

WALKS ABROAD



AND
EVENINGS
AT
HOME.

JL



“Life is onward, use it with a forward aim.”

WALKS ABROAD

AND

EVENINGS AT HOME

“Go abroad
Upon the paths of Nature, and when all
Its voices whisper, and its silent things
Are breathing the deep beauty of the world,
Kneel at its simple altar; and the God
Who hath the Living Waters, shall be there.”

WILLIS.

“Now stir the fire, and close the shutters fast,
Let fall the curtains, wheel the sofa round,
And while the bubbling and loud-hissing urn
Throws up a steamy column, and the cups,
That cheer but not inebriate, wait on each,
So let us welcome peaceful Evening in.”

COWPER.

WITH NUMEROUS ILLUSTRATIONS

LONDON
HOULSTON AND WRIGHT .

65, PATERNOSTER ROW

MDCCLXI

LONDON:
PRINTED BY J. AND W. RIDGE,
BARTHOLOMEW CLOSE.

PREFACE.

IN "WALKS ABROAD AND EVENINGS AT HOME" are combined two of the most striking features in the English character,—the love of the social Walk, and of the domestic Fireside.

It is the author's earnest desire to promote still further the cultivation of this peculiar and pleasing trait in the disposition of his countrymen; and he offers this volume in the hope that it will be found not only a useful and agreeable companion during the Summer, when the Fields, the Rivers, and the Woods are teeming with life and radiant with beauty, but also in the Winter, when kindred faces meet around the family hearth, and

" Fireside enjoyments, homeborn happiness,
And all the comforts that the roof
Of undisturbed Retirement, and the hours
Of long uninterrupted evening know."

The story of the "ADVENTURES OF PRINCE PRETTY IN THE INSECT WORLD OF WONDERS" is intended to create an interest in one of the most pleasing of all studies, that of Entomology. The fictions of the tale are all founded upon the realities of Nature. Any one who reads the imaginings of "PRINCE PRETTY" may himself become a prince crowned with the golden honours of

Knowledge, if he will pursue similar investigations with equal zeal and industry.

To those who are indifferent to the study of Nature, the following appropriate passage from "Beattie's Essays," may be given by way of admonition:—"It is strange to observe the callousness of some, before whom all the glories of Heaven and Earth pass in daily succession, without touching their hearts, elevating their fancy, or leaving any durable remembrance. But there are minds of a different make, who, even in the early part of life, receive from the contemplation of Nature a species of delight which they would hardly exchange for any other. Such minds have always in them the seeds of true taste, and frequently of imitative genius. In the crowded city, the solitary isle, the flowery lawn, and craggy mountain; in the murmur of the rivulet and in the uproar of the ocean, in the radiance of summer and gloom of winter, in the thunder of heaven and in the whisper of the breeze, he still finds something to rouse or to soothe his imagination, to draw forth his affections, or to employ his understanding."

LONDON, 1st June, 1861.

CONTENTS.

	PAGE
ADVENTURES OF PRINCE PRETTY IN THE INSECT WORLD OF WONDERS:—	1
CHAPTER I. The Birth of Prince Pretty	3
CHAPTER II. A Morning Call—A Trip to a Watering Place	7
CHAPTER III. A Cold Bath—An Unlooked-for Catastrophe— Faint-heartedness—New Resolutions—Sound Precautions	20
CHAPTER IV. Confidence Regained—Amende Honorable— A Warm Reception in a Cold Element—Submarine Investigations—A Crystal Palace—A Sad Episode	24
CHAPTER V. Tubular Dwellings—An Unexpected Shock—A Day of Life—A Lesson for Wives—A Change of Attire— A Sudden Elevation—Dangerous Associates	31
CHAPTER VI. A Partial Rebellion—"Spinning a Yarn"—A Spider's Account of His Tribes—Moral	43
CHAPTER VII. A Full Brass Band—Fresh Invitations—A very Stinging Controversy—Dishonesty and Intemperance— A Ride on a "Humble" Charger—The Ins and Outs of Singular Habitations	52
CHAPTER VIII. A Humble Community—Hives of Industry— Division of Labour—Creating a Queen—A Deadly Combat —The Best have Enemies	64

	PAGE
CHAPTER IX. Living Lamps—A Grand Illumination—Sacred Characters—Labourers in Diamonds—The Old Sexton	74
CHAPTER X. A Glorious Assembly—The Perils of Beauty—Wonderful Metamorphosis—A Mournful Train, and a Transformation—The Poet Awakes	84
ALBATROSS, THE	285
ALLIGATORS	292
ANIMALS, ELECTRICAL PHENOMENA IN	240
ANIMALS, EXPERIENCE IN	198
ANT BEAR AND THE SLOTH	263
AVALANCHES	174
AURORA BOREALIS, THE	193
BALLOONS, HYDROGEN GAS, AND HEAT	318
BEAR, THE	254
BIRD, THE HUMMING	124
BIRDS' NESTS	108
BIRDS, AT WHAT HOUR DO THEY AWAKE?	112
BIRDS, LOVE OF	115
BIRDS, AN ASYLUM FOR	116
BIRDS (PET) OF INDIA	288
BIRDS, SONG, KILLED BY MISTAKEN KINDNESS	120
BOTANICAL ADVENTURE NEAR THE LAND'S END, CORNWALL	144
BUTTERFLY'S BIRTH-DAY	89
CAVERNS	167
COTTON	299
CROCODILE, THE	278
EAGLE, THE	280

	PAGE
ECHOES . . . . .	. 164
ECLIPSE, FIRST PREDICTION OF AN . . . . .	. 245
FISH, WHY THEY CANNOT LIVE OUT OF THE WATER . . . . .	. 101
FIELDS, GO FORTH INTO THE . . . . .	. 105
GALL NUTS . . . . .	. 287
GIGANTIC SEA WEEDS . . . . .	. 100
HERBS, STRUCTURE OF WOODS AND . . . . .	. 301
HISTORY OF REYNARD THE FOX . . . . .	. 199
HURRICANES, WHIRLWINDS, SIMOOMS, &c. . . . .	. 188
HYMN OF NATURE . . . . .	. 106
ICELAND, THE GREAT GEYSER IN . . . . .	. 191
IGNIS FATUUS, OR JACK O' LANTERN . . . . .	. 316
LEAF BUDS . . . . .	. 134
LEAF, FALL OF THE . . . . .	. 151
LESSON, THE . . . . .	. 155
LIFE OF A PLANT . . . . .	. 127
LION, THE . . . . .	. 248
MIGNONETTE . . . . .	. 141
MORNING CALL, THE . . . . .	. 104
NATURAL PHILOSOPHY, SIX EXPERIMENTS IN:—	
I. THE RING AND THE CORD . . . . .	. 323
II. THE FLYING TOP . . . . .	. 324
III. THE MOUSE AND THE TRAP. . . . .	. 325
IV. THE AIR BLADDER . . . . .	. 326
V. THE FLYING HORSE . . . . .	. 327
VI. THE INVERTED TUMBLER . . . . .	. 328
OCEAN, THE . . . . .	. 92

	PAGE
PARACHUTES . . . . .	. 320
PARROT AND THE CHILD . . . . .	. 122
PASTIMES AND HOLIDAYS . . . . .	. 161
PEARLS . . . . .	. 311
PEBBLE AND THE ACORN . . . . .	. 139
RAINBOW, THE . . . . .	. 156
RAPIDS . . . . .	. 179
REYNARD THE FOX, THE HISTORY OF . . . . .	. 199
RHINOCEROS AND THE HIPPOPOTAMUS . . . . .	. 266
RIVER, THE FLOWING . . . . .	. 138
SEA WEEDS, GIGANTIC . . . . .	. 100
SERPENT, THE . . . . .	. 273
SPARROW AND THE CAGED BIRD . . . . .	. 121
STRUCTURE OF WOODS AND HERBS . . . . .	. 301
TIGER, THE . . . . .	. 258
VOLCANOES . . . . .	. 183
WILD BOAR, THE . . . . .	. 262

WALKS ABROAD

AND

EVENINGS AT HOME.

ADVENTURES OF PRINCE PRETTY IN THE WORLD
OF INSECT WONDERS.

INTRODUCTION.

IN whatever light we may consider the various living creatures that comprise the Insect World, we are constrained to admire the beauty of their colours, the diversity of their habits, the surprising development of their instinctive faculties, and the great part which they take in keeping up the harmonies of Nature.

In variegation, insects certainly exceed every other class of animated beings. Nature, when painting them, sometimes imitates the clouds of heaven; at others, the meandering course of the rivers of the earth, or the undulations of their waters: many are veined like beautiful marbles; others have a semblance of a robe of the finest network thrown over them; some she blazons with heraldic insignia; on others she portrays, with mystic hand, what seem like hieroglyphic symbols.*

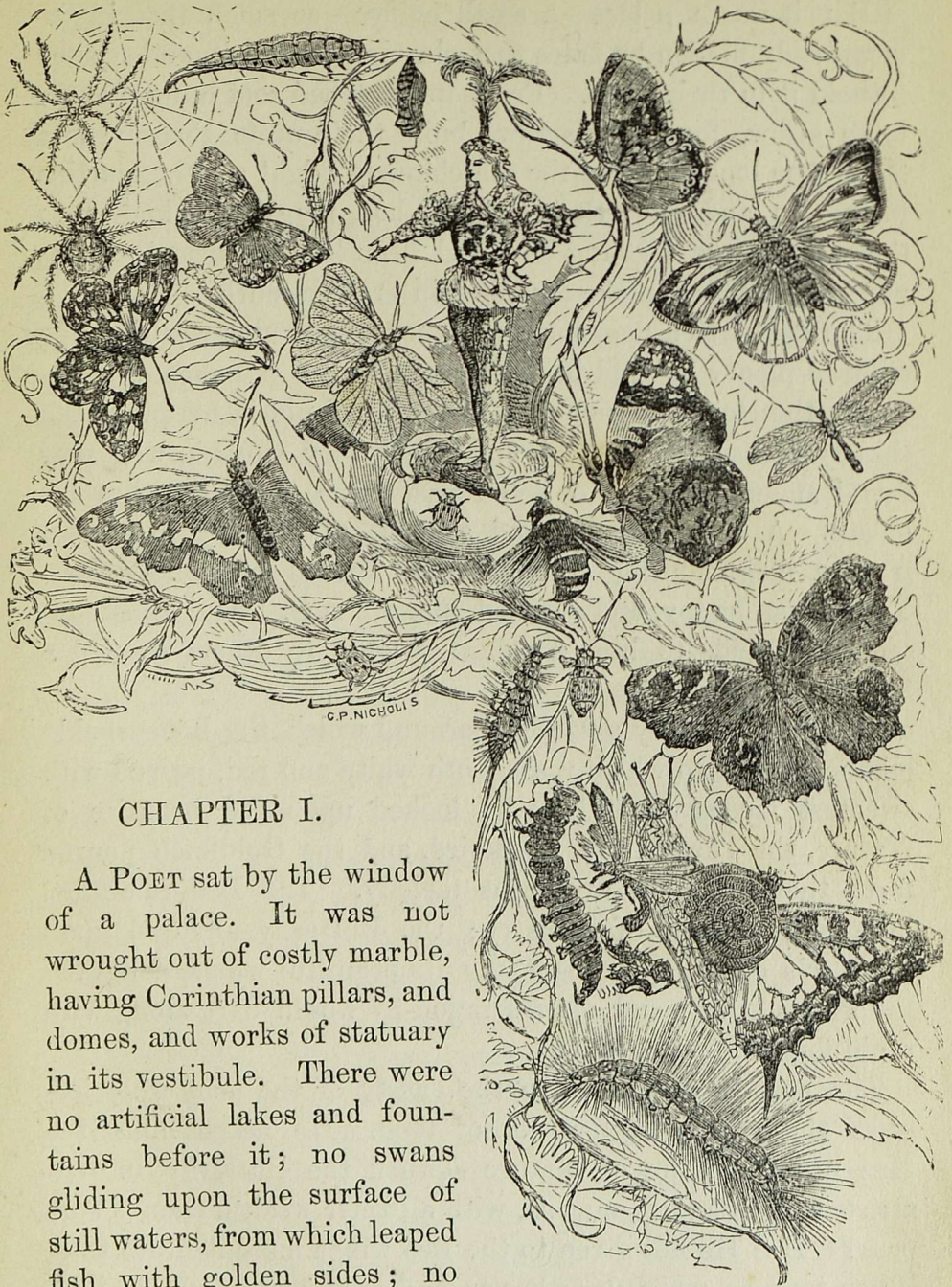
* Kirby and Spence's "Entomology."

