sheaves with a slick and busy precision till they lay in ranks like plants ready for bedding out in a formal garden. It was hot and blazing weather. The straw was evenly toasted from root to ear, not as in a wet season, when the drying of the straw extending from top to bottom does not move smoothly, but leaves green patches between the rather dirty yellows. The fields too were clean. There was no mixture of mayweed dirtying the base of the straw. No pretty but interloping bindweed ran round the stems intent to carry its pink flower near the light. When you looked at the standing crop in section, after the machines had cut a swath or two, it reminded you not of a copsewood of undergrowth, but of a clean fir plantation of straight trunks

and level heads, such as you see when the German government drills the forests into economic neatness. The men used the golden time to the utmost. You heard the hum of the machines when the silver moon was lighting the velvet colours of the west. In a trice the fields were levelled. The hedges appeared again as ridges, and before many days, so dry were the sheaves, the stackyard was as full as the fields were empty. The bargain was fulfilled, the money paid, and the farmer becoming master again was paying the ploughman a daily wage for turning the stubble to tilth.



SQUAREHEAD'S
MASTER

There are many harvests: the hay harvest, the clover harvest, the root harvest, the potato harvest, the fruit harvest, the seed harvest. The corn harvest itself is of many sorts. But there is one harvest of harvests. The crown of the year in England is the wheat harvest. When we speak of corn in England we think not of oats or barley, however wide their acreage, nor of maize, which is what they mean by corn across the Atlantic, but of wheat, the food of man.

Not once or twice have farmers to their own loss continued to grow wheat long after it was profitable, partly from custom, but partly too from the strong attraction wheat exercises on all who have traffic with the land. It makes the staple food of man, though there is no reason at all why it should; and it has made the staple food of man in many countries for many years. All the literatures are inlaid with bright pictures of harvest, and the joy in harvest

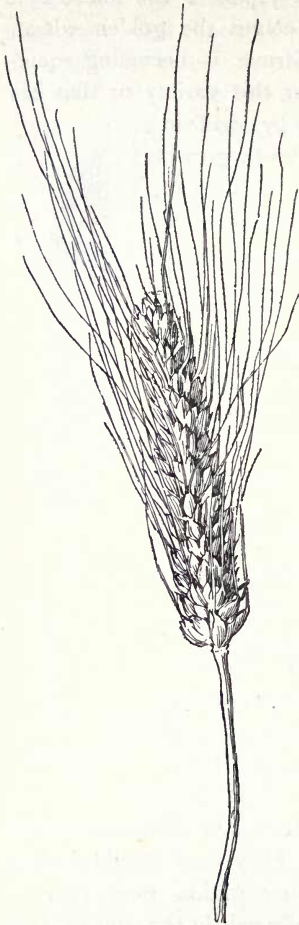
is one of the common possessions of mankind. Above the green rice that they transplant in Japan or the maize that brings wealth to the Argentine comes the golden wheat, the one plant about which the farmer is becoming something of a botanist. His care for this variety or that has followed the custom of sowing by drill in neat lines. In these days the newly grown wheat looks as regular as lines on a sheet of foolscap, and this neatness informs the whole crop till it falls. So farmers begin to hate the sight of a 'robber,' an odd variety that grows taller or lower or differs in the ear. The pure seed is demanded whether of the stout English Squarehead's master, or the wide-grained long French wheat, or the tapering Wilhelmina from Holland. You may detect a difference in the wheat harvest as you approach the towns. So vast is the quantity of sparrows which the town breeds that many farmers sow a bearded or Rivet wheat where the birds chiefly congregate. You can mark it from a long distance by the dusky almost blue look of the great stout ears on which each grain puts forth a sharp rough spear, making a *chevaux de frise* from which even the lustiness of the sparrow recoils.



WILHELMINA
WHEAT

Of the true wheats it is the colour that makes the splendour. They are real gold. They wear 'the burnished livery of the sun,' while the other grains, more shapely perhaps taken plant by plant, merely pale in the suns of July and August. A head of oats is delightful in form, whether they are the old Tartarean sorts which push out on one side

and bend in one direction almost like an opening fern leaf ;



PERCIVAL'S 'BLUE CONE'

or whether they hold their berries, two or three in a panicle, at equal spaces all round the stem. The husk and case of the berry is itself a graceful thing, especially when the black grain peeps out and the hold of the husk grows weak.

The barleys, of which Norfolk and Somerset are especially proud, have a grace that has appealed much to many artists. The flat barley head with its double row of grains and fine fringing awns appears not seldom in architectural decoration, and is altogether a much more decorative seed-head than the rough six-rowed barley that is seen here and there in these later days. But a field of oats or a field of barley has no comparison with a field of wheat, and gives small sense of harvest. The winter oats, which readily part with their grain if at all overripe, are often cut in July and a sort of

harvest begins. But now that horses disappear before

the more the oat crops grow fewer, and wheat is taking its place.

Perhaps one day these other crops will displace wheat, and harvest may mean a fruit or a vegetable or a root harvest. The straw is less precious than it was, though it is far from being burnt in England as it is on the great American and Canadian prairies. Rye straw is more valuable. Instead of straw there is growing need for the fibre of the flax which in Ireland, and here and there in England, makes harvest almost as lovely as if we reaped poppies. That curious partial little mustard harvest which makes patches of the Cambridgeshire farms almost too vivid to look at is spreading a little, and alongside we may often see the pink and white of buckwheat. Stock grow more valuable and need more green food, and the green crops are in their degree splendid, as you would expect from plants with bright flowers. What could be gayer than acres crimson with alsike clover or pink with sainfoin or mauve with other vetches, with tares or alfalfa, the cut-and-come-again crop, which we call lucerne. Of all the pleasant odours of summer none so overwhelms us with sweetness as the breath of a beanfield which carries further an even more delicate scent than the clover.



'A HEAD OF OATS

And most of these other harvests are murmurous with the hum of winged insects. It is an education in summer sounds to walk between fields of different clovers and vetches, as one may on some farms. On one side there may be a surge of continuous sound of hive-bees, on the other scarcely a note; and each crop will draw more or fewer bees in proportion to the depth of the flower. The hive-bees which exult in the white clover cannot penetrate to the honey of the new red clovers. Their instruments lack the length of the proboscis of the noisier bumbles, whose numbers, it is said, not wholly without book, make or mar the crop of seed clover.



But these crops for all their sweet scents and bright colours have not the charm of a wheat-field, where the flower is only visible as a dust and the fruit only visited by sparrows. Some of the charm of the full harvest remains even to the bristly stubble, with the shining grooves worn by the carrying carts and wagons. But a stubble-field, like fair Melrose, should be visited at night. The cutting of the wheat has been a calamity to the partridges and the rats and rabbits and the harvest mice. You may see this in a rather repellent form when the sporting characters of a village gather round the last rectangle of standing corn in a harvest, and armed with sticks if not with guns hunt the creatures that are finally driven from this refuge. But those that survive the calamity, or are not carried off to the stuffy but safe security of the

stackyard, find the stubble a very happy playing-ground when cleared of its encumbrances. Rats and mice both frolic about in the moonlight, especially in the Fen country. They come out from the dikes after sunset, and pick up food or even make burrows in the new stubble. It is a richer field for the partridges than was the standing wheat. Indeed sometimes the birds do not begin to flourish as they should till the corn is cut. If any one wished a post of observation there is none comparable with shelter in one of the last of the stooks in a stubble-field when the moon is full, and the night animals are playing and feeding, and the night birds hunting. How quiet are the owls till they split the silence of their flight with a hunting shriek, and how mysterious the rustle of the stubble stems beneath scampering feet. The foxes desert the hedgerow for the open field, and the utter tenuity of the bat's cry is heard far from buildings and trees.





BELOW THE TIDEMARK

THANKS to the moon and her tides we gain access twice a day by the sea-shore to the margin of that hidden region out of which it is believed that life came, and where it is fostered in such strange and multifarious forms. It is only a strip perhaps averaging a hundred and fifty yards wide that the sea daily bares, with a vertical depth as ridiculously disproportionate to the size of the Atlantic; and yet it is a world almost entirely different from our own, and full of unfamiliar shapes of life.

The herbs of the sea have no flowers, with the technical exception of the light green ribbon-grass which grows thickly in muddy shallows, and is a favourite food of the widgeon. Some of the seaweeds are like liverworts, and others like lichens, which are partly seaweeds themselves; but most seaweeds are quite unlike any form of dry-land vegetation. Where the tide rolls up at high-water mark a long bolster of tangled drift, the commonest seaweed is the bladder-wrack, with its rows of bubbles or blisters. It is common on almost any rock that the tide lays bare; and it belongs to the same frontier of the ocean kingdom that we are allowed to tread. Bladderwracks are seaweeds of the surface, and their bladders enable them to float at the level which suits them, whether they

hang on the rocks of an English cove or float on the steaming levels of the Sargasso sea. On the coast their characteristic place is between high and low-water mark, and we can hunt beneath them at low-water for prawns. On rocks above high-water mark, where only the spray dashes in storm, grow the small grey seaweeds that look like lichens, and are closely related to them. But at ebb of the spring tides, when the sea yields us a few yards more of its territory than usual, we may notice that the seaweeds on the lowest rocks are less often bladder-wrack than the smooth, strap-like plants of many shapes which are often known as oarweed. Oarweeds also grow in the deep rock-pools which form beautiful natural aquaria on the bolder parts of the coast. They are the seaweeds of deeper water, and need no air-bladders to keep them at the surface. Beneath the sea they form immense waving jungles to a great depth, with their own deep-water fauna; but most of them are still within the power of the upper air. An ordinary breaker is only a superficial ruffle of the sea, and its effect is felt for a depth of a few feet. But when steady gales out on the Atlantic have set in motion a great body of water, the movement of the ground-swell is much deeper, and its power often immense. All the boulders and shingle off the shore grind together with a noise which can be heard for miles inland; and then the oarweed of the deep water gets torn from its hold, and is cast up in huge masses. Coves are sometimes filled with weed to a depth of a yard after a heavy ground-swell, and the stench of the stuff in decay becomes an almost intolerable nuisance in creeks and havens. This green harvest of the sea gives some idea of the extent of the forests of oarweed which fringe our shores; and a toy picture of their luxuriance is to be seen in many of the deep, warm rock-pools on the coast of Devon.

Fresh green tints, like those of the plants of dry land, are not rare among seaweeds growing within reach of the light, but tints of olive are commoner, while many seaweeds are red. These red seaweeds resemble the rootlets of willows and other riverside trees which are washed by the stream; they too wear a red dress, instead of the green which is the normal colour of vegetation, or the brown or white of roots which are hidden in the soil. The same tint is seen on young shoots of the oak and rose and other plants in spring, while the ash-shoots wear a dark green not unlike the tint of many seaweeds. All these uncommon vegetable tints form a protection for the plant against the light. In the oak or rose shoots this shrinking is due to their tenderness, and the red tints disappear when the leaves are expanded and firm. Seaweeds wear a protection against the light not because it is strong, for it often reaches them veiled and softened by the water, but because their whole habit is that of plants developed in obscurity.

The contrasts of form and colour in a well-furnished rock-pool are perhaps no greater than that in a June wood, but both forms and colours are new. Oaks do not wave through the air in broad trunks several hundred yards long, as they would if they had the habit of this ocean vegetation; nor in the terrestrial fauna is there anything like the variety of the widely diverse orders of animal life under the sea. Instead of birds and mammals the sea-pools contain fishes, crustaceans and molluscs, sea-urchins and sea-worms, and primitive forms of existence which are little more than a stomach and a squirt. While branched corallines float in the crystal water, among the crimson and olive tresses of the hairy seaweeds; and as the blue sky is seen through the trees, so the white sand gleams through the clearings in the shining oarweed. The brilliant colours of the sea-anemones which stud

the rocks defy any reasonable explanation on grounds either of sexual or natural selection, and emphasise the primal tendency of nature to produce varied forms of beauty with which the laws of selection then proceed to work. Unmated organisms without eyes cannot be supposed to appreciate each other's beauty, whatever may be the case with sea-fowl or pheasants, and it has yet to be shown that the colours of sea-anemones serve a warning purpose such as is attributed to the bold markings of wasps and certain caterpillars.

The beauty of sea-shells is apparent to all ; and it tends to make us forget that every shell has been a home, or rather an intrinsic part, of a creature at least as wonderful. The living owner of a shell is apt to be regarded as a nuisance rather than an object of interest, and there is some excuse for this annoyance in its sulky and defensive attitude when disturbed. To watch the ways of living molluscs satisfactorily it is necessary to keep them in aquaria, or to study them on the shore with experience and knowledge ; but even a slight comprehension of their living habits adds enormously to the interest of their dead frames. Cockle-shells are among the soberest on the beach, with their plain white ribbing ; nor, when we find a pair of the empty shells cohering in the simulation of life, is it easy to regard the cockle as an agile creature. Yet it can move through the wet sand in which it lives with very tolerable rapidity, by thrusting out its fleshy foot and pushing itself backwards in a series of jerks. The long narrow razor-shells which we find strewn on sandy shores have the same habits and system of propulsion. These two shell-fish, like the oyster and the mussel, are diverse forms of the bivalve group of molluscs, which are not found on dry land, though the large fresh-water mussel is common in fresh-water lakes. But the dead shells about high-water mark and the live ones in the pools

and on the uncovered rocks also include a wonderful diversity of snail-like univalves—cousins of the inland snails of fields and streams. Their spirals are moulded in almost infinite variety. Even the whelk and periwinkle of the fish-market show a considerable diversity; the whelk belongs to the more elongated spirals, and the periwinkle to the rounder. Extremely contrasted forms are provided by the long pointed turritella shells, which look like the trumpets of sea-fairies, and the bright yellow houses of the sea-snail, in which the spiral outline is compressed to the smoothness of a pebble. One striking point of difference as compared with inland types is the thickness of most of these shells. To resist the beating of the waves they need far greater strength than the snails which dwell on land, or in the more even current of rivers. Inland snails have coats like egg-shells, but most sea-snails are defended like the kernel of a nut.

Yet not only the hard shell of the molluscs, but the rocks themselves, yield to the fret of other shells, and some of them among the frailest of their kind. Single shells of oyster or mussel or other bivalves are often found pierced with a neat round hole, as if meant for threading into children's necklaces. This is the work of the dog-whelk. The dog-whelk is a small species of whelk—it is reputed to be poisonous—with a thick smooth shell, which is often found prowling alive on stones and in pools. It is one of the predatory species of the beach, hunting for the bivalves which are apparently so safely sealed in their double shells. The dog-whelk sits on one of the shells near the hinge, and bores a hole to the fish inside. It thus paralyses the muscles which contract the shells, and when they gape open enters and feeds upon the occupant. To open an oyster is a sufficiently remarkable feat for a whelk not half as large as a common garden-snail. But shell-fish

frailer and hardly larger bore their way into many kinds of rock. Lumps of chalk and limestone on the shore are often seen pitted with numerous holes into which one can push the little finger; and sometimes the gallery is still occupied by the borer—a frail though rough white shell, like a large almond. This is the shell of the pholas, and it is frailer than most other marine shells because it is nested in these safe burrows in the stones. The secret by which the pholas melts the rocks is the same as the legendary method by which Hannibal split the crags of the Alps, except that it uses an acid secreted by itself instead of vinegar. It melts its way into the calcareous rock by dissolving it, just as the rivers of limestone districts fret out a subterranean path by means of the carbonic acid from the atmosphere. The most famous example of the work of these rock-boring shells is in the columns of the Temple of Serapis on the shore of the Bay of Naples, which sank till the shell-fish made their homes in the marble, and now stands dry again. The borers in this case were date-shells, which are near relatives of the common mussel.

Shells occupying exposed positions need to anchor themselves tightly to their hold. Mussels, which abound on almost every rock uncovered at low water, are bound to their place with strands of byssus spun by the animal. Limpets and barnacles are living synonyms of adhesiveness, and there is a magnificent simplicity about the limpet's method of attachment. Unlike the whorled sea-snails and the tightly closed bivalves, the limpet spreads its largest fleshy area on the rock, and sits under a conical shell like a bell-tent. The instant it is alarmed it draws the edge of the shell to the rock with the strong muscular band round its circumference, and is protected by its hard roof and by the forces of suction. Even if we were to bore a hole in the top of

the limpet's shell, and tie a string to it, the ingenious mollusc would still be as hard to remove as a leather sucker from the pavement; for it forms a concavity at the centre, with a firm band of muscle at the edge. 'Experiments have been made showing that a force of sixty-two pounds, or 1984 times its own weight, is required to detach it from the rock.' Not content with its power of clinging to any flat surface, it chooses a lair in some snug nook that fits its size, and retires to it as the tide leaves its rock dry.

Small white acorn barnacles stud almost every rock in the gaps left by the mussels; they look like a kind of natural rough-cast or deposit of lime. The great goose-barnacles are rarer; they are occasionally seen clinging in bunches to wreckage which has long floated on the waters before being tossed on shore. Like certain slugs they seem to have greatly outgrown their shells, which are attached to the timber by a fleshy stalk. From the shell protrude a dozen threads which constantly finger the sea-waters and collect small food for the mouth behind them. The belief still lingers on some parts of the coast that the barnacle-geese which visit us in autumn and winter are developed from these sea-creatures instead of from eggs. For all their primitive appearance barnacles are crustaceans, and comparatively high in the scale of life.

Shell-hunters know how the sea tends to drop dead shells not broadcast but in lines along the shore, and the same sifting action of sea-water in motion is evident in the beaches of shingle and sand. There is an order in all the sea's wildness, and less chaos on the wet beach than among the tumbled cliffs above. The frontal attack of the breakers drives the pebbles beyond the sand, and lifts the biggest pebbles to high-water mark; we walk to the sea at low-water through a succession of zones. There is the same

selective force in the run of the tidal current along the shore. Along the south coast each tidal wave from the Atlantic drifts the shingle eastward, dropping the small stones before the large. The most perfect exhibition of this process is on the great twelve-mile bank of shingle which forms the Chesil Beach. Instead of the nooks and capes of an ordinary coastline, the Chesil Beach forms an even curve where the process of sifting the stones can be carried out without the smallest interruption from cross currents and sheltering rocks. All the way from Bridport to the Isle of Portland the size of the pebbles increases regularly; and behind the great barrier of stones, in a still lagoon, lie hidden the bays and headlands of the original coastline.

Sand is the finest dust of the sea's floor; it is the residue of the hardest and most insoluble rocks, and of broken sea-shells. Sea-sands vary in colour in accordance with their substance. Pure white sands are formed either of white quartz or of sea-shells; other quartzes give varying shades of yellow, while the grit from rocks stained with iron gives certain sands a tinge of red. Brown sands are usually due to an infusion of mud; but the waste of granite rocks forms sands of a cool speckled brown which is pleasantly novel to the eye accustomed to yellow sands. In certain spots on the coast the sea seems to have the faculty of disgorging sand from its depths, almost inexhaustibly, while the winds pile it up into drifts which endanger the land. The moving sand-hills on both coasts of the Bristol Channel have at various periods eaten up farms, churches, and villages. At times the drift of the sand changes, and the sea lays bare again what it covered; but the only sure way of checking such inroads of sand is by planting the dunes with marram grass, and afterwards with pines and other sand-loving vegetation. Below the tide-mark the peril corresponding to the drifting sand-hill

is the devouring quicksand. Quicksands may be defined as water holding sand, instead of sand holding water in the ordinary way. The stuff is too liquid to support weight, and yet too tenacious to allow the embedded man or animal to extricate itself. Imitation quicksands can be made by working the sand beneath the foot till the concentration of water softens the mixture; in some sands it is possible, for experiment's sake, to embed one's leg nearly to the knee,



and to drag it out with a difficulty which explains the clasp of the genuine quicksand.

The orderliness and cleanness of the sea find an exquisite expression in the unspoiled air of freshness which is found in every cove after the fall of the tide. The sands scrawled and trampled six or eight hours before are spread as smooth again as if man had never trodden them; the rocks drip from their new bath, and the water in all the pools is freed of the light scum of fine sand and other impurities which settles on them even in the fresh air of the shore. Where an eddy sweeps round a cove as the tide falls, the sand will be left standing smooth and convex, with little trenches on the lee-side of all the rocks. But where there is a steady onward ripple the sand in the shallows preserves the ripple-marks.

They recall the clouds of a mackerel sky, and the likeness is not misleading. The rippling pattern of many cloud formations is due to the undulating flow of a current of warm air at the level where cold causes condensation. The crests of the waves are chilled into cloud, while the troughs retain their free vapour. The undulations of the sea in the breeze are registered in the floating layer of sand, which keeps, when it solidifies, the print of the last ripple that touched it. Though moulded by a momentary ripple, and obliterated in the normal course after a few hours, the ripple-marks on primæval beaches have yet survived in stone among the fossils of ancient rocks. Where blocks of ripple-marked sandstone overhang a modern beach, the contrast adds a doubly sensitive charm to the sands bared below at each tide.

The essential beauty of the sands is in their cleanness and freedom, and they need adornment even less than the clean turf of an old lawn. When we tread them at low-water most of their resident life has gone into hiding, either beneath the surface or in the pools scooped by the falling tide. But their smooth expanse is flecked with signs of activity which suggest the hidden vitality of the spot. Sea-worms have thrown their casts of sand like the heaps of the earth-worms on a lawn, and their number is suggested by the abundance of these little piles after each tide. In the wet sand near low-water mark the flexible tubes of the terebella emerge on the surface like large caddis-shells. The bristly sluglike sea-mouse, occasionally seen striking out of the wet sand, is a larger and more rapacious worm. Jelly-fish evaporate in the sun to a mere patterned film, and the track of the star-fish leads like the print of a rope to the pool under the weed-hung pile where it found a refuge as the tide fell. The nettlelike sting of the larger red and purple jelly-fishes is

one of the few animal perils of our temperate shores. More dangerous, though even rarer, is a cut from the black dorsal fin of the little brown weaver-fish, which lurks near enough to the surface of wet sand to be occasionally trodden upon by bathers. Now and then the spiny back of a sea-urchin protrudes from the sand, as a testimony to the antiquity of so much of this ocean life. Ages before man was yet framed these urchins were laid bare on the sands by the morning's tide. On the chalk downs above the Kentish shore

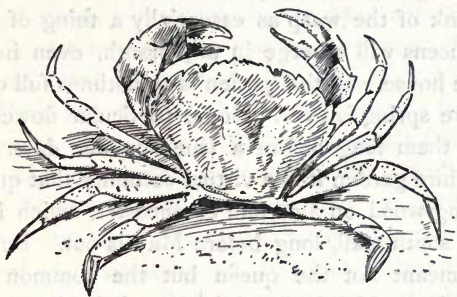


THE RISING TIDE

we can find half a dozen fossil sea-urchins in flint on the same morning as their living descendant.

The purity of the sea is partly ensured by its brine, which reduces the offensiveness of all the offscourings of the beach and of dead fish and fowl cast ashore. But there is an enormous army of scavengers perpetually at work, turning dead matter into wholesome living flesh again by consuming it as fast as it perishes. The activity of gulls above water is paralleled by that of crabs beneath it. Crabs are perpetually on the watch for food of almost any kind, and will strip a fisherman's hook of bait time after time with almost comical rapidity. They sidle about the shore in all sizes, from the little creatures like tarnished sixpences which rest in the cracks of the shallowest rock-pools to the densely mailed warriors caught in deeper water in the crab-pots. All the

many species are almost equally alert and voracious, and chiefly differ in their methods of protecting themselves from enemies. Some hide in the sea-weed fringing rocks, and others in wet sand; they sit in the sand with only their eyes pricking the surface, or burrow into it hind part before, and vanish almost as quickly as a sand-eel. The hermit crab, which takes refuge in the cast-off shell of a mollusc, is ingenious but degenerate. He has the birthright of a nimble crustacean, but exchanges it for the clumsy protection of a snail-shell. This unworthy incubus hampers his naturally active movements, and has constantly to be renewed as he grows.





THE YELLOW WASP

RICHARD JEFFERIES used to say that though our swallow does not make a spring, our wasp does make a summer. Perhaps we do think of the wasp as essentially a thing of summer; but the queens will emerge in any month, even in January within the house, and the garden is sometimes full of queens long before spring is over. Some particular flower or bulb will lure them long before a true summer date. In one Hertfordshire garden it is a virtual certainty that queens will be gnawing wood on a certain cotoneaster, which is trained against a south wall, long before May is out. But perhaps Jefferies meant not the queen but the common wasp or neuter worker, which is certainly one of the least fallible of all signs of a particular date in advanced summer.

More than this the wasp in her very colour suggests hot days, and yellow pollen, and ripening fruit, and the noise of the summer hum over the grass-heads.

The wasp nevertheless is not welcomed even as an earnest of hot weather. But even that really terrible creature, in guise and bearing, the rare super-wasp, which we know as a hornet, is not altogether unlovely. A true tale of an individual hornet's cleverness and persistence may serve

to persuade those who have a horror of these creatures that they are at any rate interesting. An idle watcher marked a hornet digging at the bottom of a hole in a piece of decayed wood, either with a view of making a nest or carrying away material for a nest. In the temporary absence of the insect the watcher stuck a needle across the entrance of the hole. The hornet on returning strove mightily to remove the needle, but even her double jaws were useless. They could get no grip on the smooth and polished surface, so, after a while, as if in despair, the hornet flew away. She was absent some twenty minutes. It seemed that she had gone 'for good.' The needle was on the point of being withdrawn when the hornet flew back and began to work with her jaws at the needle, not pulling and hauling, but, as it appeared, mouthing. Soon it became obvious that she was coating the needle with wax or some waxy substance. It was laid on, as a man may put resin on his grip, to provide a surer hold. The policy was effectual, and presently by means of the adhesive plaster the builder could apply her enormous strength to some purpose, and pulled away the obstruction.

Such an action is evidence of some capacity very near reason. At any rate it is an indication that the hornet, the greatest of the wasp tribe, has an adaptability quite remarkable among insects. People usually perhaps dislike wasps too heartily to observe them with much interest. They certainly add a terror to life. Within some favourite haunt, such as the side of a Norfolk stream or broad, they may destroy all the pleasure of an else perfect place and time. On a hot August day they will swarm into the cabin of a wherry in such hundreds that existence is unbearable, and flight is the only safety. Occasions are on record when they have driven ploughmen from the fields at a later date. It is a quite repellent experience of very late

summer to pick what was once a fruit and find it a barren chamber, full of heavy and ugly creatures, stupid with the excess of what they have eaten. They fall to the ground as if wingless, and crawl and tumble there helplessly. The instinct of the preservation of the race has abandoned them, and they eat till they die, often never again returning to the hive. But this phase, which is only a partial phase, is of a later date.

Generally, from the point of view of an observer, there is no creature who, may one say, gives you more for your money than the wasp? The more you watch hive-bees the deeper you are plunged into the abysses of a splendid self-sacrificing, almost intellectual socialism; but everything is at this stage in the insects' development cruelly accurate and mechanical. The wasp is above all things adaptable. With every experiment you evoke new arts; and, *experto crede*, the wasp is the less angry and venomous of the two insects.

A description of many hours of observation spent lying down on the side of a hot bank in August will disclose some of the secrets of the wasp's art, of which little can be found in any text-book. The nest was made in a favourite site on the side of a bank. A mouse had made a hole there in the winter, when food was scarce, in order to get at the bulb of a daffodil. Such was the inference from the state of the bulb when found afterwards behind the nest. A terrier in pursuit of the mouse, which it scented only less cleverly than the mouse scented the bulb, had considerably enlarged the hole one winter day. In May a queen wasp, driven by the sense of her own fertility, adopted the hole, cleaned it up a little, made her paper cells, laid the first eggs, fed the grubs, and in due time the workers coming out to help her a very large nest with four big layers of cells came into being.

On first watching, at the time when the nest was already big though not at its biggest, the outstanding fact was the

work of the navvies. Wasp after wasp came out of the hole carrying lumps of earth, most of them, to suggest a rough average, about as big as No. 4 shot. Some lumps were as big as the head of the wasp. All the smaller lumps were carried clean away. So far as could be seen none was dropped within fifteen yards of the nest. It is probable that the wasp must alight before letting go the burden. In order to watch the wasp more easily a small red currant was



THE WASP'S NEST REVEALED

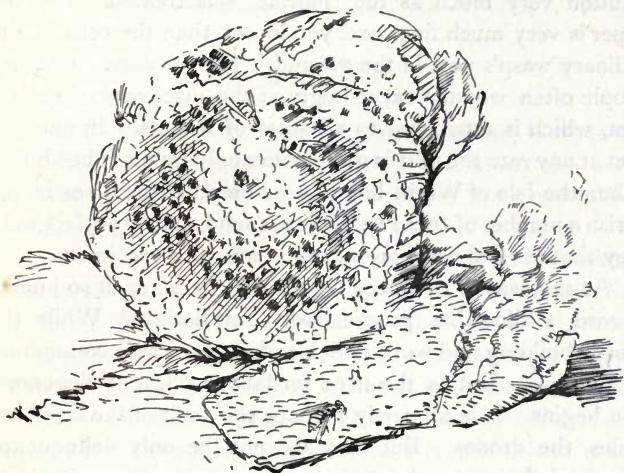
dropped into the hole. Within a quarter of an hour a wasp appeared with the currant in her jaws, and as soon as she reached the entrance she took flight with the usual abrupt impetus. She was watched by several pairs of eyes, and the burden was not deposited within twenty yards. Why the animal should put itself to this superfluous labour is not clear, unless physically she is not able to let go till she settles; and if many navvies alight close to the nest they might announce the secret of the site. Sometimes the lump was too heavy for the power of the wings to support. In that case after several efforts it was let go, and generally

rolled down into a little scooped hollow in front of the nest.

The power of these navvies and their industry is admirable enough, but the wasp as navvy is a clumsy creature to the wasp as mason. Through the earth, guarding the nest in the bank from profane eyes, several holes were driven. Within twenty-four hours each hole was always repaired so thoroughly that no draught could possibly penetrate, sometimes so thoroughly that you could not tell where the hole had been. Finally, a great part of the earth-wall was removed, so that the side of the nest was disclosed; but the wasps did not shrink from this immense, this colossal work. A separate gang, not very numerous, was told off; and it was easy to see exactly how they proceeded. They were so busy at the work that they did not appear to notice peering eyes, even within a few inches. The method was never formal or regular, as is a hive-bee's work. Each mason brought with her a pellet, a little load of earth. As this was held in the mouth against the bit to be repaired, some saliva or other chemical substance was exuded, so that you could see the hard little lump soften; sometimes it seemed to bubble with the moist application. When it reached the right consistency, became 'tacky' as manufacturers say, it was pressed on partly by the feet, partly by the mouth. But the mouth served the part of trowel. When the mud was lengthened out into a ridge of mortar, often about an eighth of an inch in length, it was always shaped by passing the mouth to and fro along the top. Often a very neat and comely bevel edge was left. When a considerable space had been covered by this process, the effect was of a piece of frozen earth. There were just the same sort of frost patterns, and the whole surface had a hard, half-polished, cement-like appearance. In an astonishingly short time the work was very completely

finished, in spite of no apparent plan or definite co-operation. If you look closely at any wasp's nest you will see that the alighting floor or front of the passage is all treated by this sort of cementing process. The knowledge of it is not specially developed to meet accidents, but is a part of the equipment of the wasp's normal instinct.

This masonic work is, of course, not at all comparable with



WASP COMBS

the manufacture by other wasps of the hanging paper nests. It is a question whether any insect or other animal makes any home, indeed makes anything, quite so light and delicate as the hanging wasp's nest. The comparison is doubtless unworthy, but the colour and in one aspect the consistency suggest nothing so much as a very perfect cigar ash, though the colour is rather more lichenous. These glaucous spheres may be compared with the contour of a chaffinch's nest or a long-tailed tit's, but both these are very solid

structures. The wasp's nest one is afraid to touch lest it should crumble like an ash, and fall in dust. Yet it is strong too in its degree. The bigger ones which are rather rarely found carry quite a fair weight and admirably serve their nesting purpose. It is curious how very little has been seen of the building process. They are made, as one may see, of paper, which is wood-fibre, treated with a chemical solution very much as the 'mortar' was treated. But the paper is very much finer and yet looser than the cells of the ordinary wasp's nest in the ground. It is *de luxe*. Country people often wonder exceedingly at the discovery of such a nest, which is attributed to all sorts of insects. In one district at any rate the nest is quite commonly found in bee hives. When the Isle of Wight bee disease emptied the hives in one parish a number of these nests were found, and so perfect were they that several were preserved as museum specimens.