Amongst the most perfectly organized tribes of the lower animals, as well as in the most stupendous objects of the animated world, we trace the wisdom of Creative Power:—

“Through subterranean cells,
 Where searching sunbeams scarce can find a way,
 Earth animated heaves. The flowery leaf
 Wants not its soft inhabitants. Secure
 Within its winding citadel, the stone
 Holds multitudes. But chief the forest boughs,
 That dance unnumbered to the playful breeze,
 The downy orchard, and the melting pulp
 Of mellow fruit, the nameless nations feed
 Of evanescent insects. Where the pool
 Stands mantled o'er with green, invisible,
 Amid the floating verdure millions stray:
 Each liquid too, whether it pierces, soothes,
 Inflames, refreshes, or exalts the taste,
 With various forms abounds. Nor is the stream
 Of purest crystal, nor the lucid air,
 Though one transparent vacancy it seems,
 Void of this unseen people.”

“Such are the genuine charms of this branch of the study of Nature (remarks Mr. Spence), that here, as well as on the Continent, Entomology divides the empire of public favour with her sister Botany. ‘*To see all things in God*’ has been accounted one of the peculiar privileges of a future state; and in this present life, ‘*to see God in all things*’—in the mirror of Creation to behold and adore the reflected image of the Creator—is no mean attainment; it possesses this advantage, that thus we sanctify our pursuits, and, instead of loving the creatures for themselves, are led, by the survey of them and their instincts, to the love of Him who made and endowed them.”

It is the purpose of Prince Pretty to pursue these descriptions more fully, and to illustrate not alone what Insects are, but what they do.



CHAPTER I.

A POET sat by the window of a palace. It was not wrought out of costly marble, having Corinthian pillars, and domes, and works of statuary in its vestibule. There were no artificial lakes and fountains before it; no swans gliding upon the surface of still waters, from which leaped fish with golden sides; no peacocks spreading their beautiful feathers to be fanned by the gentle breeze.

But it was a palace—a small edifice—so small that it was completely hidden by trees that clustered round it, and seemed to hold it in their arms. From its thatched roof hung many a loose straw, for the sparrows built their nests therein; and those who looked up to the old chimney might see the martins flitting in and out; that chimney had long been known to them, and many a young bird had been hatched near the spot whence its white smoke ascended in graceful curls.

The Poet was a poor man, if money constitutes wealth. He enjoyed plenty of gold in the flowers, in the plumage of birds, and in the clouds at sunset. But he had not in his purse the thing which men call gold, and which they worship with profound superstition. No rich repasts were spread within his palace. A cup of water and a crust of bread, with cresses from a neighbouring stream, often formed his simple fare. Yet he was happy, and deemed himself rich. And thus contentment made to him a palace of what to others seemed a humble cottage.

He was sitting by a window, around which the honeysuckle climbed, and into which roses, both white and red, peeped with sweetest modesty; and as he looked upon the beauties of Nature, the Thrush, the Blackbird, and the Goldfinch poured forth their notes of rapturous melody. The Bee came by, humming its song of industry; the Butterfly alighted upon the rose's cheek, and, displaying its beautiful wings, delighted the Poet's heart; and oft a Dragon-fly would dart along with rapid flight.

The poet meditated upon the vanity of the man who despises these wonderful works of God. He asked himself—Has not the King of Nature clothed the Butterfly in rich attire, which earthly queens, with all their wealth, cannot surpass? Has He not given to the Bee wings more delicate than silken texture, which bear her to and from her honeyed hive? and is not her body begirt with rings of gold and garments of velvet? And the Poet longed for the eyes of an insect, for an

insect's little form and wings, that he might go forth and commune with these fair creatures, and mark their ways and works.

He remembered fairy tales of old, and the song he had been taught in his nursery,—

“Come, take up your hat, and away let us haste
To the Butterfly's ball and the Grasshopper's feast;”

and he grieved that these stories were imaginative, and that they were now to him but the memories of childish illusions, before which the curtain of stern reality had fallen. He longed for some Queen Mab to give him the form and instinct of the insect tribes. And the Poet's imagination became strong with his desires. At length he thought that the insects found voices which he could understand.

Thus it was with him when the Dragon-fly said, “Come with me to the water's brink, and I will show you wonders that shall delight and edify your soul. You shall stand upon the leaf of a lily, and, looking down into crystal waters, shall see a new world composed of creatures of most beautiful and curious forms and colours. You shall see in this miniature world beasts of prey more ferocious than the wolf or the lion; you shall see how they change their shapes and their habits of life—now actively swimming the stream, then lying motionless at its bottom or floating heedlessly about, and, lastly, quitting the water, becoming tenants of the air, more active than the bird, and equally joyous!”

And the Bee said, “Come with me, and I will show you wondrous examples of skill and industry. I will take you into our hive, and give you audience with our Queen; she will command our tribe to pay you homage, and you shall pass through the galleries of our workshops, and see how we build our cells and store them with honey!” And the Ant came and said, “I will take you to our hills, and you shall witness our skill. We have places of curious construction beneath the ground. You shall see the wonderful architecture of our

homes; you shall review our armies, and see how we care for each other and for our young!"

The poet heard many insects thus appeal to him; and he sat in meditation until the golden tints of evening fell upon the hill-tops, and tipped the trees with a celestial beauty. As the insects sped their way homewards, they called at the Poet's palace, and again and again made great promise of the wonders they would show him if he became one of them. At length the grey twilight descended like a veil upon the reposing earth; and then there came to the Poet's window a new order of guests, the Moths, with soft and silken down upon their wings, and stripes of silver and of gold, of velvet and of ermine, upon their bodies.

And with them came Beetles humming a drowsy song; and the Poet saw that their backs were guarded by plates as lustrous as diamonds and as rich as rubies. These all moved him more and more to vivid imagination and strong desire; and when he heard the Cricket's voice appealing to him from his own hearth, he fell into a reverie in which his very nature seemed to change. He became a tiny thing, smaller than his smallest finger had been. Before him lay a wardrobe composed of the wings and plumes of insects; there were also their weapons of attack, their instruments of labour, their breast-plates, and their shields. Habiting himself in some of these, the poet looked beautiful, and seemed almost to be an insect. He wore a cap taken from a Moth's head, and on it he placed two beautiful plumes. Around his body he wrapped a garment made of Butterflies' wings; and his pantaloons, which fitted tightly to his shape, were formed of the skins of Caterpillars, striped elegantly with green and gold. And thus Prince Pretty, the hero of the poet's imagination, was born, and became invested with powers which no human prince ever possessed. Laying himself down upon a leaf, which rested upon the oriel, he was lulled to sleep by the song of the Nightingale.

CHAPTER II.

A MORNING CALL—A TRIP TO A WATERING PLACE.

THE twilight soon fled, for it was the season of much sunshine. As soon as the first rays of light fell upon the dewy cups of the flowers, the Sparrows twittering from the shed aroused Prince Pretty. The songs of the feathered warblers seemed to commence unusually early on this morning. Rich notes came, as it were, fitfully from half-sleeping birds, as though they knew it was a season of great gladness, and that they must arouse before their accustomed time. A large dew-drop upon a neighbouring leaf invited the Prince to his toilet; and scarcely had he completed its routine, when he received the salutation of the Bee, who had already been on her rounds and stored her bag with sweets.

“Good morning, Prince,” said the Bee; “how well you look! See! I have brought you some honey for your breakfast; it is quite fresh from this morning’s flowers. I passed you while you were yet asleep, and before the Moths had gone to rest, determined to be the first to greet you upon your awakening, and to supply you with your morning repast.”

“Thank you, good Bee,” said the Prince. “I am sorry to trouble you so early. It must have cost you much labour to bring me such sweet morsels before the flowers have unfolded.”

“I never heed trouble,” said the Bee. “He who halts to count the cost of his gain, labours with a faint heart, and prospers little. So I go on cheerfully, and if the golden chalices prove empty, I still rove about, assured that Nature has stored honey somewhere for those who seek it. And I

have ever found that a busy day has brought some reward at night, even though the morning proved hopeless."

"That's a good philosophy," replied the Prince. "And now, what am I to do to-day? Shall I carry your honey-bag, and follow you to the flowers?"

"Oh no, no!" said the Bee; "I have carried my bag from my birth, and am not too proud to bear it now. But you are a *prince*, and are to be privileged by being waited on by all our tribes. So talk no more of carrying bags, or that lazy fellow the Drone may have impudence enough to take advantage of your simplicity, and make you collect sweets for him to gloat upon. You will find enough to do in a princely way, for good princes are far from idle, though they toil not in the ranks of the producers. I see your friend the Dragon-fly coming this way, and, following him, a host of Butterflies and other goodly folk. You may expect a large gathering, for it went abroad last evening that Prince Pretty was about to visit the insect kingdoms. Every flower I have visited this morning had some inmate who insisted upon telling me that which I already knew. I thought I should never get away from a gossiping Humble-bee whom I met in a convolvulus. She actually stopped the outlet, and would not let me escape until I indulged her love of tattle. I didn't tell her that I was about to visit you, or she would be here, making a great buzz before you are ready to receive visitors. So to-day will be a great holiday, and you must keep up your dignity as a prince. You should see our queen—how *she* upholds her regal station! She carry a honey-bag! ha! ha! No, no, Prince. But here they come!"

Scarcely had the Bee finished this speech than the visitors came in rapid succession. First, the Dragon-fly, and then the Butterflies, among whom were the Queen of Spain, the Purple Emperor, the White and Red Admirals, the Painted Lady, and a whole throng of equally illustrious personages. There were Bees and Wasps of different kinds, Earwigs, Caterpillars,

and Grasshoppers; and they all seemed to have donned their best for the occasion. As the sun fell upon their gorgeous costumes, it lit up an array of beauty unsurpassed even by the brilliant gathering in the Crystal Palace, when a beloved Queen and a noble Prince opened that arena of artificial wonders.

The throng was so great, that the branches upon which they stood were completely covered, and in some places drooped down with their weight. Even some Moths and Beetles that had gone to sleep beneath the leaves, and in the niches of the window, roused up and made an effort to face the bright light of the morning. As soon as the first excitement subsided, the assembly sung the following

SALUTATION TO THE PRINCE.

Welcome, Prince, to our native bowers,
Where, through the sunny day,
We merrily dance round the loveliest flowers,
Or flit from spray to spray.

From the rose's cheek we kiss the dew;
On plates of gold our meals are spread;
And when we sleep, the stars peep through
The curtains of our bed.

We wake with all things bright and fair,
And spreading our silken wings,
We float upon the perfumed air,
While the skylark o'er us sings.

We have no care for the future hour,
Our life is a blissful day;
And when the clouds begin to lower,
We hide till they pass away.

Then forth again to our sports we come,
With our spirits ever bright:
Hark! hark! 'tis the Insect's cheerful hum,
As he sports in the golden light.

Hark! hark! Hark! hark!

To this the Prince replied: "Queens, emperors, nobles, and workers of the insect race, accept my thanks for the homage you pay me—for this brilliant reception on the threshold of your fairy world. Every way I turn I see beauties that fascinate my sight, and wonders that elevate my soul. It is my intention to devote a short season to intercourse with your several tribes, that I may learn your feelings and habits, and be able to speak elsewhere of the wonderful beauties and powers with which you are blessed. For in the court from which I appear as an ambassador, much want of knowledge prevails upon a subject so full of interest and profit to those who would understand their relation to that great Creator who cast the spangles over your wings, who gave your small but lustrous eyes their wonderful powers of sight, who imparted to you the instincts by which you are led to fulfil the routine of life for which you are peculiarly adapted, who watches over you when you slumber in tiny eggs, who prepares the nourishing food for you when you burst from their confines, who guards you when again you fall asleep in your chrysalides, and who sets before you the golden cups of nectar when, upon angelic wings, you enter the insect heaven. Lead me, therefore, to the hive of the Bee, the nest of the Hornet, the tent of the Leaf-roller, the stores of the Humble-bee, the hill of the Ant, the hermitage of the Gall-fly, the grotto of the Mason-bee, the gondola of the Gnat, the retreat of the Glow-worm, the cocoon of the Silkworm, the pit of the Ant-lion; and, rely upon it, that my intentions are pacific, and that my chief desire is to establish an Exhibition of the Industry and Art of all Insects, for the promotion of useful knowledge, and the establishment of proper ties of fraternity between the highest and the lowest grades of God's creatures!"

The conclusion of this address was followed by a loud buzz of applause.

The Queen of Spain Butterfly was then about to speak, when the company was alarmed by the branch on which they met

being terribly shaken. The Dragon-fly, looking down with his large, piercing eyes, soon discovered the cause. A snail, coming to the meeting, had endeavoured to be in time, but, as usual, proved too late for anything but disappointment to himself and annoyance to others. Finding, as he drew near, that the proceedings were already far advanced, and wishing to be in time to hear the Prince's speech, he made a desperate effort to increase his speed; and when he had nearly reached the spot, he fell down to a lower branch, and thus sorely affrighted the assembly.

"That's like you, stupid Snail!" exclaimed the Wasp—"always interrupting harmony by your sluggishness. Why don't you rise earlier and walk faster, or remain away?"

And many other insects joined in the condemnation, so that a murmur ran through the assembly, and the presence of the Prince seemed almost forgotten in the annoyance caused by the Snail, and his altercation with the Wasp.

"Allow me to explain," said the Snail, as he coolly and deliberately advanced towards the Prince, almost damaging in his course the wings of the Painted Lady and the Purple Emperor. "It is all very well for you who bear no burden to complain of the slowness of those who do. If, like you, Mrs. Wasp, I had the audacity to damage an old tree already weak with age, to build an elaborate house therein, or to burrow in the thatch of a poor farmer's house, and make way for the rain to drop down upon his grey head, that you may find accommodation to store away the good things you often pilfer from your neighbours; or if, like you, Mrs. Bee, I had a house constructed for me, covered nicely, and kept warm with straw, and a queen and guards to keep watch over that house and its stores; or if, like Mr. Dragon-fly, I had long and light wings, and large eyes, to see all points of the compass at the same moment, I should get about much more nimbly. My shell is my only house—my own little freehold, without a window in it, and only one door. It is a rude, plain edifice; but then it belongs to me,

and I carry it wherever I go. So now, Mrs. Wasp, as you seem very much disturbed, just get into my house while I slip out of it, and see how you will get on with its weight upon your back!"

The Wasp appeared to be very wrath at being thus spoken to in the presence of the Prince, and once or twice her sting was seen darting out. Her better sense, however, prevailed. But she determined not to be abashed, and, with confidence enough to attempt anything, she accepted the challenge of the Snail. A circle was therefore made, and the Snail, vacating his shell, was polite enough to hold it up until the Wasp had fairly arranged herself under it, then, dropping it down, the Wasp was at once a prisoner, and quite unable to move about. She made such a buzzing noise in her prison, that the ears of the spectators were almost stunned. The Snail then, with an air of composure and triumph, lifted up the shell, and the Wasp flew out; and while the latter set her crumpled wings in order, the Snail contentedly resumed his burden, and received the apologies and sympathy of many of the company. He was even complimented by the Prince, who said, "Snail, I see that those who judge without proper examination, will probably fall into error, and that a good test of others' character is, to endeavour to try ourselves by their circumstances!" *

A question then arose as to the disposal of the Prince's first day, and to whom the honour should belong of first conducting the Prince to a tribe. There was much jealousy excited, amid which the Moths and Beetles clamoured with rather an ill grace, since it was evident that they were nearly asleep, and, though their hearts partook of the general enthusiasm, their heads were too drowsy to enable them to wait upon the Prince in

* Snails do not belong to the Insect tribes, but to the class *Gasteropoda*, animals which move from place to place by means of a fleshy disc, or foot, situated under the abdomen. In the adventures of Prince Pretty, many small creatures, not properly insects, but often associated with them, will be adverted to.

a becoming manner. Seeing this, his Highness dismissed them with many thanks, saying that he would pass an evening or two with them very soon,—that they would, in fact, have a star-light banquet, and that, to give increased interest to the occasion, the Glow-worms, and many illustrious Beetles, Fireflies, and Lantern-flies from abroad, should be invited to attend.

Thus one portion of the jealous competitors was got rid of, and, after some arbitration by the Snail and the Humble-bee, it was determined that the Dragon-fly, as a very noble and powerful insect, and identified with a long and illustrious race, should be the Prince's first escort. The assembly then separated to spread the news, and the Dragon-fly waited upon the Prince a short interval before starting.

Those who walk the earth, and view its beauties in a line of vision almost level to the surface, before whom even low hedges and small bushes become impeding obstacles to the sight, can form but a very imperfect idea of the beauties displayed to the eye of the bird as it soars over every object, and looks down upon the fair face of Nature, enjoying a far-spreading and uninterrupted prospect. Instead of viewing fields of corn and grass by the horizontal line formed by myriads of waving heads, the bird looks down between the uprising stalks, and recognizes the deep colours of flowers, and the delicate tints of variously-shaped leaves, that flourish close upon the earth, and afford a rich exhibition of spangled loveliness as the gentle winds sweep across the surface, and spread apart the tall stems that cluster thickly together. Rising higher, the trees are revealed, with their branches spreading flatly, and undulating like the waves of the sea when stirred by the winds. Cattle appear to change their shapes, for their backs alone are seen, and they move along as if sliding upon a level tract, rather than by moving their lower limbs in active exertion. Houses appear but a congregation of slate-covered sheds; and the earth seems as a map, whose streams and seas, woods, hills, and dales

are marked by various lines, and distinguished by contrasting colours.

Equally imperfect is the conception of those whose lot it is to tread the earth by slow and laboured paces, of the delight which arises from a free and rapid motion upon that light and intangible fluid called the air. One flutter of her pinions, and away the bird glides, upheld by some ethereal power, too delicate to be recognized; another motion, and the course is altered; the inclining of a feather elevates or depresses the altitude of the rejoicing creature, which almost realizes to itself the ecstasy of instant motion without labour. Oh, how delightful it must be to stretch out upon an ærial bed—to behold the earth at a distance, and not be drawn towards it by the force of gravitation,—to move at will, to feel spirit-like, and to rest luxuriously upon something more hidden from the senses than the summer cloud. No wonder that the skylark sings so joyfully when, gently unfolding his little wings, he mounts upward to the sun, as though his immediate destiny were heaven!

The Prince had mounted the back of the Dragon-fly, and the latter, as if proud of his imperial burden, soared higher than his accustomed flight. It was then that the Prince first realized the sensations we have endeavoured to describe. The Dragon-fly sailed steadily upon the wing in the direction of the water-side, with the intention of showing to the Prince the wonders of an insect ocean, and the Prince, just beginning to feel himself comfortable in his seat, looked down upon the scene below, and began meditating upon its beauties, when suddenly the Dragon-fly started off at a furious flight, now darting forward, then back, then up and down, then over hedges and bushes, and between the long grass, until the Prince was nearly thrown off, and began to cry out from very terror. It was not, however, until the Dragon-fly had captured the prey, which had attracted his piercing eye, and

excited his carnivorous appetite, that he gave over the chase, and relieved the Prince from the fears that terrified him.

“How is this?” exclaimed the Prince, getting off from the back of the Dragon-fly, as the latter alighted upon the frond of a fern. “You have nearly frightened me to death; every moment I expected to be tossed on to the venomous leaf of a nettle, or the sharp prickles of a thorn!”

“Pardon me, your Highness; I had not breakfasted this morning; and when I saw this fine Gnat cross my way, I could not resist the temptation to catch and devour him. Allow me to finish my repast, and then we will speed on our way without interruption!” The Dragon-fly having thus explained, the Prince bowed acquiescence, and, dismissing his fears, descended and plucked a clover leaf, with which he fanned himself, for excitement had made him very warm. The Dragon-fly then stripped the Gnat of his wings, and, as the saying is, “made small work” of the rest of him.

“I had always understood,” said the Prince, “that you were a ‘horse-stinger,’ and lived by withdrawing blood from those larger animals—such was the tale told me in my youth.”

“There are many strange tales told of our tribes,” replied the Dragon-fly, “that have no foundation in truth: our food consists of butterflies, case-flies, gnats, and other creatures, for which we are ever on the chase. You see our wings are constantly open, like the sails of a revenue cutter, ready for pursuit; and when we mark our prey, we dart upon it with a rapidity that is certain of success; while our large eyes endow us with such perfect vision, that we see the minutest objects in every direction, no matter how rapid may be our flight.”

“Formidable enemies you must be, I confess,” said the Prince. “There is one question I should like to put to you, before we proceed. I have never noticed what may be called *young* Dragon-flies; you appear to spring into existence full grown. I know that there are Scorpion Flies, and Lace-wing Flies, similar to and smaller than yourself; but they are also perfect

and full grown whenever they appear. Tell me, therefore, whence you come."

"Come!" that is one of the very purposes for which I am now bearing you to our watery cradle. We are all produced from eggs, deposited by our parents in water; these sinking to the bottom, are hatched, after a certain period, into *larvæ* of a dusky brown colour; as we advance in age, in this state, we throw off our skins several times; then we pass into what is called the *pupa* state, when our future wings begin to appear, carefully shielded, by the case which covers us, from injury by the water. While in the *pupa* state our heads are armed with a most singular organ for seizing our prey; we possess a kind of flat proboscis, or trunk, with a joint in the middle, and a pair of strong hooks or prongs at the end. This proboscis we fold in such a manner as to lap over our faces like a mask; but when we espy any insect that we desire to attack, we doff the mask, stretch forth the proboscis, and seize our prey."

"Scarcely a fair method of battle," exclaimed the Prince.

"Battle it is not," rejoined the Dragon-fly; "it is our means of obtaining subsistence, and the provision given us for this purpose is most perfect. We are not, in the water, capable of any degree of speed: and if our prey knew of our approach, they would, by their greater rapidity, escape us, and we should perish. We therefore disguise our faces, and, before they are aware of it, they are seized and devoured, undergoing an almost painless extinction."

"But you have not yet told me of the process by which you become perfect flies," said the Prince.

"We continue in the *larva* and *pupa* states," answered the Dragon-fly, "for two years, when, having attained our full size, we prepare for the ultimate change. Creeping up the stem of some water-plant, and grasping it with our feet, we make an effort by which the skin of the back and head of the *pupa* case is forced open, and then we emerge, our head and wings first appearing. At first our wings are very tender and contracted;

but in half-an-hour they freely expand, and acquire the strength and solidity necessary for flight. This curious process usually occurs on a fine sunny morning, when it may be witnessed by the brook-side, by those who love to study Nature's works."

And how long do you live?" inquired the Prince.

"Alas! but a few sunny weeks. Scarcely do the first frosts of winter nip the tenderest buds, than we resign our life to Him who gave it."

"It is the course of Nature," replied the Prince; "and we must not complain of what we lose, but rather be thankful for that which we enjoy. But you have rested, and it is now time for us to proceed upon our journey."

"I am ready now," said the Dragon-fly, alighting at the Prince's feet; and in another moment the two soared away over hedges and bushes, through brakes and across meadows, until they reached a large pond, formed by an inlet from a river that flowed through a marshy country. There a new field of beauty opened to the Prince's view. Tall bulrushes waved their down heads, and around were seen in wild profusion the long, broad grasses, and the luxuriant flowers that have their resort by the water-side in the summer months. There was the water aven, with its bright yellow blossoms—the marsh cudweed, with its leaves mantled in silky down; there were also the water bed-straw, the water crow-foot, the marshwort and hemlock, the marsh orchis, the blue forget-me-not, the water violet; and lilies, purple, yellow, and white, raising their lovely heads above the water's surface, and seeming proud of their fair images reflected in the glassy mirror beneath them.

The Dragon-fly set the Prince down, a little way from the shore, upon the leaf of a lily. "Now, Prince," said he, "I want you to go beneath these waters, to explore the beauties and the wonders therein!"