As the season advances the wasp's character, if so human a word is allowable, progressively deteriorates. While the nest is building and work is demanded the whole community is laborious. But as the need for labour slackens degeneration begins. It is all partly perhaps the fault of the late born males, the drones. But they are not the only delinquents. The food changes. As August advances the wasps begin to fall with fury upon other insects, especially flies, though they will also clear off blight. If you are much abroad in a garden in August you will scarcely avoid seeing some unfortunate fly seized, beheaded, and dislimbed, with a mixture of fury and precision that is diabolic. The trimmed corpse is carried off to the swarm, for the corporate spirit is not yet dead. But from this time the feeling for the society weakens, till finally each is for himself; and hundreds gorge themselves into extinction in the rotting fruit, before the queens have gone into hiding, or the less greedy of the workers taken refuge on the ivy bloom.



A CHANGE OF DIET

ONE of the most novel of local migrations among birds is the evacuation of the towns by sparrows just about the same date that society likes to leave. Our towns are a protection, organised on a vast scale, for certain species of birds. The suburbs encourage starlings and carrion crows, among others, but both town and suburb breed sparrows in almost appalling quantity. The seven million of inhabitants in greater London are a handful to the sparrows of greater London; and the comparative number of sparrows is even greater in the Midland towns. But the town birds are not quite faithful to the towns. They have learnt to nest in the towns in any sort of site. They have even taken to living at this season in flats, like 'intensive chickens.' More than once one of those lumps of untidy hay and straw and string and feathers in which the sparrows' eggs are laid has been found to contain two or more nests. Sometimes these strange erections have fallen by their over-weight of untidiness added to the natural burden. Occasionally mere vexation at the spectacle of the bad art will cause such a nest to be overthrown. The cock sparrow is either more irritable or more tidy than the hen. On one occasion he showed such irritation at the protuberance of a long straw from his nest, built on the side of a

house in Kensington, that he tugged and tugged until, amid the laughter of a group of observers, he pulled the whole structure in ruin over his head, and the two fell in avalanche together. The towns provide sufficient building sites, and on the whole sufficient food. But when the young are well fledged a certain desire of fresh fields comes over a considerable proportion of sparrows, especially those in the Midland towns. Whether food grows scarce or whether they desire fresher food is not clear, but when August comes and the corn is whitening to harvest the birds flock to the country. They go a-harvesting for a summer holiday.

This marauding expedition is on a great scale. The birds are as thick as midges about the edges of the fields, eating grain with a greed hardly less than that of the trout at Mayfly time. It is one of many severe charges brought by the country against the town that the streets breed these birds to the destruction of the staple industry of the country. The habit appears to be new, at any rate in its present dimensions. It is a result of the progressive dominance, in mind and fact, of town over country.

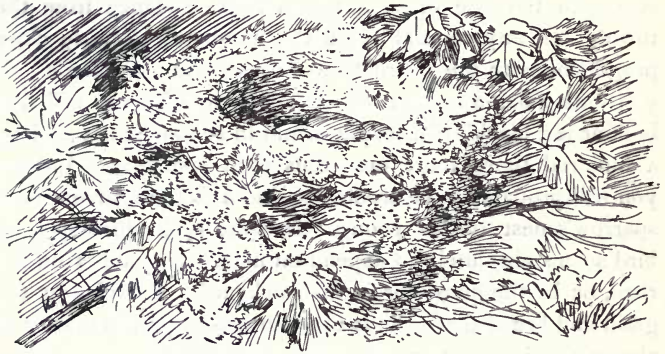
But apart from this particular migration of sparrows it is remarkable, though not very much remarked, how the food of birds alters with the progress of the seasons. This is largely, of course, a matter of necessity. You cannot have woolly-bear caterpillars at Christmas or ripe corn in June. But instinct and physical needs work in co-operation with the seasons, and our own birds are those which have the instinct and the bodily adaptability to obey the almanac in their dietary. Even the sparrows in spring enjoy animal food. All young things seem to need insect food, and to grow faster the more of it they can get. But as the young reach their full growth in summer the desire dwindles in those we call the grain-eating birds. Sparrows do not eat insects for

more than about a month. Partridges begin to prefer grain about the same time as sparrows, but they excel the sparrow in adaptability. When the grain is gone they take to an exclusive diet of green stuff, so that one could tell tolerably closely from the contents of a crop what was the date of the year.

The country as such is not popular with sparrows. In thinly populated grass country you may search some while before finding a sparrow. They are, for example, singularly scarce in the Isle of Wight at a short distance from the towns. In any country place the numbers will be in close proportion with the nearness to houses and stackyards. If you walk along a hedgerow between two fields you will find bullfinches, blackbirds, thrushes, and in summer the warblers, a hundred times more numerous than sparrows. Indeed, you will probably have trouble to find a single sparrow or a sparrow's nest, old or young. In spite of its lustiness the bird seems absolutely to depend on man. Its food is on the road, or by the house, or in the stackyard. Fortified by the grain and bread that it finds there in quantity, it is master of almost all birds that are.

Within the stackyards it has one almost invariable companion, the greenfinch, a bird as lusty, and if anything more voracious. The bird is probably one of the three or four most numerous in England. All those who have looked for birds' nests in east and middle England will have felt from time to time a growing irritation at the quantity of greenfinch nests. The rather untidy basins of moss and bents, with the rather dull eggs, are as obvious and many as blackbirds' and thrushes' nests in an earlier month. The bird is bolder in some ways than the sparrow. The writer has more than once fed the old bird while sitting on the nest. They will not dream of leaving the nest though a group of people

stand talking and laughing within a foot or two, and the nest is little hidden. But if you would see this finch in real multitude you should watch seed-crops in East Anglia when the ripening hour is near. One has seen them on mangold seed as thick as starlings in winter, and those who shoot to protect their seed find that the slaughter of several hundred, even on a half-acre plot, makes no apparent difference to the army. They seem to have a peculiar affection for mangold



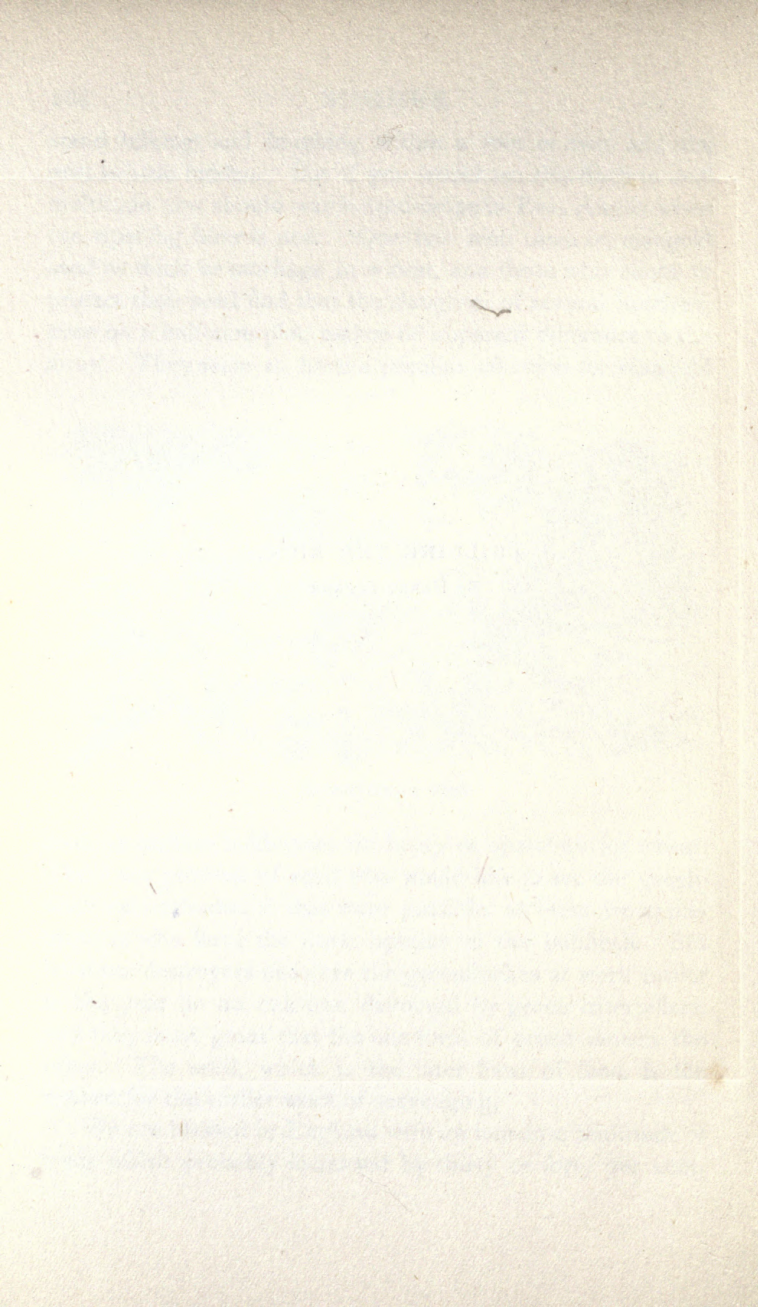
A GREENFINCH'S NEST

seed, as captive bullfinches for hemp or sparrows for wheat. There are growers of seed who would like to see the greenfinch exterminated if that were possible, as there are apple-growers who have the worst opinion of the bullfinch. But let these destroyers once see the greenfinches at work earlier in the year on an oak-tree devoured by green caterpillars, and they must grant that the one form of greed cancels the other. The seed, which is the later form of food, is the reward for the earlier work of scavenging.

We are blessed in England with an immense multitude of birds which probably increased by thirty or forty per cent.

BUILDING THE RICK

By HARRY BECKER





between 1895 and 1914, thanks partly to protection, partly to a wider interest in birds, partly to a series of mild winters. But as numbers have increased feeding habits have a little changed. More birds certainly now turn their attention to fruit as summer merges into autumn. Sparrows and blackbirds will peck small holes in apples, probably for the sake of the moisture. The blackbird always has a tendency to fruit-eating. He is as devoted to strawberries and raspberries and currants as the greenfinch to vegetable seed or the goldfinch to thistle or corn-flower seed. But this apple-eating habit is perhaps on the increase.

As the rooks grow over numerous they become more grain-eating than is their wont. Early in the summer a common sight is the rooks' hunt of the daddy-longlegs emerging in quantity from the grasses. They will hunt grubs of all sorts in the cornfields, and eat a certain amount of seed-corn. But when they are in overwhelming numbers they will now and again, but more often on the Continent than in England, deliberately fall to work on the corn, and even develop the taste of the carrion crow for young birds. The ill effect of excessive numbers is seen markedly in wood-pigeons, but both species are essentially useful even in considerable numbers; the rook for his destruction of larvæ and the pigeon for his happy taste in buttercup bulbs. The sparrow's taste is permanently perverted in some places by excessive numbers. In one particular village the sparrows have acquired a taste for the flowers of the wistaria. In most towns they fall upon the crocus petals in spring, and intermittently snip off pieces of any sort of flower. But that perhaps is rather an act of wanton damage, the sport of a restless creature rather than a form of mawkish appetite.

It is sometimes not easy to find the reason for some

eccentricities of diet. Many visitors to one orchard were shown as a marvel of growth a line of plum-trees which had come out into fresh green leaf in August instead of in May. Many conjectures were offered. The real one, only known to the owner of the trees, was that every single bud, leaf, or flower, had been quite cleared off by finches, not as one might have expected by tits or bullfinches or haw-



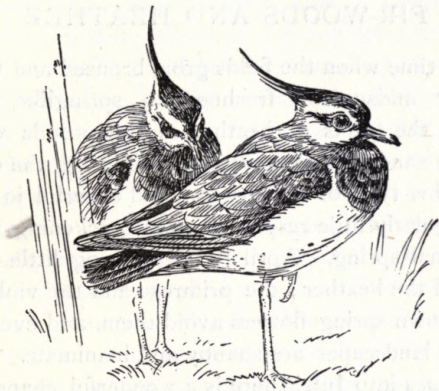
'THEY RIP UP THE PODS'

finches, all of which have at times a natural taste in buds, but chaffinches. It was feared that the trees would die, so complete was the clearance. In May they were as winter trees, robbed of all leafage by the sudden unexpected onset of these finches. Were the birds overcome with desire for green food, or were the buds infected with some insect plague? It is a question unanswered in this case, and in most of the instances where finches still attack fruit-buds.

Doubtless a garden interferes with the feeding instinct of birds. These exotic and artificial tit-bits are a disturbance of wild ways. In one part of the Isle of Wight the egg-sucking, bird-killing jays descend every year upon the rows of peas. They rip up the pods, and are so fond of what they find inside that they can scarcely be frightened off the rows even by sight of a gun.

A more steady unbroken instinct possesses the summer visitors, indeed all the migrants. The warbler and swallows, the cuckoo and flycatchers, leave us first and foremost

because the insect food grows scarce. With less constancy the fieldfares and redwings and some other winter visitors come for particular berries. Our own birds must live by their wits, taking the foods in their seasons, and, when competition is very keen or temptation strong, trying new sources. But whatever they try, all of them perhaps do more good than harm, if all do not confer the inestimable benefits of the green plover, which we may take to be the prime benefactor.





FIR-WOODS AND HEATHER

ABOUT the time when the fields grow bronzed and the woods loose their midsummer freshness, a springlike brilliance matures in the tracts of heather and fir-woods which are common on sandy and gravelly soils. Though the evergreen firs keep this type of scenery gay and cheerful in winter, it makes singularly little response to the quickening influences of the normal spring. April and May bring little change to the firs and the heather; the primrose and the violet and all the best-known spring flowers avoid them, and even in early June these landscapes are shabby and inanimate. Then, as June increases into July, there is a wonderful change. Like a dammed-up stream the withheld forces of nature burst forth with multiplied power. Every pine bough stands tipped with a new tassel of lustrous green, and this green contrasts with the brilliant purple of the sheeted heather. Both the green and the purple are colours charged with a singular intensity; if the music of a shepherd's flute seems to breathe in the colours of spring willows and April cuckoo-flowers, the firs and heather blow a trumpet-blast. And yet they have the unstaled freshness of true spring growths;

their colours are unlike the sere photography of the dog-days, or the decadent splendours of autumn. They combine spring tenderness with summer maturity, and they compensate by this peculiar brilliance in July and early August for their dullness in the earlier part of the year.

In the whole of England and most parts of Scotland the firs are a modern addition to the landscape, which is therefore a mixed product of nature and art. The Scotch pine or fir—it is strictly a pine—had long been extinct in England when in the seventeenth and eighteenth centuries it began to be planted on the heaths of Windsor Forest and the sandy Surrey hills. Before that the heather was usually unbroken by any tree, except where a few birches, hollies, and hawthorns were scattered on the ridges, or alders and sallows formed brakes in the wetter hollows. Oaks grew in the damp valleys that fringed the heaths, where the soil became more clayey, and the heather gave place to grass. Furze and broom dotted the heath in brakes, and the broom-squires or half-gipsy squatters on the heath made brooms and besoms first from the broom-plant itself, but in later years chiefly from heather or birch-twigs. The changes introduced by plantation, and the choice of the fir and heather countries as residential districts, have altered both the aspect of the landscape and the rough and isolated old life. Except where they are commoners with recognised rights the heath population has lost much of its living, and more of its rough old ways. Carts laden high with new birch-brooms still trail in from the Hampshire heaths to the Berkshire river-towns, but their ware is the product of a changed economic system, and they drag on their way through an altered landscape of the columnar pines.

The firs seed themselves so quickly that they are perpetually colonising the heather slopes beyond the limits of

the enclosed woods. There is a marked difference between the young woods, where the pines are fighting their way, and the old plantations. Among the self-sown saplings the heather still grows thickly and almost undisturbed; the young pines toss among its billowy outlines like green buoys in an impossibly purple sea. In the high woods the heather, overshadowed, is moribund; it grows in limited tracts where the light falls in, or creeps in a thin occasional growth. Often the floor of the woods is bare, except for the pale carpet of dry needles, out of which the ribbed trunks rise in their red ranks. But sometimes the fir-woods are full of tall bracken—tall because of the trees' shelter and its own straining towards the light—and these woods are the most haunting of all. The bright green fern, the dark green whispering roof upborne on the high red trunks, with their silver stains—this makes a shadowy forest stranger and more like fairyland for the absence of the usual birds. Birds are scarce in all the heather country, and scarcer still among the pines, and in July the pine-wood is a place where 'no birds sing.' Where a wood is thin enough to let the sun enter fairly freely, but the heather is not too dense, sometimes the rose-bay willow-herb will fill it in July with a dense mass of purple blossom as brilliant as the bloom of the bell-heather, though of a more tender shade. Sometimes, too, there are foxgloves, and they have another shade of purple, rosier than the bell-heather, but more heather-like than the rose-bay.

Three kinds of heather or heath are common on English and Scottish moors, besides the Cornish heath which cloaks the bleak moors of the Lizard. The most widely distributed is the ling, which forms the bulk of the vegetation covering many moors, and provides the chief food of the grouse. Ling has a starry blossom of a lighter and more delicate purple than the common bell-heather; distant moors where it

THE EDGE OF THE WOOD (SURREY)

By TOM MOSTYN

THE LIFE OF THE LORD

BY THE REV. J. H. W. H. W. H.



prevails have a more subdued and tender glow. It grows on many commons and rough fields where the bell-heather is unknown. The common bell-heather is also known as the fine-leaved heath, while the cross-leaved heath also has bell-shaped blossoms, but rosy instead of purple. It is the common bell-heather which stains the July heaths of the lowlands and the high moors in August with their most brilliant purple dye. As the blossoms pass over they wither



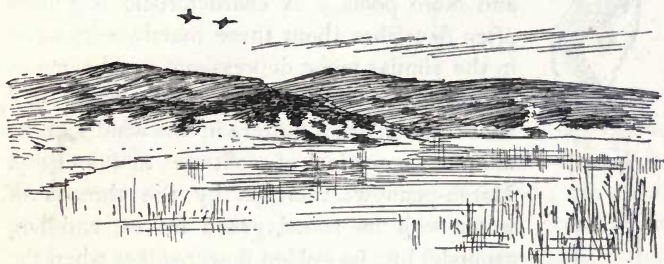
and grow rusty-red, first at the tips and later entirely. When these rusty blossoms mingle with the purple of the full bloom, they produce the sheets of crimson which often stain the more distant tracts of heath in a moorland landscape. The rosy cross-leaved heath does not grow in uninterrupted carpets like the purple bell-heather and the ling, and is not abundant enough to have much effect in painting the landscape. It prefers slightly moister ground than the other two species, and generally grows in slight depressions where water often collects, and at the base of tufts and islands of the purple heather and ling. Its leaves are delicate and hoary, in keeping with the soft pink of its bells, and individually it is the most attractive of the three species. In the

wetter patches of the moor it grows among the bleached and tangled ribbons of the flying bent-grass, which covers wide tracts of moors and mountains with its pale growth, and forms what hillmen call the 'white ground.' If we cross the moors on a windy day in winter, when the heath-blossom is all dead and the foam creeps and mounts at the leeward edge of the shallow and open pools, the flying bent breaks beneath our feet and streams down wind at every step. Then its name seems vivid and accurate, though there may not appear much meaning in it on the spring and summer days when the curlews nest in its hollows, and the tit-lark hides among its tussocks.

The rarer heaths occur mostly in the far west of England and Ireland, where they are outposts, or it may be relics, of a Spanish flora which follows northward after the warm Atlantic winds and the Gulf Stream. The common furze is another and more widely spread example of the same class of plants. There are five or six species of these western heaths, all very local, and particular in their choice of soil as well as of climate. But visitors to the Lizard in Cornwall will not have to look long for the common Cornish heath, which is abundant on the flat, bleak moors that cover the mass of serpentine rock forming the south of the peninsula. It has a shrubbier growth than the common heaths, and its vivid stems and leaves recall the stringy stems of the common hairmoss. The blossoms are rose-red and rather small, and the plant is on the whole less attractive than the bell-heather; it has not their fine economy of stem and foliage in proportion to bloom. White heather is not a separate species, but merely a variety which occurs fairly frequently on moors where the three common species abound. In the case of the ling the lack of pigment in the blossoms often goes with a paler and yellower growth of

foliage. White specimens of the purple bell-heather are the scarcest. The pink bell-heather lapses more easily into white and many shades of pale rose.

On many moors the soil itself adds strong colour to the heather-clad landscape. The peat which forms on the sandy and gravelly soils lacking in lime sets a black background in gaps of the purple bloom ; and where the sand is scarped in pits, or washed into steep banks by the rain, it often introduces a striking contrast. The crumbled silica of the rock on the east Yorkshire moors gleams white like



FRENSHAM POND

quartz, and the tertiary sands of the southern English heaths are also white where they have been exposed to rain and wind. Mixed with peat-dust this white sand becomes a cool grey ; but the predominant colour is a hot, raw orange-red, which, when exposed in a sand-pit, makes a violent and surprising contrast with the mantle of purple above, and makes the green of the bracken cool and welcome. As the hill-roads in the chalk-country wind in long white ribbons, the by-roads on the southern heaths stripe their purple with yellow and red. Round about stand the deep green fir-woods, with toothed crests cutting the summer sky ; and presently we may come to a dip in the orange and purple heaths

where the blue sky is mirrored in a wide heath-pool, dotted with cool white swans.

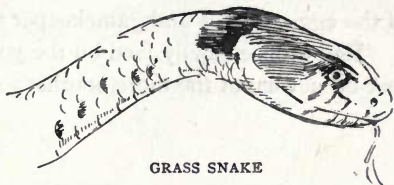
Natural lagoons are common in the southern heaths, and others, such as the Frensham ponds, have been formed by damming little streams and drowning a tract of the waste. The natural pools are formed by much the same agencies that produce the peat. Both are caused by lack of drainage in the soil; and the acidity of the peat tends to cake together a layer of the underlying sand, and so to check drainage further, and cause more peat and more pools. A characteristic bog flora often flourishes about these marshy edges and in the similar moist depressions on the moor. Sundews trap flies with their hairy leaves, and white cotton-grass flutters in the wind with its unique suggestion of solitude and sterility. Marsh-pennywort creeps by the threads of water with its round green leaves, and bog asphodel lifts its golden flower-spikes when the heather blooms, leaving withered red stems to mark its place on the winter moor. Both the drier and the wetter parts of the heath are



GRASS SNAKE

haunted by snakes and lizards. Green snakes hunt frogs in the wet tangle about the edge of the pools, where the air lies warm and dank on summer days; and adders and blind-worms bask on the sand among the heather. Their cast skins are found knotted among the heather-stems, in which they entangle themselves so as more easily to twist free of the old husk. The rare smooth snake—our only poisonous species besides the viper—is also chiefly found on the southern English heaths. Dry sunny slopes of the heath are the chief haunt of the common lizard; but we seldom catch it basking, as we can the adder or blindworm. Small and defenceless

it relies on wariness for safety, and by the time that we catch sight of it a grey-green shape is wriggling actively into the heather. The scarcer sand-lizard, which lays eggs instead of producing living young, is also confined to the fir and heather country of the south of England. Gilbert White described in one of his Selborne letters the beautiful green lizards seen on a sunny bank at Farnham; and there the brilliant sand-lizard has been recently re-discovered, and a link with the days of Gilbert White restored.



GRASS SNAKE

It is worth mention that neither of our English lizards is of the same species as the little reptile so commonly seen on sunny walls in the south of Europe. The common southern lizard does not appear to the north of the Alps, whereas our common viviparous lizard is far

hardier, and pushes to the north of Russia. One more scarce creeping beast is found about the pools on the



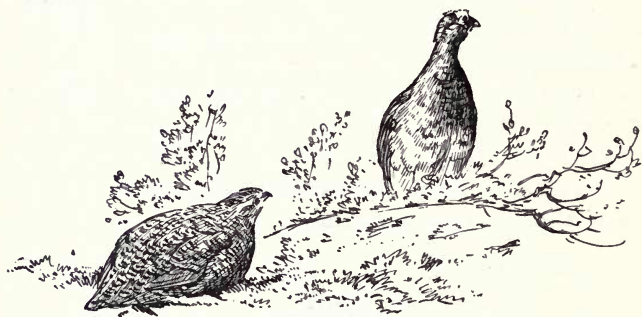
GRASS SNAKE

southern heaths—the natterjack toad, which is distinguishable by his small size and the light stripe down his back, and can be tracked by his lusty croaking after sunset. Besides common toads and frogs, newts are also common in some of the heath-pools in spring, though a dense slimy pond on a clay soil is the newts' particular fancy.

With all this variety of reptile and amphibian life, the animals and birds which prey upon it should not be lacking.

Both foxes and otters haunt the borders of the pools for the sake of frogs. But smaller and slower hawks are the great devourers of snakes and lizards, and most of them have long been killed off in their old haunts. Though the hen harrier has vanished from the heaths, the ash-coloured or Montagu's harrier has happily nested repeatedly in recent years on the Surrey heather hills, and may re-establish itself if the egg-collector and gamekeeper will spare it.

Red grouse chiefly feed on the young shoots of the ling, but do not haunt the more southern districts in spite of the



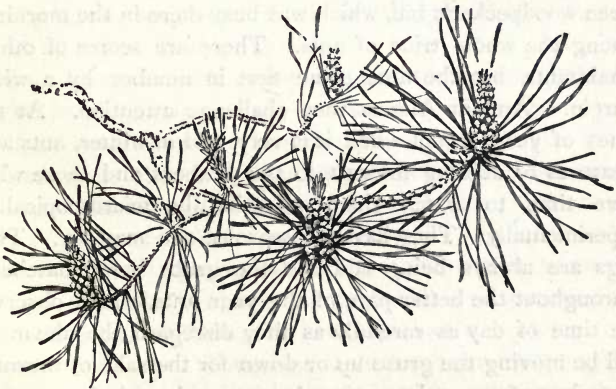
abundant supply of their food. They are a northern species, most closely akin to the willow-grouse of Norway. Black game prefer scrubby heaths and the borders of farm-land, where they can find their more varied food; and formerly the blackcock and greyhen bred in many heather districts in the south as well as in the north. They are still to be seen in some parts of the New Forest, though they would very probably have died out by this time if they had not been reinforced by drafts from the north. Heather-shoots seem a dry and harsh fare for the grouse, except for a few months in summer when they are young and tender; and in

hard winters and late springs grouse do appear to suffer from the poverty of their diet. The recent investigations into grouse disease strongly suggest that it is not caused by a



BLACK GAME

specific bacillus, such as Professor Koch claimed to have discovered, but is primarily due to want of nutriment. The parasites which abound in the grouse's interior then sap the strength of the bird in its underfed state, and it wastes to death.





THE SACRIFICE OF WINGS

IF you would realise how the ground seethes with insect life you should lie prone some hot summer day on a lawn cut close, and yet not overmuch trodden. In congenial places and times every foot of it is inhabited. You may even hear the slight but sharp sounds made by many of the company. Homeric battles are fought there. A yellow ant will drag a black ant over towering heights and into abysmal depths. Dead bodies will be rescued and carefully carried home. The signs of catastrophic issues appear in the marks of the green woodpecker's bill, which was busy there in the morning among the whole tribe of ants. There are scores of other inhabitants, but the ants come first in number by a wide margin. And in August they challenge attention. At all times of year, except when it is very cold in winter, ants are creatures of abiding interest to the Hubers and those who have time to watch them scientifically, microscopically, experimentally. They have no seasons, one may say. The eggs are always being laid and the grubs being hatched. Throughout the better part of the year ants, which observe the time of day as carefully as they disregard the almanac, will be moving the grubs up or down for the sake of warmth or coolness from an hour after dawn to an hour before sunset.

There is no creature that so scientifically uses the sun's heat and light for the sake of health. The ant is always a fascinating object of observation ; but it is only in August that it becomes, so to say, a part of the summer scenery, a common object, a being of the air as well as of subterranean places.

Most countrymen once or twice at any rate have seen a cloud of flying ants. The sight is more curious than a swarm of Mayfly in June or a migrant horde of bees. The speed of the flight is one of its marvels. One looks upon the ant in general as an almost subterranean creature, wingless, rather heavy, and so busy with mundane things that there is no room for the enjoyment of unessential exercise. We study them as members of advanced socialistic communities, endowed with strange instincts and social affections. They work for the tribe; they recognise friends and fight enemies; they communicate all sorts of news by strange signs and touches; they save their friends from drowning or other hazard; they keep their milch cows in the ant-hill, and foster a strange inexplicable association with wood-lice. All this and much more is recorded of the ant community, and when we see the animals in field or garden they seem to answer to their description.

So it comes with a new surprise, even upon those who have spent years of study on the ant, to see one day in August a vast swarm of queens and kings mount into the air with a dash and speed that seem to excel any other winged thing. The wings, which are in fact very long and of most beautiful construction, have become the master member. They glint and sparkle in the sun as the whole concourse shoots upwards at a frenzied speed till it disappears, and you might think that you had mistaken sun motes for a horde of insects. The flight is a marriage flight, such as Maeterlinck described with almost extravagant ecstasy in his

history of the honey-bee. And as with the Mayfly the flight is composed of many males and some few queens. Presently all will tumble down, as one has seen a pair of bees tumble, and the ground receives a shower of ants, the drops spread so wide that it is invisible.

In August ecstasy is short-lived; the winged hours are brief. To see the ants we must return to the roots of the grasses. All of them become glued to the ground. Most of the winged crowd lose, as it seems, desire for life now the climax is reached. Idle and half-helpless winged things are scattered about the grass, preparing to die. But among these are some who are preparing to surrender not life but freedom. The dying horde die within the shroud of their wings. The survivors, burning their boats, make ready to surrender the wings on which they have enjoyed the freedom of the air in order to recover the freedom of the ground. The act is to all seeming conscious and deliberate. In the actions of insects there is ever appearing some odd symbolic suggestion, and among the most suggestive is this shedding of the wings by the mother ant. Possibly at this date the wings may grow a little loose in the socket, or begin to cause some physical irritation; but what you see is an animal, possessed of the most splendid and lovely member that is given to any creature, deliberately and with effect ridding herself of the gift in order that she may attend to lowly and more necessary duties. Getting rid of the wings is a most laborious affair, and there seems to be no established or instinctive method of doing it. However the stiff short grasses of a lawn are as useful as anything else. You may see these self-sacrificing insects scratch and rub their wings against the blades, trying to force them off in this cumbrous manner. They bend the wing this way and that, fold it under their body by a complicated grip of the legs. Finally, after a score of apparently vain efforts

the lovely veined diaphanous thing, beyond the reach of manufacture, is tumbled into the roots of the grasses; and shorn of its chief beauty the ant goes to the labour of the nest.

No doubt the queen bee makes a like surrender. After that ecstatic dash towards the sun she lives for the most part a housewife's life and a slave's life till the end comes, when a young queen is preferred before her. But she does at any rate keep the engine of flight, if she does not use it. The winged ants are sometimes handicapped by their wings long before they come to the time when irritation or a sense of duty drags them to surrender. If you open a busy hill to watch the organised industry it happens now and again that the winged ant, seeming always more aimless than the rest, will attempt to walk away from the circle of the nest. Not once or twice we have seen one of the self-constituted keepers seize the truant and drag her back incontinent. For such purpose the wing provides a most useful handle. The tip is grasped in the jaw, and the whole twisted this way and that quite regardlessly of the owner's feelings, who stumbles anyhow back to the nest in the wake of the keeper. One cannot see that the wing suffers in the least. It must be of the strongest tissue, but even then it seems to be a burden rather than a heaven-sent engine of flight. This use of the wing as a sort of handle belongs to the earlier part of the summer. When the queen is hauled back to the hill in August the contempt of the wing is more roughly expressed. The worker ants, socialistic Marthas not without envy, seem always to have a grudge against the wing; but it is not till the marriage flight is over that they anticipate the self-surrender of the queen, and themselves nip off the wings before they take on themselves the office of jailer, and prevent her escaping again from the subterranean home and prison. One might mistake them for wasps nipping off the

wings of a fly in murderous greed rather than for handmaids insuring the future of the race under the instinct of duty.

Many nightflying insects are, as it were, secretive of their power of flight, and parsimonious of it. They keep it in reserve for use at moments so rare that many people never discover that the crawling creature possesses such a member at all. More than this, some of the creatures that have the loveliest and the neatest wings affect for the better part of their short life a gait, a mode of motion, that almost suggests the curse on the serpent. In spite of its legs the earwig looks almost like a little worm, that should live better on the ground or under it during the whole of its life. How many countrymen who would regard the earwig as one of the most familiar of insects have never even suspected the presence of its wings, though they are visible even when folded along the back and half hidden under the case, which is itself a rudimentary wing.

But now and again on late summer evenings you may see quite a host of earwigs abroad on the wing, and at such times they will appear in upstairs rooms in numbers which suggest a mystery to those who have looked on the earwig as a groundling. It is hard to see why animals possessed of such beautiful and effective planes should use them so seldom, but flight in this species, as in some of the ants, is peculiarly associated with the marriage ceremony; and only at the breeding season do we see earwigs in any number on the wing. Both male and female use them at other times, but it is seldom; and most of their migrations are made by that 'fussy wriggle' which suggests the serpent tribe. They sacrifice their wings by disuse.