"Why?" interrogated the Prince. "Is not my business

with the insect tribes? Why, then, start me upon a submarine excursion, when I had looked for another course?"

"There, Prince, you are mistaken; this is the very purpose for which we set out. Not only my own tribe, but of all the insects that flit around you in the summer air, a large proportion are first developed and approach maturity in the water. And this is, perhaps, the greatest wonder of the insect world, that we change the very element in which we live, and often, with that change, assume new habits—sometimes the opposite of those we once pursued. And as to our shapes, no transformation for a bal-masque was ever more complete than that which some of us undergo. Even I, rich with colours and light of wing, was once an inhabitant of this very pond, as I have already explained, and was then comparatively a lifeless, ill-looking, and grovelling creature! You see, Prince, as there is no one by to hear us, we may as well confess that the origin of all of us is very humble; we all wear swaddling clothes in the opening of our lives, yet when we don our robes of power we feel elated with our dignity. If, however, we modestly looked back to our origin, and allowed the remembrance of it to influence our lives, there would be less of vain conceit abroad, and a worthier pride—the pride of being what we should, instead of what we would—might take its place!"

The Prince meditated awhile, and heeded little the explanations which the Dragon-fly gave of the course to be pursued upon entering the waters.

"But I fear this exploit," said the Prince, arousing from a short reverie; "I am unaccustomed to the water, and am not equipped for it; my dress of silk and velvet will be ruined by immersion, and, worse than all, I am not fitted to breathe in water, therefore I shall be drowned."

"I have not overlooked your requirements," said the Dragon-fly; "you shall have a bathing dress that will answer every purpose. In the summer season, I have already said, myriads of insects change their habitation from the water to the air.

Coming up upon the shore, or climbing up the stalks of aquatic plants, or rising to the surface of their streams, they cast off their bathing dresses, and leave them behind. I will just fly around, and in a few moments I will bring you a dress that will keep you quite free from wet, and yet enable you to move freely." So saying, the Dragon-fly started off. Looking down over the margin of the leaf, the Prince thought he espied numerous strange-looking creatures swimming about, and watching his movements. Once he thought that they appeared exceedingly fierce, but a passing cloud interrupted his sight, and in a moment the Dragon-fly had returned, bringing the pupæ cases of Flies and Beetles of various kinds; and the Prince, taking off his fine garments, and equipping himself in these, was much pleased to see that he looked quite like a diver, and to feel that he had a sufficient protection against any emergency. He had put upon his head the helmet of a Dragon-fly in the grub state; and this was admirably adapted for his purpose, as it enabled him to see and to breathe freely. The Dragon-fly promised to wait for him in the same spot, and to explain many things when he came up. The Prince stood upon the verge of the leaf, and swung his arms, and shrugged his shoulders, before he made up his mind to dive off.

CHAPTER III.

A COLD BATH—AN UNLOOKED-FOR CATASTROPHE—FAINT-HEARTEDNESS—NEW RESOLUTIONS—SOUND PRECAUTIONS.

“WHAT are you hesitating about?” asked the Dragon-fly of the Prince, as the latter stood upon the brink of the leaf.

“Are you afraid?”

“Afraid! not I,” replied the Prince.

“Then why don’t you plunge in?” asked the Dragon-fly.

“Not because I am *afraid* to do so,” said the Prince, “but it strikes me as being dreadfully cold.”

“Now, excuse me, Prince,” said the Fly, “I have scarcely patience to look at you timidly wetting one toe and then another. Oh, I remember the time when I lived in that dear pond, how its cool waters laved around me, how every undulation of it bore me along, imparting a delightful feeling; and how I have hunted over its bed for game well worth the catching! If it were not for my wings, I feel that I could plunge down again, and be as young as ever in that home of my childhood! In, in, Prince!”

“It’s all very well to cry ‘In! in!!’” said the Prince. “I have known stouter hearts than mine to quail before a cold bath. I have seen the hero of a mighty battle shrink from the touch of cold water. He talked glibly of the delights of sea-bathing; of its bracing effects and sanitary results; but as he drew near the water-side, his pace became slower, and he rested upon the sands, looking wistfully at the sea, and then turning and looking more wistfully at the shore. By slow degrees he disrobed, and then went down to meet the rippling waves with a waddling gait that would have disgraced a child of four years, and when the water just kissed his feet, he caught one up, and then the other, as though he had been bitten by a snake. At length growing bold, he ventured in to

his knees;—how they knocked together, and how his teeth chattered, while every rising wave sent forth from his chest a convulsive breath, as though it were his last. Another bold resolution, and dipping his hand into the water, he wetted his nose, and the locks of hair that seemed to stoop over his brow, thirsting to catch a drop of the refreshing element. Delighted to think that he had achieved a victory, he rushed back to the shore, and went home extolling sea-bathing to a party of friends who confessed that they never dared to venture in. So you see, Dragon-fly, I am not the worst of the timid.”

“But you are much like him,” exclaimed the Dragon-fly. “Let me give you a word of advice; whenever you take a bath, in at once; no dilly-dallying about it, but dash in, and after the first splash you are ripe for anything, and you will love the water almost as the air. So now Prince ——”

The sentence was unfinished, when there was a little splash—the Prince had left the leaf.

A moment afterwards, and an unusual commotion took place near the spot where the Prince had dived. The water was thrown up in small waves, and successive rings radiated from a troubled centre towards the shore. It was evident that something unexpected was taking place, for the Dragon-fly had counselled the Prince to seek the bottom at once, and to communicate first with the larvæ and pupæ of the Dragon-fly tribe. Why, then, this disturbance upon the face of the hitherto quiet water? The Dragon-fly watched the movement with intense anxiety, and presently he was alarmed at beholding one of the Prince’s arms rising above, and beating the water. He therefore flew to the spot, and was terrified to see that the Prince had been attacked by a number of insects, called from their well-known ferocity, “Water Devils.”* One had seized the Prince by the neck, another by the arm, and two had hold of one of his legs; others were surrounding him, and seeking

* *Hydrophilus Piccus*.

opportunities to seize hold. In the greatest terror the Dragon-fly flew over the spot, and sought to alarm the Devils off by the shadow of his figure, but in vain. He even darted down upon the water and disturbed it, at the risk of destroying his wings, but all to no purpose. The unequal combat still waged, and it seemed evident that the Prince would fall a victim to his bloodthirsty assailants, when the thought occurred to the Dragon-fly to go to the margin of the water, and communicating the facts to a large number of the grubs and pupæ of his tribe, to send them to the Prince's rescue. Not a moment was to be lost, for these junior members of his species were poor swimmers, and would take some time to reach the spot. However, he darted along, and fortunately succeeded in despatching a sufficient force of "police of the D division," as we may term them, and with great difficulty they succeeded in driving the Devils off, and rescuing the Prince from a terrible fate. They assisted the Prince to regain the leaf of the lily, and here he was rejoined by the Dragon-fly, who loosened his helmet, and did all in his power to resuscitate his exhausted frame.

As soon as the Prince was sensible, the Dragon-fly most earnestly implored forgiveness for the offenders and for himself. "I ought," said he, to have sent intelligence beneath the waters of your arrival, and the resolution of the insects of the air to pay you homage and to hold your person sacred. But, in my haste to show you the wonders of this insect ocean, I overlooked my duty, and the result was nearly fatal. These Devils are the scourge of our insect seas; they are the larvæ of a Beetle, and attack every living thing that comes near them, even of greater dimensions than themselves. They are voracious, and from morning till night they prey and gluttonize. They are not at all nice, and will devour with equal rapacity a small fish, a tadpole, or any insect they can lay hold of. When their proper prey is scarce, they even attack each other; and so fierce are they, that if two are together a few hours only without food, a combat begins, and never ends until one of them dies. They

are armed with forceps in their head, with which they seize their victims, and with smaller organs by which they suck their blood. They have large black eyes, which are distinctly visible, and when, before a combat, they stare at each other, their looks are almost hideous."

The Prince heard and trembled. "Luckily I have escaped them," said he. "And really, Dragon-fly, I have no desire to renew the attempt. I should certainly like to succeed in my mission, yet who knows but that some other Devils may lie in wait for me, and that I may be devoured at last? I would not again be so attacked, for all the honey of the Bee or the beauty of the Butterfly."

"Let me prevail upon you, good Prince, to make one other attempt. That which you have undergone is a mishap that can be guarded against in the future. Let it rather stimulate you to fresh investigations, since it shows that in these little seas of our world there are wonders to be explored, unknown and unsurpassed. Great victories have always cost great dangers. Our insect life is one of constant peril, though we forget this fact, so great our bliss in the moment of our enjoyment; and when terror and death arrive, they come so instantly, that as we came unconsciously into life, so we depart from it. Birth is to us as the bursting out of sunshine, and death seems but as the sudden gathering of a cloud."

"Well," said the Prince, "I will not be a coward. I will pursue my intention. But while I rest here, go and send intelligence to all the tribes of the waters that I am coming, and let them know my prerogative." The Dragon-fly, rejoicing in this resolution of the Prince, started off to the water's edge, to despatch the necessary information. On his way, meeting with some Bees laden with honey, he directed them to the Prince, that he might refresh himself. And soon the arrangements for the Prince's examination of the insect ocean were complete.

CHAPTER IV.

CONFIDENCE REGAINED—AMENDE HONORABLE—A WARM RECEPTION IN A COLD ELEMENT—SUBMARINE INVESTIGATIONS—A CRYSTAL PALACE—A SAD EPISODE.

As soon as the Prince had gained sufficient courage, he re-entered the water, having been assured by the Dragon-fly that no more violence would be offered to him, but that he would be treated with the respect due to his celebrity. However, he went down very gradually, sliding over, and holding fast to the edge of the leaf, until he became assured of the pacific intentions of those below. Confidence being gained, he soon found the bottom, where he was instantly surrounded by creatures of many tribes, differing widely from the tenants of the air, and making up for their want of beauty by curiosities of appearance, which completely astonished him.

There was a gentle motion in the water, and numerous graceful aquatic plants waved in it, just as trees undulate in the air. The rays of light entering the water, and impinging upon various glassy surfaces, produced beautiful prismatic colours, which gave to the scene around a fairy-like enchantment. Everywhere might be seen miniature groves, caves, and grottoes, either obscured by a profound and solemn gloom, or illuminated by a spangled loveliness.

As soon as the Prince commenced his investigations, he was surrounded by a multitude of living creatures, differing so much in size and shape that they appeared to present a complete miniature animal kingdom. Foremost among the larger creatures were the Devils,* that had unwittingly attacked the Prince upon his first appearance in the water. They now pressed around him, and made the *amende honorable* by paying him every attention, and by keeping the importunate crowd

* *Hydrophilus Caraboides.*

away. Certainly a more effective body of police could not be found, for a mere look from one of them was enough to keep in awe a host of timid creatures. A general truce had been resolved upon, so that the most antagonistic individuals assembled together without much danger. If now and then the established order appears to have been broken through by some ungovernable member of the insect society, let it be no subject of surprise, since in other communities, claiming much higher intelligence, similar offences occur, and frequently, too, in crowds that are pressing around the very skirts of royalty. Upon the surface were Water Measurers* darting about their thin and thread-like bodies; Gnats floating in their gondolas, and preparing to spread their wings for the insect heaven; Water Boatmen† plied their busy paddles; Water Scorpions‡ moved sluggishly about the banks, and upon the branches of plants; larva and pupa Dragon-flies, Water-moths,§ and May-flies|| moved in large numbers upon the bottom; and there were literally millions of creatures wheeling, darting, or crawling about, apparently rejoicing in the festivity. Some small fishes intruded among the multitude, and caused alarm; but being frightened by the activity of the scene, they immediately swam off, without creating any serious disturbance.

“Well, Mr. Devil,” remarked the Prince, “I’m glad to be upon good terms with you. Already I feel that those once our enemies may become our friends, and that animosities should be but short-lived.”

“We are happy to be of service to your Highness, and so to atone for our former conduct. We have a bad character here, Prince, because the part assigned to us is unwelcome to those by whom we are surrounded; but we fulfil a destiny, however, which we had no part in originating; therefore pray understand the calumnies that may be spoken against us.”