It is only in the final stage, when maturity is reached, that the wings are fully developed, for the earwig drags out during the days of its active life that metamorphosis which

is so startling in the butterflies and moths. From the egg—which the mother earwig hatches almost like a bird—is produced not a grub, but apparently a creature of the same general pattern as its parents; but the wings are missing. It grows like many creatures—like the spider or the woodlouse—by successive moults, and the wings appear only at the end. These moults may be said roughly to correspond to that slow unseen development when it has passed from the grub stage to the pupa stage. We see in this insect as a process what appears in the butterflies a sudden transformation.

The peculiarity of the wing of the earwig lies in its folding capacity. It resembles a little in this some of the beetles and the ladybird; but it excels them all in complication and neatness. One may not seldom find a beetle in trouble with its wing. The diaphanous hinder wing refuses to be pulled under the hard forward wing or case, and there is a struggle in the packing. The earwig's wing is rather like one of those old-fashioned circular fans which were pulled out and into a hollow case. The ribs and tucks are elaborate and well marked; and are not contracted into their narrow space solely by one reflex action. As a rule, probably always, the earwig turns up the tail backward and uses the two pincers—curved in the male, and nearly straight in the female—to tuck the last folds under the case and along the back.

Of many insects it is true that they only appear beautiful when our eyes are helped by the microscope; but the earwig, which is usually regarded as ugly, if not abhorrent, is large enough to disclose its beauties to the naked eye if we look close. The antennæ are then seen to be of a complicated beauty; and it is worth a long watch to see the creeping thing open and close its silver wings when the dusk of a summer evening, which is the creature's high noon, tempts to their use.



THE HEAT OF THE SUN

THE general verdure of English summers gives an added vividness to the tanned landscapes of drought which recur every few seasons some time between May and September. The grass in the open fields loses every glint of green ; from a ridge of hills overlooking a clay plain only the bronzed hedges and the brighter line of the sedges by the winding rivers diversify the dull papery whiteness of the burnt-up pastures. Under the torrid sun the whitey-brownness of the dead grass is some shades paler than we see it in March after a frosty winter ; and now there is the contrast of the green boughs of trees and bushes, whereas in March the boughs are bare. This contrast gives the landscape a topsyturvy look, as if in a photographic negative. We are accustomed to see the full body of colour in the sward, with the green of the trees of less importance ; but now colour has fled to the boughs, and the earth is blank of verdure, and has only a stricken sense of drought.

Stridently green as the trees appear against pastures turned to biscuit colour, they wear a very different green from their full verdure of May. In every summer there is a date when the trees suddenly become dark and bronzed,

after two or three days' hot sunshine, that definitely marks the turn to summer from spring. In drought this bronzy darkness is intensified. Sycamores—so exquisitely fresh when the buds first slip their tissue wrappings—in the days of the dogstar show blacker in the landscape than pines in winter. Elms and ashes in the pastures, beeches in the woods, and apple-trees in the orchards, are almost as swarthy; and the twisted hawthorn bushes are as black as they were white with bloom a few weeks before. It is a landscape of southern Europe transferred to England, yet with a difference. In a typical English landscape there is no such background of bare and rocky hills as usually seems waiting anywhere in the Mediterranean watershed to send a thirsty glitter through the summer heat, and make the whole scene appropriate and natural. The soft green contours of our hills testify to a moist and fostering sky, and give an uneasy setting to the waterless lowlands. The even expanse of Kentish or Midland pastures is an obvious adaptation to a climate which will grow a real turf sward, such as is absent from Continental lowlands; and although the turf is not as dead as it looks, it is dead enough to give an unhomely appearance to the landscape.

Instead of cicadas which shrill the more joyfully for the fiercest heat, our fields have little blue butterflies, which are gravely disturbed by excess of drought. When the pastures grow scorched, and possibly the nectar in the flowers more thick and thirsty, blue butterflies wander away in search of water. By nine o'clock in the morning, long before the hours of greatest heat, they flutter in crowds on the moist gravel at the edge of brooks and ponds, or suck up the spillings from the farm water-carts in the village street. Common white butterflies slake their thirst in the same way, and the anxious flocks of blue and white insects titillating

the moistened earth with their suckers is one of the most distinctive features of strong summer drought.

Expedients of thirsty birds and animals often recall hard winter frosts, when the earth is sealed by our climate's contrary extreme. Rooks and jackdaws, debarred from probing in the soil, haunt refuse-heaps in the fringes of towns, just as they do in a hard January; and in the heat and glare by the railway line, they bicker over greasy sandwich papers containing scraps of passengers' lunches thrown from the carriage windows. Moles dive deeper



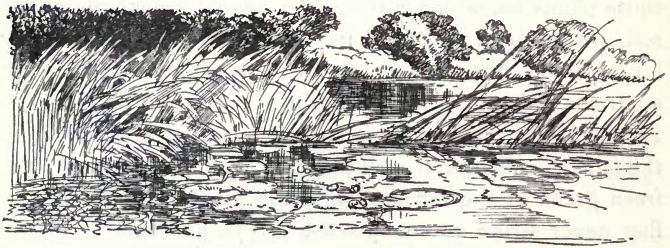
into the earth, as in frost; but sometimes they take an opposite course, and thrust their way above ground in the crumbling surface layer of the soil in rides in woods, and among the roots of the grasses. They probably find beetles in such places; hedgehogs hunt the same spots after dusk, and beetles certainly form a large part of the urchin's diet.

In blazing July weather most wild flowers cut short their development of foliage, and concentrate their stunted energies on blossoming and the ripening of seed. Plants of swift annual growth from a shallow root, like the common mullein and the fennel, grow to hardly half their height in a

sunny and thirsty year. On the other hand the seeds ripen more lustily, and the garden seeds of a hot dry summer are often noticeably more productive than those of a damper year. Plantain leaves outspread upon the gravel in shady places grow dry and curled as even the shade becomes torrid, and bring a sense of dishevelment beneath the boughs. Only those plants thrive which have deep roots striking to moist layers of earth. The hottest summers often stimulate the profusest tufts of yellow summer foliage on the bronzed crowns of the oaks, and in the sere fields suckers of elm rise thickly from the lateral roots. Nor do those plants fail which, although of annual growth above the soil, are fed by a perennial root-stock. Bryonies fling their bines about the hedgerows with a sappy vigour that contrasts pleasantly with the tired weeds and dead grass. Riversides and sedgy pools in the meadows stand forth on the faded landscape in stripes and patches of emerald; the fresh green of the bur-reed and the glaucous blades of the flag never strike so cool a sense to eye and brain. Marsh woundwort and gipsywort among the sedges flower on through the summer heats with a soft luxuriance that the season takes from the blossoms of arable land and pasture. In a long droughty summer the weeds of the root-fields æstivate almost like the snails of hotter climates. After the first blooming of the poppies and corn marigolds at the end of June, seed-heads and scanty foliage predominate over blossom until the coming of the autumn rains, when there is an outbreak of long-suppressed vigour.

Even in the hottest summer weather there is a surprising amount of evaporation from the soil in depressions and hollows which collect water in other seasons. Campers know the chill that rises towards morning in such sites, and that the drier the summer and the hotter the weather the

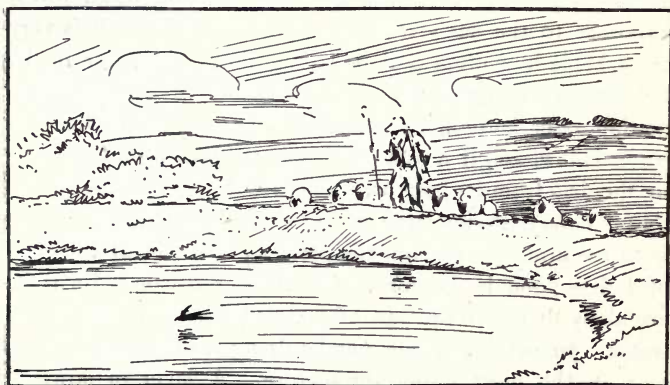
colder, as a rule, is the hour before dawn. The pools of cold air that are found in hollows on hot summer nights are partly due to the descent of the coldest air to the lowest ground as the temperature falls; but partly it is due to the direct power of the sun, which sucks up the moisture in the ground to a greater depth than in years of less sunshine. In the July nights one climbs in a few yards from the damp chilly air in the hollows to the warm layers of the upper slopes and the open fields. The transition corresponds to the daylight boundary between grass brown and dead to the

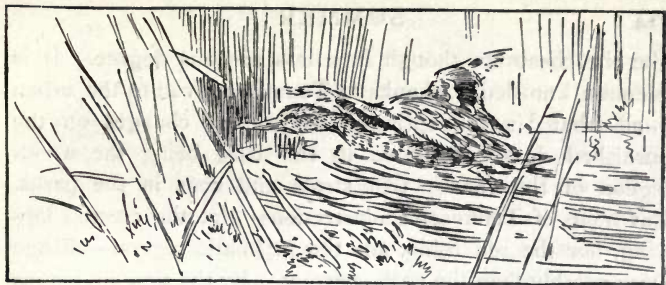


very root, and turf which still retains a sort of under-fur of green. Often at dawn in the hottest summer weather high ranges of hills are also wrapped in mist, though the lowlands may be almost clear. This, too, is due to the evaporating power of the sun, which fills the higher air with masses of vapour which condense at night where they meet the colder layers of the heights. The fog is often thick enough to drip profusely from the trees; and by midday, when the white road along the hills is lapped in heat, it is curious to see the dust beneath each tree thickly pitted by the drops. After a light shower of rain the road outside the tree's shelter is pitted; but in the white night-fog the tree itself sheds rain, while the earth around it is dry.

On high downs these summer night-fogs help to feed the dew-ponds, which are so valuable to the upland sheep farmer in dry seasons, when water for general farm use may have to be carted two or three miles. Dew-ponds are fed by rain, when rain falls, like any other ponds; and it is doubtful whether dew as distinct from mist contributes much to their store. They are not so miraculously inexhaustible as is sometimes said, and they vary a good deal in their power of withstanding drought according to height and position. But considering their shallowness, small size, and usual direct exposure to the sun's rays on the treeless down, it is very remarkable how often and how long they hold water in the fiercest summer droughts. The mist condenses on the surface of the water and on the bare sides of the pool when the water is low, and if a tree overhangs the supply is increased by the drip from its boughs. There is no truth in the notion that an overhanging tree prevents the collection of water from the atmosphere; but the presence of a tree at the edge of a dew-pond is dangerous for another reason. Its roots are likely to pierce the pan of puddled clay which holds the water. In making a dew-pond this layer of clay or chalky marl is the most important feature. A layer of straw is often placed beneath it; and though it is sometimes supposed that the object of the layer of straw is to check the transmission of the earth's heat, and so promote condensation, the real object seems to be simply the careful packing of the water-tight bottom. Besides the more copious condensation of the mist, a reason for making dew-ponds on bare crests of the down is in order to prevent surface drainage. If a rivulet entered the pond in times of rain, before long it would break up the clay pan, and the water would escape into the chalk. In modern dew-ponds in the chalk valleys surface water is occasionally utilised, and the inflow of the gutter

faced with cement. But it is doubtful whether these low-lying ponds are appreciably fed by mist, or deserve the name of dew-ponds at all. They have little of the antiquity and mystery associated with the dew-ponds on the great crests ringed with earthworks, where the plovers come to bathe in the yellow summer afternoons, and the sheep follow the shepherd with his crook, as in old Bible pictures.





'THE MALLARD . . . MUST HIDE'

SUMMER LIVERIES

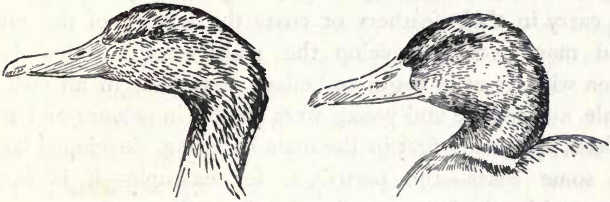
THE glory of colour which fills our world in spring grows gradually blurred as summer advances. Doubtless colour is born at the same time that colour dies. The roses are red when the leaves are brown, and on the common the gold of the gorse is succeeded by the purple of the heather. Nevertheless, things do take a sober colouring under the passage of the suns. But not only leaves so decline. It is easy to see that feathers lose colour no less than leaves. Some birds change out of all recognition, so drab is the later livery and so bright the early. They become 'eclipsed,' to use the word invented years ago by that fresh and vigorous naturalist, the polemical Waterton.

Even a Cockney may notice this change that summer brings to the birds within his ken. When the chestnut leaves in the parks grow sullied and brown on the lower boughs, and the trees look as if they were wearing skirts of two colours and two lengths, the town birds more or less follow suit, and take their cue from the trees. Indeed, the towns house three species which undergo a peculiarly well-marked change—a spring change, and consequently also a summer change. The sparrow, the pigeon, and the starling all suffer

like the chestnuts, though in a less obvious degree. It is common knowledge, thanks to Tennyson, even to the urban mind, that 'in the spring a livelier iris changes on the burnished dove,' the dove in this case being the wood-pigeon of the variety that struts and coos in the parks. But none of Tennyson's illustrations—not the crested lap-wing, nor the red robin, nor the prismatic pigeon—change more notably than the cock-sparrow. By the time he begins carrying straws in the spring and fussing about the untidy lumps in the trees that he uses for nest, he has changed from a dull brown bird, scarcely more conspicuous than his sober mate, into a gorgeously liveried creature. The washy dabs of dark colour on his throat have grown and brightened into a deep black, most finely and conspicuously denoting his sex. He has not moulted in the proper sense, though there are birds which moult twice and even three times in the year, but has rubbed off the protective nap which hid his native colour. By such process does the chaffinch and others, too, make themselves glitter finely in the spring. But the livery does not keep its salient freshness very long. As summer advances, the cock-sparrow that had been 'peacocking' in gorgeous superiority to his mate steadily sobers down till the difference, though obvious, is not striking, and neither is very much superior in looks. Such a blurring is quite visible even to the casual eye on the cock-starling, and to a less extent on the pigeons.

When the change begins to come over these birds they do not conspicuously lose vitality, as birds do in the moult, though they and all birds show a diminution of energy when summer succeeds to spring. A more thorough and overwhelming experience befalls a bird which also may often be watched in towns more easily than in the wilds of nature. The mallard, or male wild duck, is the outstanding example

of 'eclipse' plumage. The wedding feathers of the male are very splendid. The green is more brilliant than the laurel leaves, and the white flashes stand out more distinct on wing and neck than sprays of bloom. Head and wing, and breast and back are all burnished. Male and female might be members of different species. With the growth of fine feathers he is strong on the wing, and enjoys long bouts of flight. But the duck nests early; and when summer comes the young are already capable movers. The mallard then suffers a sort of collapse. He moults in thorough



fashion. His fine feathers drop, and with this loss he loses power of wing. It may be, it is the theory, though one cannot tell, that the loss of colour is a protection necessary to a creature that has lost vigour. The mallard, being more or less helpless, skulks, and must hide as best he may, in beds of reed and rush. He must use his webbed feet instead of his tough wings. So now he becomes almost the double of his mate, and they remain in this likeness till the autumn is on its way.

In all these changes are many mysteries. Volumes have been written about the meaning of the change and about the process; but for most of us the fact is enough. The tide of energy rises and sinks; till the heyday of the year the males 'play the peacock,' as indeed do the flowers. Nevertheless, the puzzle is attractive. For a little

while the whole family of the ducks are very much of a pattern. The young almost exactly resemble their mother when the close season ends, though at the end of August you may without difficulty pick out the cocks, and by November the full male plumage is in evidence. Is the change just a growth and fall up to and down from that ecstasy of energy, palpable in all the being of the birds at spring? or is there a purpose in the particular hues of summer and winter as well? Is the male colour a developing distinction, or a disappearing distinction? And what can we argue from the colouring of the young? They are supposed to carry in their feathers or coats the history of the race; and many young develop the male colours rather late. Men with theories begin to believe that once in all species male and female and young were similar in colour; and that colour, appearing first in the male in spring, developed later. In some cases—the partridge, for example—it is being assumed by the hen as well as by the cock.

Nevertheless, the summer loss of the 'crest' and 'livelier iris' of spring, most sudden and salient in the ruff and the plover and the dunlin, is rather different from the mallard's collapse into drab colour and weakness of flight. The black grouse or blackcock, when the breeding time is over, falls into as helpless a state as the mallard. He loses a number of his wing feathers and several of his tail feathers simultaneously, so that flight is quite or nearly impossible, and skulking is the one road of safety. Even the red grouse, our one native game bird, at this season suffers severely in vitality as he alters in appearance, and becomes an early victim of disease—indeed, a much easier victim than the hen which does not go through these abrupt changes. It seems that all these birds which moult at what would seem to be a rather unseasonable hour, suffer in some degree

from the oppression of summer coming between the twin rigours of spring and autumn. That this summer eclipse is something more than the first stage in a preparation for the spring splendour is suggested by the ptarmigan, which is one of the few birds that has a separate dress for spring, summer, and winter. Both the summer duskiness and the winter whiteness seem to be in some degree protective. They help to hide both birds, which are indeed pursued by a great number of enemies from ermines to eagles. But how much of what is held to be protective is more or less accidental? Is there any bird at any season more glaringly conspicuous than the cock pheasant, which suffers no eclipse in summer, yet now and again one sees even a pheasant strangely disappear into the autumn hues of a wood, as if he were especially adapted to avoid human enemies when the sport of shooting begins? The male and female partridge, which one must hold in the hand to distinguish from one another, have a constant colour, very beautiful but not salient. They are very conspicuous in spite of their brownness on the close-cut stubbles. On the light plough-lands of Surrey they are perfectly fitted to their surroundings, but are quite fairly distinguishable on the chalk ploughs of Berkshire. What is one to infer?

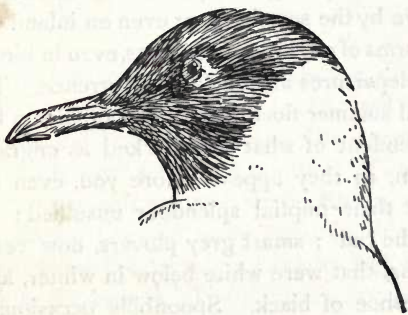
The fact is, most hunted birds and animals consent in colour with their surroundings. Stripes and dots are hard to pick out. Some are said to stand in poses that help their colours. Mr. Pycraft, one of the specialists on colour, says that the snipe stands with head down and the bittern with tail up, each so that he may use his particular pattern of soft stripes of grey and brown to the best advantage.

But, as it seems to the writer, birds are not growing better and better fitted to their surroundings, but worse and worse. The livery of most young birds, when once they

have left the nest, is more protective than that of their parents. Young blackbirds are a charmingly evasive speckled brown, showing, we are told, their affinity to the thrush from which they have separated. But to-day, at all times and at all seasons, nothing could be better calculated to challenge attention than the cock blackbird. That mass of unbroken black draws the eye, almost as much as if he could compass all the colours of a parrot. How the young robin with its pretty speckled brown breast disappears into the shadows of a bush where the yellow-brown back or red breast of the parent would challenge attention. The young cast off their baby clothes at very different dates. In perhaps the majority of cases the male begins to put forth his peacock colours about the time that he is growing strong on the wing, and needs less protection of colour. Sometimes you come upon well-grown birds, thrushes, for example, on which the pretty down of their infancy still clings oddly to the grown feathers, and occasional instances have been noted of a persistent down. Those who notice the partridges shot in September will find a fair number still distinguished by the pointed feathers that are rounded off in most birds by the time they are strong on the wing. The livery is doubtless associated with maturity in other more essential forms. Many gulls are not mature till their third year; and the townsman again has the chance of observing this belated change of livery in the black-headed gulls that crowd up the Thames and flock in the parks and reservoirs. In summer birds of the previous year are still spotted with odd patches of colour, appearing quite promiscuously; and you can sometimes often detect the third-year bird from the second, especially the males in spring.

In these young, at any rate, there is no suggestion of

protective colourings. Their livery has no obvious purpose; and generally the theory is extended too far. From time to time any observer must come across examples of adaptation to environment which resemble a parody on the theory of protective mimicry. We have quoted several elsewhere; but the writer has always felt a certain scepticism since he saw one summer day a barn owl roosting on an apple-bough up into where had grown a bush spiræa. The owl's body was a most perfect match to the blurred white flowers, of which, till you looked close, the bird seemed a floral extension. However, birds' feathers are very often consonant with their surroundings, especially when they are young, and the mother's livery is less conspicuous than males for protective purpose or with protective effect.



BLACK-HEADED GULL



HICKLING BROAD

WHERE FISH ARE FOUND

WE do not regard any summer month as a time of migration. It is the habit to think of June and July as a time when creatures all settle down to their work of breeding and feeding their young in special and restricted haunts. But if you live by the sea-shore, or even on inland waters, you see various forms of migration in process, even in birds, and new arrivals and departures are of daily occurrence. To Norfolk Broads in full summer flock many birds of divers kinds more or less independent of what are marked as migration dates. Most of them, as they appear before you, even in summer proper, have their nuptial splendour unsullied: knots and godwits 'in the red'; smart grey plovers, now vested in jet black; dunlins, that were white below in winter, are patched with a horseshoe of black. Spoonbills occasionally amble about as if they had taken possession; and ducks, still gaudy, in spite of the presence of some flappers, people the shallows. Grey herons prance in queer and grotesque attitudes as they search the creeks for eels or it may be for flounders. Fishermen may note more remarkable migrations under the waters. On some of the more difficult rivers, even in North-West Ireland, the salmon do not take the river falls by storm

till June, though they began going up rivers not many miles distant in January. You may see sea-trout off the east coast of Norfolk in any of the summer months, and of course the herrings and sprats wait for full summer to come shorewards. Less noted, but very strange migrations, are to be observed among the coarser fish, for which Norfolk Broadland is the most famous resort.

Anglers in summer are legion; but visitors cannot compete with native devotees in prowess among the bream, which bite best at night and run larger in the basket than by day. It is astonishing what catches a country yokel will make



with a sturdy clothes-prop and the coarsest of tackle. The common bream teems in every broad, and often affords excellent sport, catches being estimated by stones, and capture by the hundredweight being not unusual. The white bream is abundant, but much more elusive. Bream are somewhat restless in disposition, and move about in wandering shoals. They travel from the broads to the rivers, and from the rivers back to the broads. These movements may be merely capricious; they may be governed by some, to us, obscure natural laws, like migration proper. On occasion bream will work well downstream; and sometimes numbers have been overtaken by the 'salts' on an unusually big spring-tide, when they have 'turned up,' to struggle feebly and die at the surface, before they could rush back to their favourite safer quarters.

Roach and perch are abundant: the latter of late years

has materially deteriorated in size, large specimen perch being the exception to-day. This species delights in brackish waters, and will hang upon the verge of the 'salts,' preying upon the shrimps that come up with the tide. Little urchins with a piece of stick and the roughest tackle, angling near the lock at Oulton Broad, where there are often several degrees of salinity in the water, capture hungry perch in numbers. The rudd is abundant at Hickling and in the Heyham sounds; it is a frolicsome, sturdy fish, giving excellent sport, taking a bait with an impetuosity which



makes it a favourite with anglers, who, when out specially for its capture, in order to locate it, cast bread-crumbs on the surface of the water. If there be a shoal within seeing distance, in a few minutes the stream will be alive with the splashing of their tails as they dash eagerly at the crumbs. If the angler but flings a lively worm into their midst a fish inevitably becomes hooked on the instant, and sport, while crumbs remain, will be fast and furious. The angler who is wily does not wait for their return, but, quietly drawing his stakes, shifts his position, following them up. He who is not so ready to move repeats his seductions, and may be rewarded time after time by an arrival of a shoal. If a rippling of wind freckles the surface so much the better.

THE OLD WATER MILL AT HOUGHTON

By TOM MOSTYN

THE OLD WAY TO THE NEW

BY J. H. B. B. B.



Gudgeon are numerous in shallows and at the broad margins, but like that troublesome little fish the ruffe, who also prefers the shoal waters, no one seeks their patronage but would prefer to do without them. Nor does the fisherman by any means appreciate the attentions of a muddy-skinned eel, which has a knack in a very few minutes, if not carefully played, of coiling itself and the line into inextricable knots and kinks. Dace do not favour the broads and rivers, although some are occasionally caught; but there are survivors from bait-cans thrown after a day's fishing into the water. Hybrids of the bream and roach and other species, under the name of Pomeranian bream, and the like, are met with now and again. Tench are fairly plentiful in some waters, but rarely take the hook: they are more often captured in funnel or 'poke nets' made with hoops, which are set in out-of-the-way corners. A bunch of gay flowers placed inside the net has the reputation of being an excellent lure. In some ditches and in disused clay-pits they are in some instances abundant.

These and other species have a pleasant time in broad-land waters, feasting on the abundant pond-life—vermes and the larvæ of various insects, with which the waters teem. Their joys are broken in upon only by the angler who has no scruples, and the tyrant pike who has an appetite voracious as a shark but an eye that has no sense of proportion: it is by no means an uncommon occurrence for the angler to land a large roach or a rudd whose sides are deeply scored by the teeth of a pike whose voracity was more marked than his sense of judgment. As the angler sits, patient and watchful as a cormorant, or the loafing boatman laggardly drifts with wind or tide, he is not seldom aroused from his reverie by the sudden appearance of a shoal of small fishes that glisten for a moment in the sun, like flying-fishes, and disappear again as

quickly as they came. Some hungry jack is playing the part of an ogre below, and the scared little creatures are fleeing him in terror.

As the observer sits or prowls around among these rush-margined Norfolk lagoons, he finds much to interest him. There are swimming and diving birds of many kinds croaking and clucking and quacking around, whilst smaller species, living among the sedges and interminable reed-beds, pipe and chirp, and warble and chatter all the livelong day,



and often into the night. At eventide the swallows and the starlings in their hundreds arrive from the surrounding countryside for miles and miles, to spend a clean-bedded, tick-proof night's slumbering on the reed-stems, rocked by the cool night breeze as it pushes its way among the labyrinths of reeds and rushes.

That elusive, wary animal, the otter, still lives here; perhaps even more numerous than most would think in the fastnesses of these swamps. Occasionally the more prying nature-lover, who is not content to loiter and navigate his craft in the more open and frequented ways, comes suddenly upon the wreckage of a fine plump fish among the stubby 'rondage,' or on some swampy corner, which an otter has

left after a goodly supper. To-day he will be quietly sleeping off his surfeit in some out-of-the-way lair, known only to himself, and not even to the vigilant keeper who prowls around day after day, ever hopeful, but always disappointed—the otter does not intend to make known his



secret hiding-place. Many water voles and shrews hold high jinks among the 'cuts' and 'deeks' by the margins of the larger lakes. The voles feast upon the luscious grasses that spring up from the ooze below the shallows, and any dead fish, flung aside maybe by an angler, or dropped even by a startled heron, is acceptable. He will devour a roach right to its backbone, and without a doubt likes a garnishing of many an insect.



SHORE AND SALT-MARSH

ON wide, flat shores fine days in later summer have a peculiar fascination. There is a freshness in the sea air which has vanished at this time of year from the inland pastures and cornfields in the hot part of the day. The untamed sea sends its breath through the heat of July, and there seems something wild and akin to it in the flight and cries of the birds of the salt-marsh and shore. The flowers are also strange to inland eyes. Yellow sea-poppies seem not only beautiful but wonderful; for there is so sudden and marked a change in the transit from ordered inland landscapes to the alien life of the shore that it restores to us a child's capacity for fresh experience. The sea-poppy is certainly less brilliant than the common corn-poppy, which is the most brilliant of all our flowers; but it is a more striking plant in other ways. The pure yellow blossoms make an exquisite contrast with the cool blue-green foliage, which is far more abundant than the corn-poppy's little leaves. Sea-poppies sometimes form thick beds or brakes, that a rabbit might shelter beneath; and by that time the dying blossoms begin to send forth their long narrow seed-vessels, interlaced like distorted horns.

By August the blossoms are rare, though the eccentric growth of the stems and seed-vessels is often at its height.

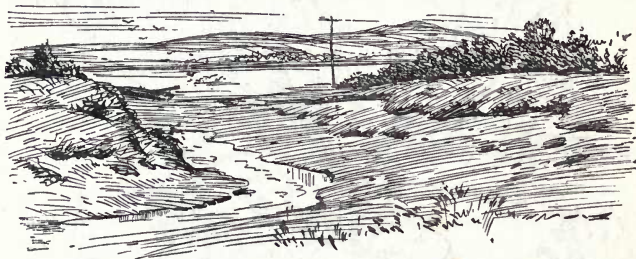
Then, as the sea-poppy fades on the shingle-banks, the sea-lavender comes into bloom on the marshes outside the wall, occasionally flooded by the tide. Sea-asters dapple the mud-flats a little nearer the water with their rayed blossoms; the sea-aster grows so close to the water that its yellow and purple flowers are often submerged by a spring tide, and stained with a grey film of mud. The debatable land of the



SEA-POPPY

salt-marsh is seamed with a network of tidal channels, half hidden by prostrate masses of dull green sea-blite; even at low-water it is impossible to penetrate far into this wilderness without a wetting, and the sheldrake and curlew can lurk unseen for the whole interval between tide and tide. Then, when the tide comes back, the marsh is often unapproachable in any way; for many of the channels are too small to push a boat along, and so numerous that it is impossible to travel more than a few feet safely on dry land. Swimming-birds ride in safety among the wider channels, or

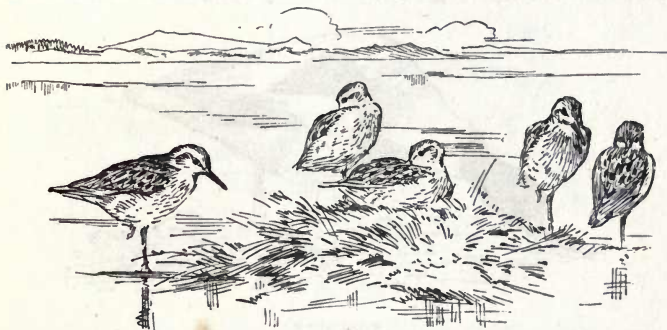
follow the incoming tide on the mud-flats behind the brown-edged line of foam. Redshanks, and the straggling dunlins that remain through summer, congregate on some miry islet out of gunshot, and call inspiritedly, in harmony with the water's brisker flow. The drowsy calm that filled the period of low-water in the summer sunshine is over, and usually a little breeze gets up with the incoming tide, and adds to the sense of seaside activity that is never missing long. Among the deep cornfields and dusky pastures within the wall, we shall have to wait until autumn, or at least until harvest for



the next turning-point in time. Once outside the sea-wall every tide brings a stir of diurnal change, like the whole cycle of the equinoxes and the solstices packed into twelve hours, and the days of July and August go to a livelier and more springlike measure.

Constant change and stir is provided by the movements of the birds that haunt sea-marshes and estuaries. As the advancing tide of the year leaves midsummer behind, the bird-life of these seaside tracts is replenished from two sources. First, the birds that nested locally lead forth their fledged families, and soon there is a steady inflow of the breeders on inland moors and wastes far to northward, which

spend part or whole of the autumn and winter by the shore. The most conspicuous birds of the first class are the shelduck, which now breed in increasing numbers on the banks of many estuaries. They nest as a rule in holes among the sand-hills or on the sea-walls, and in various districts are called burrow-ducks; their favourite site is an outlying rabbit burrow. By July the ducklings are already out in the world, and scuttling about the wet sand-banks and oozy channels under the care of their parents; and by August they have won the beautiful

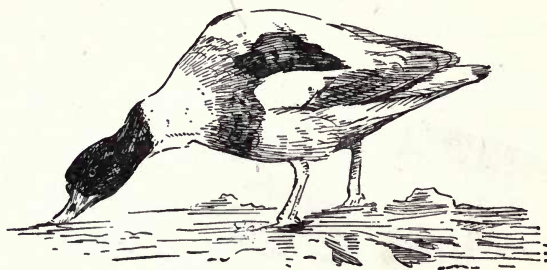


DUNLINS

white plumage brindled with chestnut and black, and gleam almost as large and bright as their elders as they drift up and down the channels with the tide. Local broods of mallard are also to be found for some time in the sea-marshes, but they are fresh-water ducks by habit, and less at home on the tidal creeks, which are the shelduck's natural haunt. They are apt to skulk uncomfortably among the overgrown channels, and seldom join the happy low-tide parties of shelduck and vagrant gulls which splash and doze and preen themselves hour after hour in the sunshine at the edge of some ooze-locked pool. It seems all as quiet and permanent

as the edge of a farmyard pond, as the hours pass in the sunshine, and the light breeze carries their shed feathers into a little drift on the leeward shore. Soon the tide returns, and the scene that seemed so quiet and stable swiftly vanishes. A wave licks over the sands, and washes out half the shores of the pool with a single surge. The gulls take wing, and the shelduck turn tail to the tide, and float away together over the site of their vanished resting-place.