* *Hydrometa Stagnorum.* † *Notonecta glauca.* ‡ *Nepa cinerea.*
§ *Phryganea grandis.* || *Ephemera vulgata.*

"I have heard no calumnies," replied the Prince. "I was of course a little prejudiced by my own experience."

"We can well understand that," replied a forward Devil; "but we thought it possible that Mr. Dragon-fly, who brought you to this streamlet, had said unkind things of us, notwithstanding that his position was once much the same as our own, before he assumed those satin wings. But we shall be up with him by-and-by."

"He certainly told me a few things about you," said the Prince, "which were elicited and confirmed by what had previously taken place."

"No doubt he told you the truth," continued the Devil; "but he did not tell you all. Look at those creatures of his own species that are now around us. Observe their large but deceptive eyes, looking as winning as if they were in love; mark how stealthily they move about, exhibiting neither mouth nor sting to alarm the victim that they approach. Would you believe it, immediately upon one of them drawing near to an unsuspecting creature, a mask falls from his face, and there is then revealed a murderous trap, which opens and snaps upon the surprised creature, which soon pays the forfeit of misplaced confidence?"

"I have been informed of it."

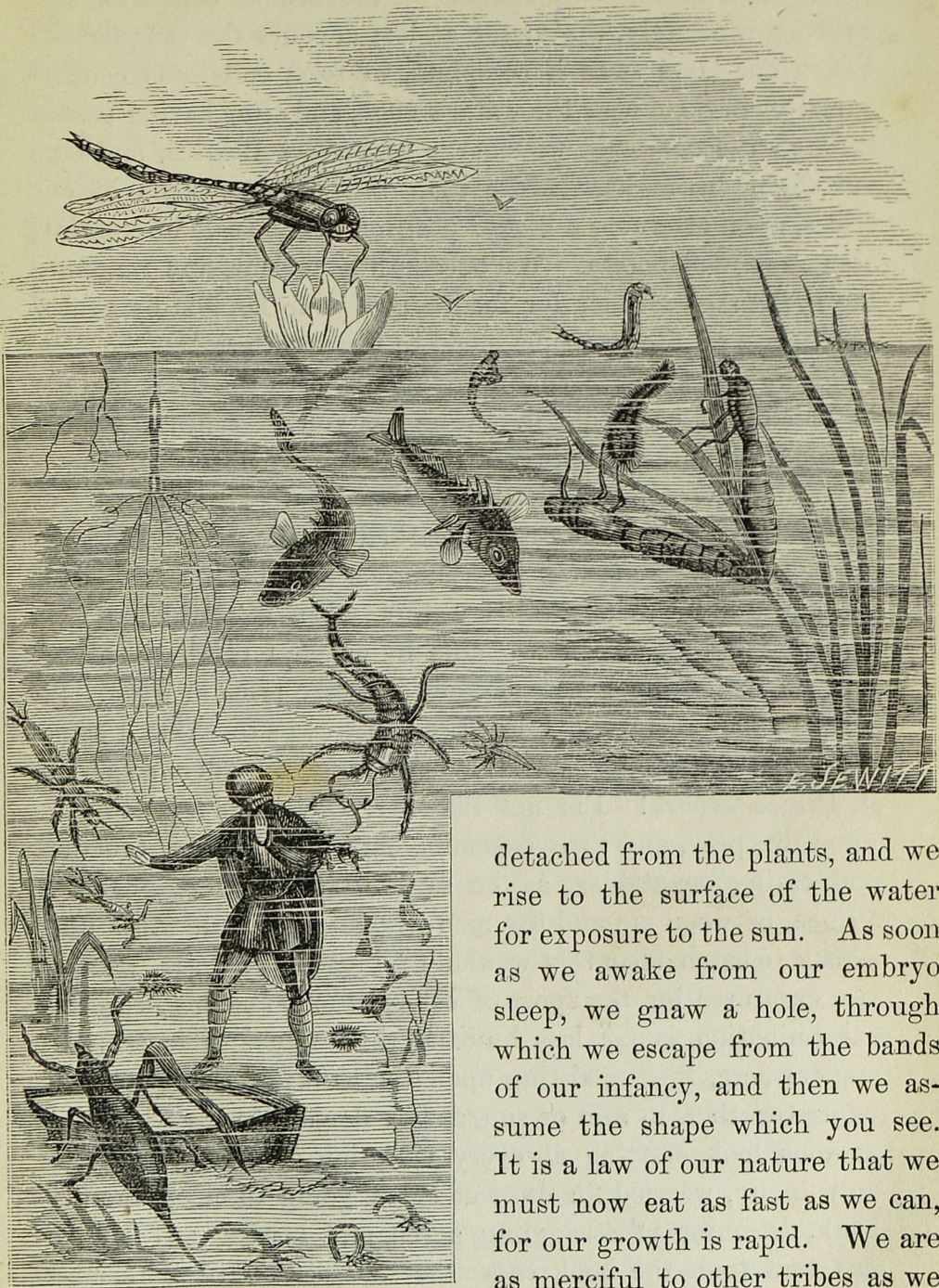
"Indeed, Prince. By whom?"

"By the Dragon-fly himself."

"I'm glad to hear of it; for we, Devils though we are called, are always open. We disguise nothing. Our arms are always drawn and prepared for action. We don't assassinate by stratagem and deceit."

"The Dragon-fly has been a good friend to me," said the Prince, "and I would not think unkindly of him. I shall be glad to hear your history."

"It is soon told, Prince. We pass the winter in eggs wrapped in silken balls, and are cradled upon the stems of water plants. Subsequently our silken covering becomes



detached from the plants, and we rise to the surface of the water for exposure to the sun. As soon as we awake from our embryo sleep, we gnaw a hole, through which we escape from the bands of our infancy, and then we assume the shape which you see. It is a law of our nature that we must now eat as fast as we can, for our growth is rapid. We are as merciful to other tribes as we are to our own, for, in that dreadful extremity, when food is scarce

we do not hesitate to submit to the law of conquest, and fighting resolutely, the victor at last devours the vanquished! When our larva state is complete, we form cells, and conceal ourselves in them near the water's edge, and after having passed through the chrysalis, we emerge as perfect Beetles, and take our flight by night. More than this, Prince, some of our tribes, upon attaining a higher position in the scale of creation, assume refined habits. We become vegetarians, and renounce the system of murder for food. But your Dragon-fly gentry are always on the scent for blood to the very last."

"I am pleased with your account, and with the frank manner in which you have told it. Who are you?" said the Prince, turning to another creature that was drawing near him.

"I am a Water Scorpion, your Highness. Observe my flat, oval body, with my wing-cases marked by the ridges upon my upper surface. I am now in my perfect state, and can rise into the air, and fly to any other waters, when discontented with these. Here are the instruments by which I catch my prey," said he, exhibiting a pair of long crab-like arms in front. "I glory in the sport; and I dare say you will be told that I sometimes kill for killing sake. I don't deny it. There's sport in it, Prince—sport! I'm not like Mr. Devil there, getting fat upon live prey, and then becoming fastidious and sentimental, and eating vegetables, as he says. Where's the difference, Prince, between me and the man who sticks a little worm upon a hook to catch a fish that wouldn't fill his mouth? He tortures two creatures for the sport of catching one, and his process of extermination is far less humane than mine. I've seen the anglers here, Prince, sitting upon the banks of this stream for hours together, in rain or sun, gazing down into the water with anxious look, starting at every vibration of the silken snare, and finally, wearied for want of sport, going to sleep upon the bank, dreaming of struggling perch, and leaving any luckless fish that took the hook to writhe in agony until they might awake to exult in their success. And these refined beings,

Prince, feel an antipathy to me, call me 'Scorpion,' and if they see me kill a Tadpole, they look upon me as a bloodthirsty creature, and would crush me beneath their feet, could they but reach me!"

The Prince made no reply.

The Prince's attention was next attracted to a curious diving-bell, which he turned to investigate. Observing some one within it, he inquired, "Who is here?"

"I am a Water Spider, Prince," said a voice from within, "and this is my abode, which I am happy to show you. I could not manage well in the water, were I always wet, so I construct an ærial apartment, in which I dwell in comfort. I construct it in the following manner:—I weave a series of loose threads, which I attach to the leaves of plants, beneath the water; when I have found enough of these, I cover them with a varnish, that unites them together like oiled silk; but the fabric is far more transparent and glass-like, and is so elastic, that it is capable of great expansion and contraction. I then make a bag of the same materials, and ascending to the surface, I fill it with air and transfer the latter to my apartment. I repeat this process until my abode is well supplied, and the water completely excluded, and I am the owner of a dry, light, and airy tenement in the midst of the water. My husband does not live with me, he having an apartment of his own elsewhere. But he very properly calls to see me at fitting seasons. I often leave the water to hunt for prey; and when I have obtained it, I dive, and enjoy my repast undisturbed in this nice little dwelling. What do you think of it, Prince?"

The Prince looked in, and expressed himself much delighted. Indeed, it was a curious, and even a beautiful place; and upon the outside it had much the appearance of a bell of quicksilver—a crystal palace in a crystal stream.

The Prince's onward course was now interrupted by a wreck, which lay upon the bottom. It was of a little ship, and her broken masts and sails were scattered about.

This is the story of the wreck:—"A young widow, who had been married but a few years, had lost her husband in an engagement with a slave ship upon the coast of Africa. He was a brave and affectionate man, who expended his courage upon a proper object,—the overthrow of oppression. They were blessed with a fine boy in the first year of their marriage; and the father, loving a seafaring life, would often, when at home, sit and relate to his child stirring tales of the seas, and of the rejoicings of captives restored to liberty. The lad soon imbibed his father's spirit. Every letter that came from the happy parent spoke of his darling boy, who should live to be in his turn the deliverer of his sable brother. And once the father sent, by a homeward-bound vessel, a model ship for his dear child. It was in every respect a fac-simile of the one in which he sailed. It had a little figure-head of Britannia, and on its stern was gilt the name the *Rescue*. Soon after this, the sad intelligence reached England, that in a desperate encounter with a slaver, the father had been killed. The poor widow endured agonies which no pen can describe. But she found comfort in reflecting upon the heroic struggle in which her husband had fallen, and she looked with intenser love upon the child, now her only comfort and hope. Often she walked by the water's side, and beheld her boy sail his tiny boat upon these waters; and she rejoiced in the hope, which strengthened every day, that he would prove the child of promise which his father had prayed for and predicted. Sometimes he would come down to the stream, attended only by elder playfellows; and then the sailor boy would delight to relate the tales he had heard from his father, and to explain the different parts of the ship, and show how its sails were worked. One day he had set the little vessel afloat, with all her canvas spread, when a gust of wind capsized her, and, stretching out his hand to save the prized gift of his lost father, he fell in, and was drowned. Thus another grief was imparted to the sorrowful mother, who had now lost all that had existed on earth to give her comfort here.

Often afterwards she would come and weep by the water's side, as looking down into the clear stream she could trace the form of the little wreck. Her cheek became paler, and her visits less frequent. At length she came no more. She had found a rescue in heaven, whither all she loved had flown."

CHAPTER V.

TUBULAR DWELLINGS — AN UNEXPECTED SHOCK — A DAY OF LIFE — A LESSON FOR WIVES — A CHANGE OF ATTIRE — A SUDDEN ELEVATION — DANGEROUS ASSOCIATES.

THE Prince's attention was next attracted by a singular procession of what appeared to him to be moving particles of leaves, sticks, and stones. Although they were lifeless and shapeless to the eye, there was an evident volition in their movements which indicated life within. Upon closer examination, the Prince discovered these moving bodies to consist of tubes formed of the various substances named, within each of which there existed a living creature, whose head and legs being thrust forth at will, enabled the occupant to move his tenement wheresoever he pleased.

"Who, and what are you?" said the Prince to the foremost.

"We are Caddice-worms," replied the grub;* "and these are the humble abodes in which we pass the first portion of our lives. We construct them variously of bits of straw, chip, or stone; sometimes of the shells of young water molluscs, forming a sort of grotto. Most of us are herbivorous, and we think we have a right, by dwelling in these tubes, to protect ourselves from the preying propensities of various carnivorous species; but man defeats our purpose by employing us for bait, in a sport which he calls angling. Rude as our tenements appear,

* *Phryganea grandis*.

they are not wholly unworthy of your examination. However rough the exterior of them may be, the inside is as smooth as glass; and when you consider that we have to select small stones or shells, and turn them about until, getting their smooth parts to meet, we form a surface as even as the best mosaic pavement, you will give us credit for ingenuity and perseverance. Moreover, we have to construct these tubes with due regard to the specific gravity of the water, and the degree of motion in the stream, of which we are inhabitants. If made of materials that are too light, they are apt to be borne away by the current; if too heavy, the labour of our motion becomes excessive, or we may be imprisoned to a spot, and unable to obtain food. In the first case, when a chip tube is too buoyant, we balance it by affixing to it a stone of sufficient weight; but if a stone tube be found too heavy, we decrease its relative gravity by fixing to it small pieces of chip. In this way we are able to get about comfortably; and though we perform no great exploits in the water, we are content, until the time comes for our release, when, assuming the form of flies, we spread out our wings and rise into the air to enjoy a few hours of sunshine, during which we propagate our species, and then calmly resign the joys of life to those who are to follow."

The Prince was much gratified by this account; and while the grubs moved slowly around him, exhibiting the varied and curious structure of their dwellings, he reflected upon the philosophy which might be gleaned therefrom. If, thought he, in the great current of this world's affairs, men would guard against being made too buoyant by vain ambition, or too stationary by sluggish indifference, how smoothly life might pass away, and how greatly the strife and want, which now mark the history of mankind, might be diminished!

Scarcely had these reflections passed the Prince's mind, when he felt an extraordinary shock, by which his whole frame became paralyzed. The cause was soon found to be that a Hydra, attached to a leaf floating upon the water,* had

entwined its thread-like arms around him, and had imparted the electric shock by which it is known to destroy its prey. The effect, though not powerful enough to injure the Prince, disturbed his whole system for a short time. Devils, Scorpions, and Dragons, at once came to his rescue, and denounced the Hydra for his audacity.

“Do you mean to tell me,” remarked the Prince, “that those thread-like filaments are the arms of an animal?”

“Animal you can scarcely call him,” replied a Dragon-grub. “He’s a sort of half-vegetable, half-animal: vegetable enough to be deceptive, by his still and lifeless appearance; and animal enough to be mischievous and destructive when anything living, especially small aquatic insects, come in his way. There he floats, like a diminutive water-plant, which an animalcule might be allured to feed upon; but once within the grasp of those wiry arms, that look like bits of silk floating idly in the water, death to the victim of misplaced confidence! The creature—unlike us, who have each but one stomach and one mouth, and a set of instruments to supply them—has so many stomachs and mouths, that there’s no counting them; and a proportionate number of arms to grope about for food to supply his ever ready appetite. Then he has that confounded electric battery, which you have just felt the effect of, and which only a few days ago made me wince, as if Mr. Devil there had laid hold of me behind with his terrible forceps.”

The Prince saw a great many of these Hydras suspended by the leaves and stalks of aquatic plants, and there were others of different shapes slowly moving about by a series of contractions and extensions, as when a leech moves forward by fixing his anterior extremity to a spot, and then draws his posterior part onward, and advances by a repetition of this process. Prince Pretty was about to question them, when Mr. Devil exclaimed, “Oh! what’s the good of attempting to learn anything from such *canaille* as those? It’s no good talking to them; they have neither brains nor tongues, but are a sort

of animated stinging-nettle, gifted only with powers of mischief."

Such (thought the Prince) are the views we too often entertain of each other. In searching for the imperfections of others, we overlook our own; and Devils oft denounce what Devils often do.

In receding from the reach of the Hydra, the Prince entered a small basin where the waters were still, and where some decomposing vegetable matters lay. Here he beheld millions of living creatures, some moving nimbly about, others oscillating to and fro, others progressing by a series of eccentric movements. Some were white, others yellow, green, and purple, and most of them were transparent, so that the organs of respiration and digestion within them might be clearly perceived. How magnificent was this sight to insect eyes—to such microscopic vision as the Prince now enjoyed. Already he had seen wonders baffling the most poetic imagination; but now the climax seemed reached in the magnificently simple—the gigantically small. Here the extremes of greatness and nothingness appeared to meet. Here was a world—and yet that world seemed nothing! The Prince's hand was no larger than a pea, and yet in the hollow of his palm he caught up a million of these creatures, and watched them with extreme delight, as he saw them sporting, fighting, springing into life, or dying,—whole generations passing in a glance. The Prince paused to meditate upon this sight; but his meditation found no expression,—it was beyond utterance! The objects which thus attracted him were the smaller animalcules and the infusoria.

And even with these the Prince held converse. To the human eye, these creatures are either imperceptible, or devoid of form; but to the microscopic sight, with which the Prince had become endowed, these were creatures that in their relation were as formidable to smaller animalcules as is the lion to the lamb, or the eagle to the mouse. The Prince, mounting upon



the back of one of the larger of them, witnessed the pursuit of their prey, in the course of which thousands were captured and devoured.

“ For such is Nature’s plan,
The grand, unbroken chain ;
The great the small devour—then die,
And feed the small again ! ”

Being now near to the bank, and also close to the surface of the water, the Prince was aroused by observing a number of interesting creatures issue from small holes in the earth. As they came forth, they vibrated a series of fin-like



plumes which lay along their sides, and thus set the water about them in rapid motion.

“Good day,” said the Prince, as a salutation.

“Good day,” rejoined the insect, as again he set his fin-like attachments in action. “Good day, Prince. Well mayst thou say ‘good day’ to such as me!”

“To such as you? And why to such as you?” asked the Prince.

“Because,” said the insect, “as soon as I assume my complete form,—as soon as I cast off the scales and fins that surround me now,—a day, nay, scarce a day, is mine. I have then only a few hours to live. As certain as I spread my wings to the noonday sun, so certain will it be that ere the sun shall gild the western skies, I cease to exist,—my mission is done!”

“Indeed?” exclaimed the Prince, sadly.

“Indeed, Prince, it is true. Wish me then ‘good day!’ wish me sunshine; wish that no clouds may frown, nor showers fall,—wish that no envious bird may snap me in its jaws, and so rob me of the little space of life allotted to me as a tenant of the air. How would you feel, Prince, if, waking in the morning, you *knew* that death would overtake you ere night came,—or that night and everlasting death would come together?”

The Prince made no reply, but the speaker proceeded:

“Prince, I am an Ephemera; some call me a May-fly, others, a Day-fly, because I have, at a certain stage, marked by a wonderful transformation, but a day to live. I spring from an egg dropped by my parent into the limpid stream; then I hide from fishes, and insects more powerful than myself, in a hole in the earth, from which I emerge in search of food, and to breathe the air. These feathery fins are the organs of my respiration; as I vibrate them thus, the water passing rapidly over their fine vessels gives its fixed air to my use. I live here two years. Two years, Prince! that’s a long lease, and to me it seems an

age. But then the time comes when my form changes,—I cast off this uncouth dress, and fly away to the nearest plant; resting thereon, I free myself of another covering, until I appear like a fairy thing, all silk, gauze, and silver. Such a beautiful thing as I become could not last long, the very air would tarnish me. I, therefore, spread my wings, and away to fly over the water's face. Every second gives me a thousand pulsations of joy; bliss is mine! bliss, ecstatic bliss,—if the skies be fair, and fate decrees no wrong. Up and down I fly! The sun is high in the heavens—already he has passed the meridian—now time closes upon me with lightning speed! On! on! Up! down! Oh, this is ecstasy! It is over,—the Ephemera drops upon the stream, and is borne away, to be seen no more! This is my history, Prince; what think you of it?"

"Think!" exclaimed the Prince, "that you are like the man who starts up from the crowd, fired with an ambitious flame. The wreath of glory has been bound around his brow; but the breath of popular flattery dies away, and the hero and his laurels sink into the stream of oblivion! Ah, poor Ephemera! truly I pray for you a good, good day!"

Looking upward, the Prince observed an immense number of insects pendant from the surface. Sometimes they darted down with a sort of angular jerk, but soon returned to the summit again, where they appeared to rejoice in the sunshine. They were of different shapes, and variously disposed. Some were covered with long bristles, and displayed large eyes, while a series of tubes projected from their anterior extremities; others were less bristly, but exhibited a large round head, with two projecting appendages; and it was remarkable that the former suspended themselves from the surface of the water by the tail, the latter by the head.

"We are waiting to greet you, Prince," said one of them; "millions of us have assembled here to do you homage. Observe those canoe-like structures floating buoyantly upon the

water, and moored to some aquatic plants. Those are boats, or rafts, formed of the eggs from which we spring. Our females are gifted with the power of standing upon the water, and laying down their eggs with the regularity which marks the method of the butler in storing away wine: she proceeds until she has formed a concave raft, and then leaves it for the influence of the sun. It is so constructed that it will neither sink nor overturn; and if forcibly moved from its natural position, it resumes the same again as soon as the obstacles are removed. When we quit these eggs, we assume the larvæ form which I now display. The tubes at my posterior extremity are air-vessels, through which I breathe. See now, I rise to the surface of the water, and enjoy the summer air. Now I close the tubes, and my buoyancy being lessened thereby, I sink to the bottom, carrying with me a little globe of air, to subsist upon while below. In about a week this state changes to one of scarcely less activity. A singular transformation then occurs. The air-vessels no longer appear at our posterior, but our anterior extremities; and now our position near the surface, when breathing, is just the reverse of what it was before. Gradually our case becomes more buoyant, while our perfect development is going on within. Now it rises above the water, and an orifice opening, the head of a perfect fly, known as a Gnat, appears. This is a critical moment. Should a gust of wind, or a rush of water, overturn the little gondola, the life of the new creature is lost. But this seldom occurs; the tiny craft is in such excellent trim. The boat is blown about by the playful winds, and stealthily the transformed creature draws himself from it—first venturing to set one foot upon its margin, then another, and another, until he stands erect, and is able to rustle his wings, and try his powers. Now he pushes the boat away, stands for a second upon the water's surface, and then rises into the air, to join millions of his fellows who are already rejoicing in the beams of the sun!"

“I remember having noticed myriads of you on my way hither,” said the Prince; “and I observed that some of you wore large plumes, while others were less ornamentally attired. Whence comes this distinction?”

“Oh!” replied the Larvæ, “the Gnats with plumes are gentlemen; they dress up to the fullest style of fashion. The ladies with us are plainly attired, wearing no showy appendages. You see, Prince, we like our wives to be admirable more for simplicity than for show, and Nature has kindly favoured our fancy.”

The Prince thought that many wives might gather a lesson from the Gnat; but he made no remark, for he was hastening on to leave the stream.

The Prince now left the water, by climbing the stalks of the lily, and, regaining the leaf from which he had dived, he sat down for a short while to rest himself; and was speedily rejoined by the Dragon-fly, who had taken the opportunity during the Prince’s absence of regaling himself by a feast upon smaller flies. He thought that he would not offend the Prince’s feelings by preying upon them in his presence.

“Ah, Prince! I see you are up again, and all safe!”

“Yes, my friend,” rejoined the Prince; “and no one can tell the interest I have taken in the sights I have witnessed. Truly it may be said that the hidden beauties of the world are not less remarkable or numerous than those that everywhere meet the eye.”

“Ah! you may well be gratified,” rejoined the Dragon-fly, “though, in the short time you have been in the water you can have formed no adequate conception of what it contains. It is not only in sunshine, but in shade, that beauties are to be found; not in day only, but in night; not in summer, but in winter; and were you to remain in the stream for a longer season, you would find new worlds ever opening before you. But come, we have plenty to do, and must move on now to the woods!”