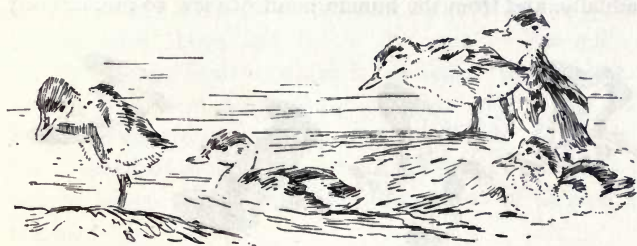
Redshank breed among the sea-marshes, and become more numerous though less anxiously noisy from midsummer



SHELDUCK

onwards; and terns and black-headed gulls multiply in the immediate neighbourhood of their scattered colonies. Little is seen of the families bred by the ringed plovers on flat shingly beaches; these elusive little birds seem no more numerous when they have done nesting than before. But there is a gradual access of life—sometimes even as early as the end of June—when the broods from inland begin to reach the shore. By August enormous flocks of common plover collect at the mouth of estuaries near some district where they breed in abundance. The plover flocks round the Solway sands in late summer are only exceeded in size by the great packs seen in hard winter weather.

The 'tewfits' of a hundred parishes among the lowland hills may be collected in one of those great flocks, which rise with their innumerable wings flickering and twinkling much like the ripples on a sunny sea. Large summer flocks are often seen on the wide estuaries of the rivers flowing into Cardigan Bay; and the same late summer migration of flocks to the shore brings plovers into the life of almost every stretch of ooze and salting round our whole coast. Flocks of golden plover are also common in the west and north, wherever they have breeding-grounds not far away; the



YOUNG SHELDUCKS

moult now over, they have no longer the black breasts and bellies which are so peculiar and conspicuous a feature of their breeding plumage on the hills a few months before. The skimming flocks of dunlin grow rapidly larger, as the unmated birds which spend all the summer by the shore are reinforced and eventually outnumbered by the main body packing southward and to the sea. Curlew and oystercatchers reappear on their favourite ooze-banks, and with them come a group of little land-birds which shift their quarters in late summer to the seaside as well as to lowland pools and streams. They include grey and pied wagtails and meadow-pipits, which feed along the drifts of weed on the shore, and may all be found on some part of our shore-

line all the winter. Early in August, and long before there seems any need to quit England in our warmer seasons, this group of shore-loving small birds is reinforced by a trickle of other migrants, leisurely slipping along the shore-line where it forms a convenient stage on their southern way. Yellow wagtails join the grey and pied, and players on sea-side golf links may notice that there are more wheatears about than can be accounted for by the resources of the immediate neighbourhood. All this is the beginning of the autumn migration; but that great annual event begins so gradually, and from the human point of view so prematurely,



COMMON PLOVER

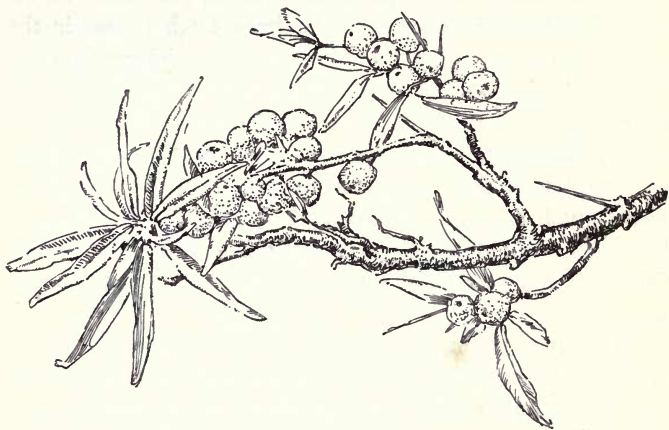
that many of the new movements which it brings about are features not of autumn but of summer.

Many kinds of gulls haunt the same flat shores as the flocks of waders, and feed at low water on the same banks of ooze and sand. They are increasing so rapidly that they are not only colonising many new nesting-grounds, but are developing fresh tastes and methods of hunting. Tricks new to experienced observers have been noticed lately in widely separated parts of the country. Herring-gulls and black-headed gulls have been watched paddling with their webbed feet in the shallow water at the edge of the tide, and catching the food washed out of the mud. The trick seems to have originated with the herring-gulls and to be

copied by the black-headed gulls. But some of the black-headed gulls have improved upon it; we have watched them swimming a little further out in the shallows, paddling with their dropped feet, and catching the food disturbed in the water around them. In a flock of scores of birds only half a dozen may be seen beating out their food in this way, while the others hunt for what is already exposed; and the plan is much more common among herring-gulls than black-headed gulls. Thrushes will sometimes catch worms in the same way on a lawn, and marine worms of different species form probably the bulk of the prey secured by the gulls in beating both above and below the water. But gulls are largely garbage feeders, which is one reason why they thrive as parasites of man about fishing-ports and on the refuse heaps outside towns. They pick all kinds of animal refuse washed up along high-water mark, from dead birds and fish to bacon rind thrown from the galleys of passing coal tramps.

A curious vegetable waif of sandy and gravelly shores is the tea-plant, which grows in hedges and low thickets, and is a straggling bush in no way related to the shrub which gives us tea. It is a member of the solanum tribe, which has a rare faculty of getting about the world by human aid, as is shown by the potato and the thorn-apple. The tea-plant has oval pointed leaves something like those of the real tea-shrub, and seems originally to have been named by some confusion. It has pale purple blossoms sufficiently like those of the woody nightshade to suggest their relationship, and is conspicuous among the seaside flora when in bloom. Green hairy tamarisks with their spraylike plumes of pink blossom are also prominent on the outskirts of seaside towns and gardens, but they have never freely established themselves as wild plants. Sea-buckthorn and the shrubby sea-blite

form thickets on the sandy and shingly wastes, and give cover to the gulls and waders when wind and rain beat from the sea. Sea-buckthorn has narrow hoary leaves, like some dwarf willow, and bright orange berries in later summer, which tempt gardeners to naturalise it as an ornamental shrub. It is chiefly scattered about the sandy coasts of the east of England, and is one of the plants framed to stand



SEA BUCKTHORN

drought. Shrubby sea-blite forms dense brakes of dull green foliage at a few points along our coast; its upright growth makes it more noticeable than the common creeping kind, and it is particularly abundant and conspicuous on the great shingle ridge of the Chesil Beach. Rock, shingle, sand, and mud have each their own company of sea-plants; plants of one type of soil seldom stray to the next, though the swift alternations of English seaside landscapes may sometimes make them near neighbours. Sea-holly and sea-convolvulus love a sandy shore; the little blue-green bushes of

sea-holly—like a kind of thorny cabbage—shine coolly among the sand-hills where the shimmering heat mirage of July streams aslant in the breeze from the sea. Sea-convolvulus runs among the same hills of sand, helping to bind them firmly when the harsh marram grass has succeeded in winning the first hold. This convolvulus is larger than the pink corn-convolvulus, but smaller than the white bindweed. The bindweed has a seaside trick of 'sporting' into pink, and so entrapping the unwary flower-lover into the belief that it is



SAND-HILLS AND MARRAM GRASS

the real seaside species; but it clings to hedges and the herbage of grassy banks and ditch-sides, while the sea-convolvulus twists upon the sand. True samphire is a plant of the steep cliffs, so that its collection would be truly 'a perilous trade,' if there were nowadays enough competition to induce samphire gatherers to climb the more dangerous crags for it. But pickled samphire is now not greatly in demand, and its succulent branched leaves and stiff umbel of white bloom can be found, for curiosity's sake, without much risk for the active. Marsh samphire is a spurious imitation which grows on the level saltings. It has much the same

thick, glassy growth, but the stems are blunt and clubbed, and there is no disc of white flower. Its interest is borrowed from the reputation of its namesake, and it is among the duller plants of the shore, like the sea spinaches, beneath which the clouded yellow butterflies cling on first crossing the sea.



HERON

INDEX

- ACORN BARNACLES, 270.**
 Adders, 296.
 Admiral butterflies, red, 167, 177, 179; white, 167, 170.
 Afterglow in summer, 22, 23.
 Alder-flowers, 10.
 Alfalfa, 261.
 Alpine choughs, 151, 152, 156.
 Ants, summer flight of, 300, 301.
 Arnold, Matthew, quoted, 6, 137.
 Ash-trees, 46, 307.
Asplenium marinum, 47.
 August, calendar of, 239-241.
- BAMPTON CLIFFS, 10.**
 Barley, 260; wild, 255.
 Barnacle geese, 270.
 Barnacles, 269, 270.
 Bats, 97.
 Beanfields, 261.
 Bee-orchis, 111-112.
 Beeches, 47, 307.
 Bees, bumble, 183, 205; hive, 183, 184, 262, 278.
 Beetles, 10, 48, 183, 217-227; water, 83.
 Bell-heather, 241, 292, 293.
 Bent-grass, 294.
 Bindweed. *See* Convolvulus.
 Bird hawk moth, 96.
 Bird's-foot trefoil, 107, 135.
 Birds, dangers to ground-nests of, 50, 56; in summer mood, 2, 32; learning to fly, 141; migration of, 240, 288; moulting in July, 128; on the riverside, 82-92; on Norfolk Broads, 320; song in June, 65-72; songlessness in July, 4, 10, 26, 182-184; summer liveries of, 313-319.
 Bittern, 93, 317.
 Blackberry, 18, 114.
 Blackbirds, 2, 25, 26, 141, 148, 181, 232, 233, 287; song, 66, 67, 68, 69; young, 143, 318.
- Blackcap, 26, 65, 66, 71.
 Blackcock, 298, 299, 316.
 Blackheaded gulls, 318, 319, 332, 333.
 Bladderwort, 78.
 Bladder-wrack, 264.
 Blindworms, 296.
 Blue butterflies, 35, 173, 241, 307.
 Bluebells, 208.
 Bog asphodel, 296.
 Bombardier beetle, 223.
 Borage tribe, 117.
 Box-rose or snowball tree, 126.
 Box-trees, 119.
 Bracken, 292.
 Bracken-clock beetle, 227.
 Bream, 321, 323.
 Brier roses, 61, 64.
 Bridges, Robert, quoted, 6, 9.
 Brooklime, 78.
 'Brown' butterflies, 36-40, 175.
 Bryony, 209, 309; black, 20-21, 115; white, 15-17, 20, 115, 118.
 Buckthorn, 333, 334.
 Buckwheat, 261.
 Bugs, 222.
 Buff-tip moth, 103.
 Bullfinches, 71, 232, 288.
 Bulrushes, 76.
 Buntings, ciril, 67; corn, 10, 65, 73, 182; yellow, 70.
 Bur-marigolds, 82.
 Bur-reed, 74, 75, 309.
 Burnet moths, 96, 178.
 Burnet (or Scotch) rose, 64.
 Burroughs, 4.
 Burying-beetle, 218, 225.
 Buttercups, 107.
 Butterflies, 35-42, 128, 173, 174, 177, 241, 307; flight of, 167-179.
- CABBAGE WHITE BUTTERFLIES, 37, 177.**
 Caddis-worms, 82, 83.
- Camomile, Common, or Mayweed, 161, 162.
 Champion, 23, 24, 161, 162.
 Carpet moths, 97.
 Carrots, 124.
 Cathartic or Purging Flax, 108.
 Centipedes, 224.
 Cinnabar moths, 95, 96.
 Cirl-bunting, 67.
 Chafer beetles, 10, 217, 227.
 Chaffinches, 27, 70, 288; nest, 58, 59.
 Chalk Downs, the, 106-119.
 Chalk-hill blue butterfly, 173.
 Charlock, 7, 160, 161.
 Cheddar pinks, 235.
 Chervil, 47, 163.
 Chesil Beach, 271.
 Chestnut blossoms, 3, 10.
 Chestnut, sweet, catkins of, 205, 206.
 Chiffchaff, 54.
 Choughs, Alpine, 151, 152, 156.
 Clematis, wild, 17, 45, 115.
 Click-beetles, 48, 223.
 Clock-beetles, 217, 227.
 Clouded yellow butterflies, 179, 336.
 Clover, 7, 23, 47, 135, 160, 254, 261.
 Cockchafer beetles, 163, 217, 218.
 Cockle-shells, 267.
 Cocksfoot grass, 136.
 Colorado beetle, 219.
 Colouring of summer landscape, 313-319.
 Coltsfoot, 159.
 Comfrey, 78, 117.
 Convolvulus, 160; sea-, 334, 335.
 Coots, 90, 91, 245.
 Copper underwing moth, 101.
 Corn-bunting, 10, 65, 73, 182.

- Corn-cockle, 49, 160, 161.
 Corncrake, 31, 32, 53.
 Corn crops, risks to, 253.
 Cornfield flowers, 157-166.
 Cornflowers, 160, 161, 162.
 Cornish heath, 294.
 Corn-marigolds, 157, 158, 159, 161, 162, 309.
 Corymbs, 124.
 Cotton-grass, 296.
 Cow-bane, 124.
 Cow-parsley, 121, 124, 163, 208.
 Cow-parsnip, 121, 123, 124.
 Crab-apple, 129.
 Crabs, 274, 275.
 Crane-fly, 218.
 Creeping-jenny or Moneywort, 80.
 Cuckoo-spit, 222.
 Cuckoos, 10, 65, 69, 88, 89, 128, 182, 240, 288; young, 89, 144.
 Curlews, 244, 327, 331.
 Cymes, 123.
- DABCHICKS, 87, 89-90, 92, 145.
 Dace, 323.
 Daddy-longlegs, 218.
 Dandelions, 107.
 Dane's blood or Pasque flower, 106.
 Darwin, Charles, 111.
 Darwin, F., 19.
 Date-shells, 269.
 Davis, quoted, 197.
 Dead-nettles, 164.
 Deadly nightshade, 106, 113, 114, 118.
 Deathwatch beetle, 219, 224.
 Deer, red, 247.
 Demoiselle dragonfly, 83, 84, 202.
 Dermestes-beetle, 219.
 Devil's coach-horse beetle, 218, 223.
 Dew-ponds, 311-312.
 Dewberry, 81.
 Disc-flowers, 120-126.
 Docks, 133; water, 73.
 Dog-hips, 204.
 Dog-roses, 3, 10, 23, 58, 63.
 Dog's-tail grass, 134, 135.
 Dog-whelk, 268.
 Dogwood, 120.
 Dor-beetle, 218, 225, 226.
 Dragonflies, 73, 83-84, 197-202.
 Droning beetle, 224.
 Drought in summer, 307.
- Duck, wild, 56, 128, 314, 320, 329.
 Duck-shooting, 243.
 Dunlin, 320, 328, 329, 331.
- EAGLES, 248, 249.
 Earwigs, 98, 304-305.
 Eels, 323.
 Eider-duck, 245.
 Elders, 118, 125, 232; blossom of, 23, 120, 121, 123.
 Elms, 3, 43, 45, 229, 230, 307, 309.
 Emerald moths, 100.
 Emperor butterfly, purple, 167-170; moths, 95, 96, 104.
 Evergreens, 45.
- FENNELS, 120, 308.
 Ferber, Captain, quoted, 152.
 Fern-owl. *See* Nightjar.
 Ferns, 236, 237.
 Fescue grass, 134.
 Fieldfares, 289.
 Finches, 139. *See* Chaffinches, Goldfinches, Bullfinches, etc.
 Fir-woods, 46, 290 *et seq.*
 Fish, migratory movements of, 320.
 Flags, yellow, 74, 309.
 Flax, 261; Cathartic or Purg-ing, 108.
 Flight, birds' first lessons in, 141 *et seq.*; of butterflies, 167-179; of large birds, 151, 152.
 'Flighting' of duck, 244.
 Flowering rush, 76.
 Flowers, discs of blossom in midsummer, 120-126; of cornfield, 157-166; of river-side, 82-92.
 Fluellin, 164.
 Flycatchers, 10, 288; pied, 65; spotted, 141, 166.
 Fogs in summer, 310.
 Forget-me-not, 78.
 Foxes, 51, 263, 298.
 Foxgloves, 116, 292.
 Fox moth, 10, 97.
 Fox-tail grass, 134, 136.
 Frensham Pond, 295, 296.
 Fritillary, 177.
 Fritillary butterflies, 128, 176-177; dark green, 176; high brown, 176, 177; pearl-bordered, 40, 41, 174; silver-washed, 176, 177.
 Frog-bit, 78.
 Frog-hoppers, 222.
 Fruit, ripening of, 48.
- GAME, end of close time for, 243.
 Geometer moths, 99, 100, 102.
 Ghost swiftmoths, 23, 24, 97.
 Gipsywort, 79, 309.
 Glow-worms, 1, 10, 23, 223.
 Goatsucker. *See* Nightjar.
 Godwits, 320.
 Golden eagle, 247.
 Golden-crested wren, 72.
 Goldfinches, 139, 162, 287.
 Goose barnacles, 270.
 Goose-grasses, 13, 14, 209.
 Gorse, 8.
 Grasses in summer, 131-140.
 Grasshopper warbler, 30, 67.
 Grass-snakes, 296 *et seq.*
 Grayling butterflies, 174, 175.
 Greenfinches, 142, 285-286.
 Gromwell, 117.
 Ground-nesting birds, dangers to, 30-56.
 Grouse, 240, 298, 314.
 Grouse-shooting, 245-246, 248.
 Gudgeons, 323.
 Guelder-rose, 10, 125.
 Guelder-trees, 120, 124, 125.
 Guillemots, 10.
 Gulls, 274, 318, 332; black-headed, 318, 319, 330, 332, 333; herring, 332, 333.
- HAIRSTREAK BUTTERFLIES, purple, 170; white-letter, 171, 172.
 Hampshire mill-race, 191; trout stream, 186; water-meadows, 193.
 'Hard heads,' 165.
 Harebells, 241.
 Hares, 2, 33.
 Harvest, 252-263.
 Harvest-mouse, 240.
 Hawfinches, 288.
 Hawk moths, 10, 96, 97, 98, 102.
 Hawkweed, 38, 107.
 Hawks, 298.
 Hawthorn berries, 204; trees, 10, 120, 307.
 Hayfield, the, 131.
 Hazel, fertilisation of, 47.
 Hazel-fly, 227.
 Heart's-ease, 162, 163.
 Heat of the sun, 306-312.
 Heath butterflies, 37.
 Heather, 290, 292; white, 294.
 Heaths, Cornish, 294; cross-leaved, 293.
 Hedgehogs, 308.