The Prince had by this time donned his Butterfly-garments, and laid his bathing habiliments down upon the leaf. He again mounted the back of the Dragon-fly, and was borne off to a neighbouring wood. The spot upon which they alighted was on the side of a hill overlooking a narrow valley, and rivalled by an opposite hill of equal beauty. Tall elm-trees, and majestic oaks that had flourished through millions of insect generations, threw their shadows in fanciful tracery upon the ground, whereon the long grass, waved by the caresses of the passing wind, formed a sea of silken verdure. The companions of childhood, the Daisy and the Buttercup, were there in great profusion. Here and there a few scattered thorns and sapling oaks broke the level of the grassy ocean, as occasional rocks relieve the monotony of the sea. The spectator, standing upon this hill side, looked down through festoons of foliage upon pretty cottages, and ornamental villas, in the valley,—the homes of virtuous industry, and the retreats of honoured age. Far in the distance might be seen, in dim outline, tall steeples and chimneys, marking the situation of a splendid city; and in a long line diverging therefrom, was a forest of masts of ships from many nations. The birds chirped merrily, and the Cuckoo's note proceeded in measured cadence from the opposite hill. The village church stood upon the hill-top, and a winding path leading to it, marked the Sabbath walk of old and young. But why need we dwell on this? Our insect-worshippers have their homes, their palaces, but they know no temple save the broad face of Nature, upon which they unceasingly hum the note of praise!

The Prince had no sooner reached this spot, than a throng of insect followers surrounded him. A general instinct seemed to prevail as to the Prince's locality. Among the visitors upon this occasion were a number of diminutive Spiders, who were treated with great contempt by the Flies. They came, however, in overwhelming numbers, and descending upon the branches, left their webs trailing about, to the evident incon-

venience of the other creatures of the assembly, who were constantly flitting and tripping, on account of the impediments thus offered to their movements.

The Flies of the assembly became greatly enraged, when one of these busy little creatures stepped up to the Prince, and invited him to a meeting of the Spider tribes, from which he and his fellows had come as a deputation.

“Treachery!” cried the Flies, “treachery! It is only to ensnare us, Prince; or it may be yourself, that these artful assassins and robbers have resolved upon this stratagem; and they have sent these, the most inoffensive members of their tribes, that the deception may be the more secure!”

“Do not judge so harshly,” interposed the Prince. “Is it true that your fellows have plotted to ensnare my friends, here? and that you are their emissaries in the plot?”

“Not at all, Prince, not at all! A hundred of us will remain as hostages under the surveillance of Mr. Dragon-fly and his confederates, if you like. We want simply to show you evidences of our skill and industry!”

“Skill and industry,” repeated a host of voices, accompanied by a fluttering of wings, which might be understood as an insect laugh. “Cunning and roguery! that’s the true meaning. Why, Prince, don’t they spread out their snares across the green lanes, low in the grass, high in the trees, in the crevices of broken walls, in the corners of window-panes, in spots where the sun shines so brightly that we can’t see the traps set for our feet, and in corners where light seldom comes? Are they not always covering the earth with these treacherous snares; and often when they have caught an unfortunate victim, don’t they bind him round and gibbet him, and keep him hung in full view of their murderous deeds, until they choose to kill and devour him?”

Such were the objections raised by the Flies, in a number of remonstrances addressed to the Prince. The Spiders, therefore, saw that they had little chance of prevailing.

“Out with them!” cried the voices again; “they don’t belong to us,—they are not of the insect tribes,—they are our enemies!”

The Prince moved his hand to appease the excitement, and was about to speak, when he found himself borne upward by a gentle motion, attached to threads, which were scarcely perceptible to the view. The Flies fluttered about in great consternation, as they discovered that the Gossamer Spiders had surrounded the Prince with their buoyant webs, and that he was being borne away by them across the valley. They knew that they dared not interfere by breaking the webs, or they might do injury to the Prince, so they resolved to follow and abide the issue. The summer air was dry and dense, and the Prince reclined gracefully upon the silken fibres, as he looked around upon the magnificent scene. They soon arrived upon a spot where the more formidable members of the Spider tribes were busily engaged spinning webs, and making dwellings and snares for the Prince to inspect. The Prince, finding that their intentions were pacific, and being greatly interested in what he saw going forward, requested the Flies to keep at a little distance, and not to fear, while he obtained a treaty with the Spiders for the integrity of their proceedings. This he succeeded in doing, and the Prince at once found a new field for inquiry. Now and then, however, the spirit of treachery would manifest itself, so that the Prince found it necessary to interfere, when—

“Will you walk into my parlour?” said a Spider to a Fly,
“It’s the prettiest little parlour that ever you did spy.”

CHAPTER VI.

A PARTIAL REBELLION—“ SPINNING A YARN ”—A SPIDER’S
ACCOUNT OF HIS TRIBES—MORAL.

PRINCES are often perplexed to maintain their popularity. The prejudices of the crowd often sweep them from the height of honour and dominion. It was almost thus with Prince Pretty, for the Flies continued to declaim against the Spiders, and to denounce them as being alien to the insect tribe. But the Prince appeased them thus:—

“I know that men who style themselves naturalists do not consider Spiders *insects*, because they differ in their organization from you—because they breathe by gills situated beneath the abdomen, have eight legs instead of six, have no antennæ, and have fixed eyes. But God gave them these—and they are as much His creatures as you or I. Besides, in human affairs we have found that by knowing our enemies, and marking their ways, we either make them friends, or are better prepared to defend ourselves from their attacks. That you dread Spiders is natural; but there are instances in which you have a great reason to dread each other. Have I not seen the Dragon-fly devour the Gnat? and the Water Devil destroy the Water Boatman? In this respect may not Spiders claim pre-eminence, since they do not prey upon their own kind, but feed upon creatures having no resemblance to themselves?”

The Flies were silent; and after a little pause, they withdrew, leaving the Prince to pursue his investigations.

“Now, Prince,” said a Diadem Spider,* “I have the honour of giving you an account of our habits. Just follow me, and I will lead you to a suitable place for observation.”

The Prince followed the Spider, and presently he stood upon

* *Epeira diadema*.

a spot, whence, looking around in every direction, he saw the curious webs of Spiders presenting to him a series of various structures compared to which the Crystal Palace was a clumsy contrivance.

“This web,” said the Spider, “which appears so fine to your view, is composed not of one filament only, but of a large number of them spun together. These are so fine, that it would require *four millions* of them to be as thick as a hair of a man’s beard. The organs by which these wonderfully fine threadlets are spun, are too complicated to be well described, but here you may see them in motion.” Thus saying, the Spider attached her thread to a branch, and running along, the Prince observed innumerable threadlets, each escaping from a separate pore in the apparatus. The Prince examined the compound structure of the web more minutely, by referring to the part which had been attached to the branch. He found it spread out like a fan, and the Spider explained that the hold upon the branch was strengthened by this contrivance.

“Now,” said the Spider, “I will explain to you how we manage to move across places which seem impassable. You see, Prince, I am now on the topmost branch of this bough, and I want to get to another branch opposite; but I should have to descend and walk a long distance to gain it in that manner. But observe!” Here the Spider attached a thread to the branch, and then raising her body, as a tumbler does when standing upon his hands, she discharged a small quantity of a viscid fluid, and presently this darted out into a long line, as if it had been shot from the body of the Spider by some electric force.

“That is curious!” exclaimed the Prince; “you seem to be very expert at ‘spinning a yarn,’ and you shoot it out in a most mysterious manner.”

“That’s a mistake, Prince; we don’t shoot it out, we merely discharge a small globule of the fluid, and as soon as it is caught by a current of air, it is borne away, and as it recedes from our

bodies, to which it is attached by one extremity, it becomes a fine thread. Now, the other end has caught upon the branch I wish to reach. That's fortunate; for had it not been so, I should have thrown out another, and another, until I had succeeded. I have had to wait and watch hours together, and to throw out hundreds of threads before one has struck the point I wished to gain!”

“A capital example of perseverance,” remarked the Prince.

“And an equal encouragement to it,” said the Spider, “for I seldom fail to succeed. Oh, but for this, a thousand mishaps would have occurred to me! Heavy rains have fallen, and formed a perfect ocean around a branch upon which I have been taking shelter; then with my thread suspension-bridge, after hours of waiting and of toil, I have escaped from imprisonment.”

“But it seemed to me that not a breath stirred at the moment when your web flew out!”

“So it appeared,” replied the Spider. “The breath of air that would bear my web to a resting-place would be imperceptible to you. If man were sensitive enough to feel every vibration of the air, or every change in its temperature or humidity, and were he equally susceptible of the million other varying conditions that surround him, he would not know a moment's peace.”

So saying, the Spider tested the security of the line, and then ran across it with great rapidity. Returning about halfway, she formed another line, and dropping about twelve inches from the centre, she threw out a third threadlet, which floated about for a second or two, and then caught in an inner branch of the bough, to which the Spider descended. And in this way she displayed to the Prince the practicability of reaching any spot she desired to gain.

The Spider next invited the Prince's attention to a perfect net that had been previously constructed. “In making this web,” she explained, “my principal care is to get a good strong thread, as a mainstay for the rest. So I throw out a line, and then

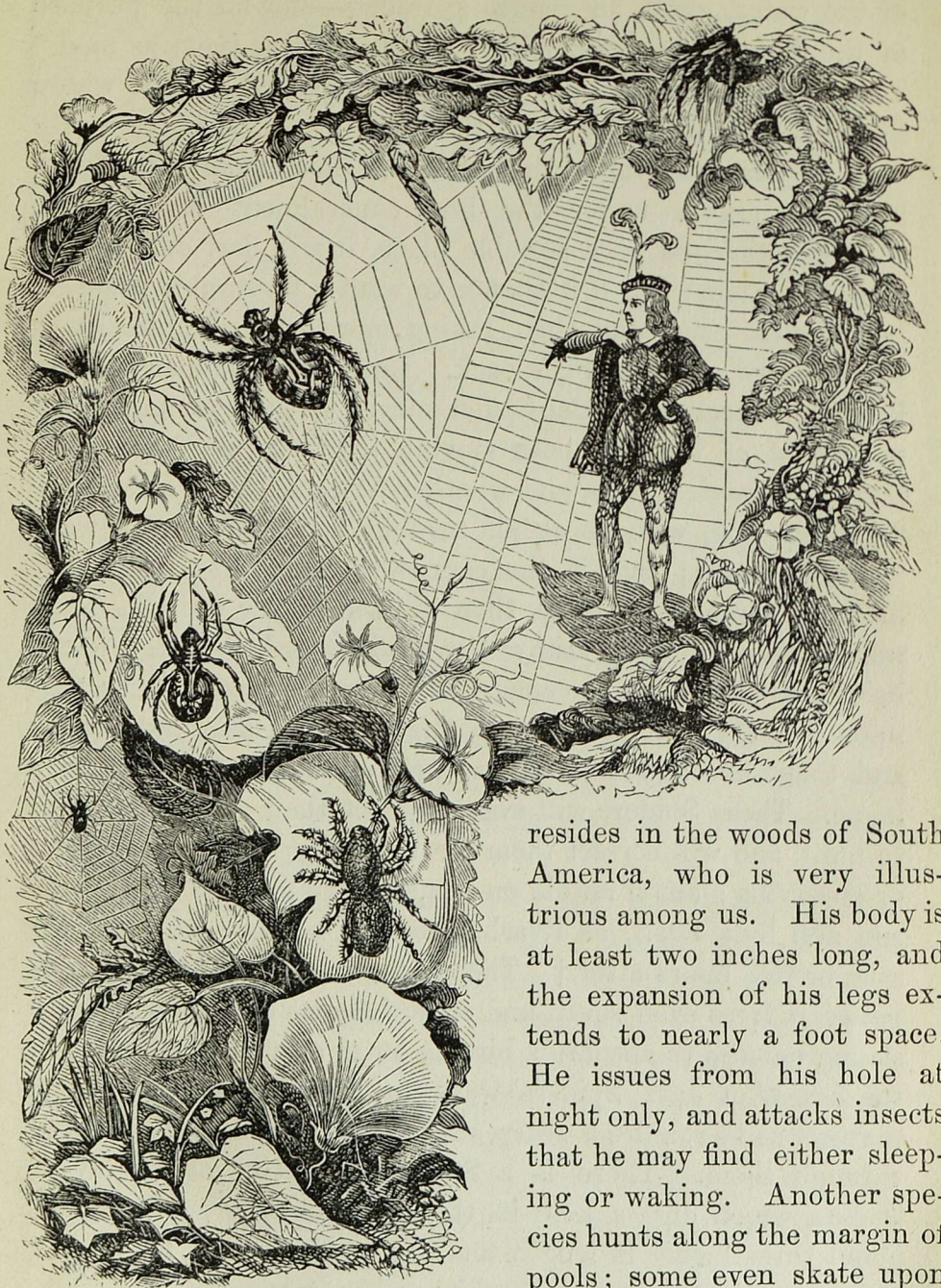
double it many times. Then I pull it with my legs to test it, and drop myself down suddenly from various points of it, to see if it will bear a good jerk; for there is nothing, Prince, more annoying to a Spider, than to see a delicious prize, a good fat fly, drop into the net, and after buzzing about, fly away, taking half the web with him. And they often play us such tricks, notwithstanding all our precautions. Having a good foundation, I proceed to attach other lines, spreading out their ends like a fan, to get a strong hold. You will see that the lines radiate from the centre, and that these are intersected by circular cross lines, which give to the net a perfectly geometrical appearance. Sometimes we rest, waiting for our prey, in the very centre of the net, and at others we hide under a leaf, and shelter ourselves from the wet, or the sun. There! the net is quite perfect: and to tell you the truth, Prince (though we mustn't be overheard), I should like a good supper now!"