- Hedgerows in summer, 13-21.
 Hedge-sparrows, 181. *See* Sparrows.
 Helleborine, 109, 112.
 Hemlock blossom, 120, 122, 124.
 Hemp-nettle, 157, 164.
 Henbane, 106, 113, 118.
 Herald moth, 101.
 Hermit-crab, 275.
 Herons, 244, 320, 336.
 Hickling Broad, 321.
 Herring, 321.
 Herring-gulls, 332, 333.
 Hodgson, Ralph, quoted, 127.
 Holly, 46.
 Holly-blue butterflies, 174.
 Hop, 19.
 Hornets, 176, 277.
 Hound's-Tongue, 117.
 House-martins, 86.
 Hudson, Mr., 67.
 Humming-bird hawk moth, 97, 116.
- INSECTS, hum of, 183; life in summer, 300 *et seq.*; on the riverside, 82-92; sacrifice of wings, 300-305.
 Iris, yellow, 74, 309.
 Ivy, 44; blossom of, 122.
- JACKDAWS, 308.
 Jack-go-to-bed-by-noon, 49.
 Jays, 288.
 Jefferies, Richard, 276.
 Jellyfish, 273.
 July, calendar of, 127-129.
 June, calendar of, 9-11; nights of, 22.
 Junipers, 106, 118.
- KESTRELS, 140.
 Kexes, 3, 10, 47, 132, 135.
 Kidney Vetch. *See* Ladies' fingers.
 Kingfishers, 84-86, 146; young, 148, 149.
 Knapweed, 165.
 Knots, 320.
- LABURNUM, 10.
 Ladies' bedstraw, 108.
 Ladies' fingers, 106, 107, 108.
 Ladybirds, 218.
 Lammas Day, 241.
 Larks, 9, 25, 66, 67, 72, 253; nests, 50, 55; song, 180.
 Leather-jackets, 218.
 Leaves, their struggle for light, 43 *et seq.*
 Light, the struggle for, 43-49.
- Lightning, 212-214; summer, 213.
 Lilacs, 10.
 Lime-blossom, 205, 206, 207.
 Lime-trees, habit of leaves, 207.
 Limpets, 269.
 Ling, 292.
 Linnaeus, 8.
 Liverworts, 236.
 Lizards, 296.
 Loch Shin, 187.
 Loddon Lily, 76, 77.
 Loddon, the, 189.
 Loosestrife, 80.
 Lowell, quoted, 5.
 Lucerne, 261.
- MALLARD, 313, 329. *See also* Duck, Wild.
 Maples, 46.
 Marbled green moth, 103.
 Marbled white butterfly, 167, 172, 173.
 Marigold, Bur-, 82.
 Marigolds, Corn, 157, 158, 159, 161, 162, 309.
 Marsh-pennywort, 296.
 Marsh samphire, 335.
 Marsh woundwort, 78, 309.
 Martins, 143, 248; house, 86; sand, 86.
 Mayflies, 82, 199.
 Mayweed, 161, 162.
 Meadow brown butterflies, 37, 39, 175, 177.
 Meadow grass, soft, 137.
 Meadow-pipits, 88, 331.
 Meadow-rue, 79.
 Meadowsweet, 78.
 Meredith, George, quoted, 127, 180.
 Mi moth, 95, 96.
 Mice, 139, 232, 240, 242, 263.
 Midsummer's Day, 11.
 Mignonette, Wild, 113.
 Migration of birds, 240, 288.
 Milkwort, 78, 108.
 Millipedes, 224.
 Missel-thrush, 66.
 Moles, 308.
 Molluscs, 267.
 Moneynwort, or Creeping-jenny, 80.
 Montagu's harrier, 298.
 Moon-daisies, 133-135.
 Moorhens, 28, 87, 90, 91, 92, 145.
 Moors, the, 292; soil of, 295.
 Mosses, 47.
 Moths, 10, 23, 24, 87, 95-105, 178.
- Mountain-ash berries, 204; blossoms, 120, 124, 125.
 Mountain ringlet butterfly, 36, 39.
 Mulleins, 106, 113, 115, 116, 118, 308.
 Mustard fields, 7, 261.
 Mushrooms, 241.
 Mussels, 269.
- NASTURTIUMS, 49.
 Natterjack toad, 297.
 Nests on grounds, dangers to, 50-56.
 Newts, 297.
 Nightingales, 4, 5, 10, 24, 26, 34, 65-67.
 Nightjars, 28-30, 146.
 Nights of summer, 22-33.
 Nightshade, 46; deadly, 106, 113, 114, 118; woody, 114, 115, 209.
 North, Christopher, quoted, 249.
 Nuthatch, 53, 54, 232.
- OAK-EGGAR MOTH, 96, 97.
 Oaks in summer, 291, 309.
 Oar-weed, 265.
 Oat-grasses, 135.
 Oats, 259, 260, 261.
 Oil-beetles, 217, 226.
 Old Lady moth, 87, 101.
 Old-man's-beard, 134. *See* Clematis.
 Orange-tip butterflies, 174.
 Orchises, 109-112.
 Otters, 298, 324.
 Owl moths, 97, 99.
 Owls, 139, 143, 182, 263, 319.
 Oyster-catchers, 331.
- PANSY, FIELD, 162, 163.
 Parsnip, wild, 124, 125, 208.
 Partridges, 132, 139, 240, 245, 262, 263, 285, 318; dangers to young, 51, 52; dusting, 32; nest, 50; summer livery, 317; young, 145.
 Pasque flower, or Dane's blood, 106.
 Peacock butterflies, 167, 177.
 Penzance Brier Rose, 61.
 Perch, 321, 322.
 Periwinkles, 268.
 Persicaria, 209.
 Pheasants, 146, 148, 245, 317; nests, 56.
 Pholias, 269.
 Pigeons, 2, 313. *See* Wood-pigeons.
 Pimpernels, 80, 157.

- Pinks, Cheddar, 235.
 Pipits, 72; meadow, 88, 331; tree, 69.
 Plantain, 135, 309; water, 79.
 Plants, struggle for light, 43-49.
 Plovers, 25, 146, 312, 330, 332; golden, 331; green, 289; grey, 320; ringed, 330.
 Plume-thistle, 159.
 Poa grasses, 134.
 Pond-skaters, 222.
 Poppies, 8, 157, 160, 161, 309; sea-, 326, 327.
 Potentilla, 241.
 Prawns, 265.
 Primroses, 208.
 Purging flax, 108.
 Pycraft, Mr., 317.
- QUAKING-GRASS, 133.**
 Quicksands, 272.
- RABBITS, 243.**
 Radish, wild, 160.
 Ragged Robin, 11.
 Rats, 51, 52, 233, 263; water-, 91.
 Razor-shells, 267.
 Redshanks, 93, 328, 330.
 Redwings, 288.
 Reed-mace, 76.
 Reed-warblers, 10, 53, 87.
 Ribbon-grass, 264.
 Ring-dove, 26, 34.
 Ringlet butterflies, 36-38.
 Ripple-marks, 272, 273.
 Riverside, birds and insects at, 82-92; flowers and rushes on, 73-82.
 Roach, 321, 323.
 Robins, 34, 54, 65, 72, 318; song, 66, 182; young, 142, 143, 145, 147.
 Rock-pools, 266.
 Rooks, 34, 243, 287, 308; nests, 50.
Rosa arvensis, 60, 64.
Rosa canina, 63. *See also* Dog-rose.
Rosa spinosissima, 61, 64.
Rosa villosa, 64.
 Roses, 57-64; briar, 61, 64.
 Rowan. *See* Mountain Ash.
 Rudd, 322, 327.
 Rushes, 74-82.
 Rye-grass, 136.
 Rye-straw, 261.
- ST. BARNABAS' DAY, 11.**
 St. Bartholomew's Day, 241.
 St. John's wort, 11, 47, 49.
 St. Swithin's Day, 128.
- Salmon, 320.
 Salt marshes, 326 *et seq.*
 Samphire, 335; marsh, 335.
 Sand-martins, 86.
 Sandpipers, 149; green, 244.
 Sands, the, 271.
 Scabious, field, 162, 165; devil's bit, 165.
 Scented Rush, 75.
 Scorpion-grass, 81, 163.
 Scotch ringlet butterfly, 37.
 Sea-anemones, 266.
 Sea-asters, 327.
 Sea-blite, 333, 334.
 Sea-buckthorn, 333, 334.
 Sea-convolvulus, 334, 335.
 Sea-holly, 334, 335.
 Sea-mouse, 273.
 Sea-poppies, 326, 327.
 Sea-shore, the, 326-336; below the tidemark, 264-275.
 Sea-snails, 268.
 Sea-spinach, 336.
 Sea-urchins, 266, 274.
 Sea-weeds, 264 *et seq.*
 Sea-worms, 266, 273.
 Sedge-flies, 83.
 Sedge-warblers, 27, 28, 88, 182.
 Sedges, 74.
 Seeds sown by birds, 231.
 Serapis, Temple of, 269.
 Shearing Day, 10.
 Sheldrakes, 327.
 Shelduck, 327, 329, 330, 331.
 Shells, 267.
 Shrews, 325.
 Skipper butterflies, large, 40, 41; small, 178.
 Skull-cap, 82.
 Snails, inland, 268; sea-, 267, 268; water-, 83.
 Snakes, grass, 296.
 Snapdragons, 229, 234.
 Snipe, 92, 93, 94, 184, 317.
 Snowball tree, 126.
 Snowdrops, 208.
 Soldier and Sailor beetles, 10.
 Song-thrushes, 25, 26.
 Sorrels, 133, 135.
 Sparrows, 27, 34, 150, 181, 253, 259, 287; migration from town in summer, 283-285; summer livery of, 313-316; young, 143.
 Spoonbills, 320.
 Sprats, 321.
 Spurry, 160.
 Squinancy-wort, 108.
 Squirrels, 50.
 Stag-beetle, 218, 219, 220.
 Starlings, 50, 139, 143, 181, 253, 313.
- Stitchworts, 13, 14.
 Stoats, 33, 51, 52, 248.
 Stonechats, 54, 71.
 Stonecrops, 235, 236.
 Stubble-fields at night, 262.
 Succory, 174.
 Sulphur moths, 97, 99.
 Summer, coming of, 1 *et seq.*; drought in, 307; nights of, 22-33; turning-tide of, 203-209.
 Summer snowflake, 76.
 Sun, heat of, 306.
 Sundews, 296.
 Sunlight, importance of, 47-49.
 Swallow-tail moth, 97, 99.
 Swallows, 27, 86, 182, 288.
 Sweet chestnut catkins, 205, 206.
 Sweetbriar, 61, 64.
 Swift-moths, 23, 24, 100.
 Swifts, 10, 65, 86, 240.
 Sycamores, 307; on walls, 229, 230.
 Syringa, 10.
- TAMARISKS, 333.**
 Tares, 261.
 Tea-plant, 333.
 Teasels, 82.
 Tench, 323.
 Tennyson, quoted, 8, 10, 197.
 Terebella, 273.
 Terns, 330.
 Thistles, 159.
 Thorn moths, 95.
 Thrushes, 25, 26, 56, 66, 141, 143, 145, 181, 209, 318, 333; young, 143, 145.
 Thunderstorms, 210-216.
 Tide, the rising, 274.
 Tide-mark, below the, 264-275.
 Timothy grass, 134.
 Tits, 49, 72, 148, 232, 288; blue, 10, 67, 146, 147, 148; great, 8, 50, 147, 148.
 Toadflax, 164, 234, 235.
 Toads, natterjack, 297.
 Tobacco plant, 49.
 Tomatoes, 49.
 Tortoise-shell butterflies, 37.
 Totter-grass, 134.
 Travellers' joy. *See* Clematis.
 Tree-pipit, 69.
 Trees, their struggle for light, 43-49.
 Trout, ways of, 185-196.
 Tulip-tree, 46.
 Turnip moths, 99.

- Turtle-doves, 10, 26, 65, 183.
Twitch, 135.
- UMBELLIFEROUS FLOWERS,
120 *et seq.*
- VALERIAN, 78, 234.
Vapourer moth, 96.
Venus's comb, 163; looking-glass, 163.
Vetches, 161, 162, 261; horse-shoe, 107; kidney, 108.
See Ladies' fingers.
Villarsia, 78.
Viper's bugloss, 106, 116.
Voles, water, 325.
Vultures, flight of young, 152 *et seq.*
- WAGTAILS, 72, 138, 147;
grey, 331; pied, 89, 147,
331; yellow, 332; water,
27, 87, 142, 151.
Wallflowers, 229, 233.
Wall-gardens, wild, 228.
Warblers, 27, 30, 53, 67, 288;
grasshopper, 30, 67; reed,
10, 53, 87; sedge, 27, 28,
88, 182; willow, 66.
Wasp, the yellow, 276-282.
Water-cress, 78.
Water-beetles, 83, 221.
Water-boatmen, 83, 221, 222.
- Water flora and fauna, nomen-
clature of, 80.
Water-guelder blossoms, 120,
124, 125.
Water-lilies, 78, 120.
Water-plantain, 79.
Water-plants, 74-82.
Water-rats, 91.
Water-scorpions, 222.
Water-snails, 83.
Water-speedwell, 78.
Water-violet, 77.
Wayfaring tree, 10, 120.
Weasels, 51, 56.
Weaver-fish, 274.
Weeds, 157.
Weevils, 10, 219.
Welsh trout stream, 188.
Wheat, 258.
Wheatears, 332.
Whelks, 268.
Whinchats, 54.
White, Gilbert, 29, 297.
Whitebeam, 118, 120, 124,
125, 204.
White butterflies, 307.
White-letter hairstreak butter-
fly, 171, 172.
Whitethroat, 2, 58, 72.
Widgeon, 264.
Wild cats, 248.
Wild duck, 56, 128, 243, 314,
320, 329.
- Wild geranium, 46.
Wild roses, species of, 63, 64.
See also Dog-rose.
Willow beauty geometer moth,
102.
Willow-warbler, 66.
Willow-wren, 147.
Willows, 82.
Wire-worms, 218.
Witchell, quoted, 68.
Woodpeckers, 148; green,
143, 300; pied, 144;
spotted, 143, 144, 184,
232.
Wood-pigeons, 146, 204,
287.
Wood-wren, 68.
Wordsworth, quoted, 7.
Woundwort, marsh, 78, 309.
Wrens, 33, 182; golden-
crested, 67, 72; willow,
147; wood, 68.
Wrynecks, 11, 65.
Wych - elms on walls, 229,
230.
- YEW-TREES, 106, 118; on
walls, 232.
Yellowhammer, 33, 71, 180,
182.
Yellow rattle, 11.
Yellow underwing moths, 96,
97, 99, 100.

INDEX

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