The Prince smiled at the Spider's candour, and intimately examined the structure of the web.

"Do all Spiders obtain their food by these means?" inquired the Prince.

"Oh, no!" replied the Spider. "Among us, as among men, there are vagrants, and wild hunters, and others, which roam to find their prey. We are the fixed residents, whose web-qualification might entitle us to vote in an election for a Spider Parliament. There are some that conceal themselves in cells formed of the leaf of a plant, which they roll up, and from which they dart upon any insect that may happen to pass; others will lurk in the crevices of decayed walls, or the barks of trees; some cunningly hide at the bottom of the calyx of a flower, and when the unsuspecting flies enter, in search of sweets, they find 'death in the cup.' Some even pretend to be dead, until their prey draws near them, when they suddenly start up, and seize their victims. We have a relative,* who

* *Mygale avicularia*.



resides in the woods of South America, who is very illustrious among us. His body is at least two inches long, and the expansion of his legs extends to nearly a foot space. He issues from his hole at night only, and attacks insects that he may find either sleeping or waking. Another species hunts along the margin of pools; some even skate upon

the surface of the water, in quest of prey; and others actually form rafts of decayed wood and leaves, and, floating about upon the surface

of the water, watch for drowning insects—not for the purpose of the Royal Humane Society, but to employ them as food.* There is a small brown and delicately-spotted Spider, whose hinder legs are longer than the rest, which, espying a Fly at three or four yards' distance, will not make directly to her, but crawls under the best concealment it can find, till, being arrived at a suitable place, it will dart out, seldom missing its aim; but if it chance to want a favourable position, it will first peep, and then, taking more careful notice, will leap exactly upon the Fly's back. But if this happens not to be within reach, then the Spider moves softly, watching every movement of the Fly, both moving together, as if the same instinct animated them, and whether forwards or backwards, or to either side, without at all turning her body, like a well-managed horse; but if the capricious Fly takes wing, and pitches upon another place, then will the Spider whirl its body nimbly about, keeping always her head towards her prey, until, being arrived within the sphere of her reach, she makes a leap upon the Fly, catching him by the head, and feasting herself; and then, like a provident creature, she bears the remainder home. These Spiders will even instruct their young ones how to hunt, and will correct them for not being sufficiently expert or observing; but if an old one happens to miss its aim, it will run and hide itself, as if ashamed, and not be seen again for four or five hours after.† The Spiders of Bermuda spin webs between trees even seven and eight fathoms distant, which are strong enough to ensnare a bird as large as a thrush. And in the forests of Java, Spiders' webs are met with of so strong a texture, as to require a sharp cutting instrument to make way through them. There is a Spider,‡ a native of the West Indies, which digs a hole in the earth, obliquely downwards, about three inches in length, and one in diameter. This cavity she lines with a tough web, which, when taken out, resembles

* Kirby and Spence. † Evelyn's "Travels in Italy." ‡ *Mygale nidulans*.

a leathern purse. This house has a door with hinges, and the members of the family tenanting the nest open and close the door whenever they pass and repass. The nest of the Mason Spider is similar to this. It is composed of very hard clay. It is formed of a tube, about one inch in diameter, between six and seven inches long, and slightly bent towards the lower extremity. The interior of the tube is lined with a uniform tapestry of silken web, of an orange white colour, with a texture intermediate between India paper and very fine glove-leather. It has a circular door, about the size of a primrose, concave on the outside, and convex within: it is formed of more than a dozen layers of the same web which lines the interior, closely laid upon one another, and growing thicker towards the hinge, which becomes the thickest and strongest part of the structure. The elasticity of the materials gives to this hinge the property of acting like a spring, and shutting the door of the nest spontaneously; and it is so cleverly contrived, that when the door is shut, it is very difficult to discover its existence.”*

The Prince was much interested in this account by the Spider of the remarkable instinct of its tribes. “And yet,” he remarked, “you are regarded with great antipathy by most other living creatures!”

“Such is our fate, Prince,” observed the Spider. “The unknown is always dreaded more than the known. We are brushed from corner to corner, and exultingly trampled under foot. But if the benefits were considered we confer upon man, by devouring flies, that would otherwise subsist to the destruction of domestic cleanliness, and to the spoliation of vegetable substances, we should be regarded with less antipathy. We may not be very beautiful, Prince, but I have seen a Spider whose form was perfection,—whose every movement was elegance——”

“I see,” said the Prince, “you are capable of love!”

* Rennie's “Insect Architecture.”

“Of course we are. The law of love is universal. God has planted its germs everywhere. Let not vain man fancy that he alone possesses this Divine attribute. But let me show you that we are capable of the highest love. There is a Spider, common under clods of earth,* which may at once be distinguished by a white globular silken bag, about the size of a pea, in which she has deposited her eggs, attached to the extremity of her body. Though apparently a considerable encumbrance, she carries it with her everywhere. If you deprive her of it, she makes most strenuous efforts for its recovery; and no personal danger can force her to quit her precious load. Are her efforts ineffectual?—A stupifying melancholy seems to seize her; and, when deprived of this first object of her cares, existence itself seems to have lost its charms. If she succeeds in regaining her bag, or you restore it to her, her actions demonstrate the excess of her joy. She eagerly seizes it, and with the utmost agility runs off with it to a place of security. One of these spiders fell with her bag into the cavern of an Ant-lion,—a ferocious insect which conceals himself at the bottom of a conical sand-pit, for the purpose of catching any unfortunate victim that may chance to fall in. My poor friend tried to run away, but she was not sufficiently active to prevent the Ant-lion from seizing her bag of eggs, which it attempted to put under the sand. She made the most violent efforts to defeat the aim of her invisible foe, and struggled with all her might. The gluten, however, which fastened her bag, at length gave way, and it separated from her; but she instantly regained it with her jaws, and redoubled her efforts to rescue the prize from her opponent. It was in vain: the Ant-lion was the stronger of the two, and in spite of all her struggles, the atrocious plunderer dragged the object of her maternal affection under the sand. The unfortunate mother might have preserved her own life from the enemy; she had but to relinquish the bag, and escape out of the pit. But she preferred allowing herself

* *Lycosa saccata*—Kirby and Spence.

to be buried alive along with the treasure dearer to her than her own existence!* The attachment of this affectionate mother is not confined to her eggs. After the young spiders are hatched, they make their way out of the bag by an orifice, which she is careful to open for them, and without which they could not escape, and then they attach themselves in clusters upon her back, belly, head, and even legs; and in this situation she carries them about with her and feeds them till their first moult, when they are big enough to provide for their own subsistence. Sometimes the mother carries hundreds of her progeny in this way, and when she is attacked, they suddenly leap from her, and run away!"

"But have you no warlike propensities?" asked the Prince.

"I confess we have!" replied the Spider. "But our battles are bravely fought, and upon equal terms. The worst specimen of our combativeness is that in which some of our females attack the males and drive them off, as soon as family concerns begin. Woe to the male Spider that does not, when the proper time comes, make his exit from the presence of his favourite!"

The Prince reflected, and fancied that he could find something like a parallel even among the human kind. But he whispered not a word of this to the Spider.

"You seem to enjoy a pretty easy life?" said the Prince.

"It is not all ease," said the Spider. "Often when unfavourable weather prevails, we are whole days without food. Perchance the morning opens brightly, and we busily spin away until our nets are complete. Then just as we hope to catch our delicious prey, the wing of a bird, fluttering among the trees, tears our structure into fragments, and we have to toil again unfed. We construct our net again, when rude winds or rains resume the work of spoliation. But we toil on, and on, and gain our reward at last!"

"Well, Spider," said the Prince, "I have gleaned from you

* Observation of Bonnet.

a noble example of industry, patience, perseverance, courage, and affection. I shall regard your tribes with more interest in the future, and whenever among mankind I find laziness, complaining, cowardice, or want of heart, I shall offer you as an exemplar worthy of imitation!"

CHAPTER VII.

A FULL BRASS BAND—FRESH INVITATIONS—A VERY STINGING CONTROVERSY — DISHONESTY AND INTEMPERANCE — A RIDE ON A "HUMBLE" CHARGER—THE INS AND OUTS OF SINGULAR HABITATIONS.

As soon as Prince Pretty had parted with his Spider friends, he withdrew from the scene of their labours, and was again amongst his winged attendants, when all at once a band of extraordinary music struck upon his ear. There seemed to be thousands of instruments playing at once; and however different their performances were from those at Jullien's monster concerts, their music certainly had many charms for the Prince, owing probably to the peculiar transformation which his Highness had undergone, and the consequent change in his various faculties.

In a moment he found himself surrounded by a swarm of Bees. Alighting near to him, they covered every leaf and flower, until he looked like the leader of a legion of winged warriors. The Flies appeared considerably alarmed, and many of them flew off to a place of safety, fearing an attack from the Bees.

The Queen Bee, advancing towards the Prince, said, "Your Highness, we invite you to our hive, which is not far distant. We have prepared for you a rich repast of honey, and are anxious to show you the wonders of our community."

The Prince bowed with profound respect to her sovereign ladyship, and confessed that he had looked forward with great

pleasure to an expedition through the habitations of the Bees. He had heard of the many wonders connected with their modes of life—their skill, industry, and perfect economy of government, and he would at once confess that he regarded them as being among the most illustrious of the insect tribes.

His Highness's reply was received with a loud buzz of applause.

At this moment there was a considerable stir among the swarm, which it appeared originated in a great number of Wasps and Humble Bees that had joined the party, and claimed to have equal title to the Prince's attention. The tumult at last developed itself into a discussion between a Queen Bee, a female Wasp, and a Humble Bee, also of the gentler sex. Ladies have always been celebrated for their talking propensities, and upon such an occasion as this, they may be pardoned for giving free vent to their feelings. In the course of their colloquy, the following points of interest were elicited:—

“I don't see, Mrs. Wasp,” exclaimed the Queen Bee, “what business you have here, or what claim you hold upon the Prince's respect. You are a pettish, mischievous busy-body, always intruding where you are not wanted. You even enter the habitations of men, as the Prince knows, and there you whiz and buzz about, threatening to alight on people's noses or ears, flying around and over their heads, causing ladies to scream and run from very fear, and frightening them at last into hysterics. You dip your tongue into everybody's dish; blood, honey, and wine, are alike acceptable to your voracious palate.”

“That's your story, Mrs. Bee,” exclaimed the Wasp; “but the fact is, that what you call our pettishness and mischievousness is nothing more nor less than our activity and good-temper. 'Tis true we fly into the haunts of men, and buzz about their faces, and it is because we like to see the world and its inhabitants. We are not like you, remaining chiefly at home, to be fed in idleness and luxury by the poor slaves who

are your dupes. If we are attacked, we show fight, and you do the same thing. But our buzzing is only a merry song. We fly about more nimbly than some of your people, who are so greedy over their gains, that they load themselves until they can scarcely move, and hoard more than they can ever enjoy."

"You need'nt taunt us with hoarding," rejoined her Majesty, with an air of great dignity. "Where thieves are about, it is necessary for us to lock up our store, and guard it as well as we can. Many a poor Bee has been waylaid by you, and robbed of his hard day's earnings; and often have your audacious burglars entered our dwellings, and pilfered our store."

"That may be," said the Wasp; "the Prince knows well enough that the law of conquest is not confined to us alone. Among even the lords of creation there are Wasps and Drones, that plunder and rob upon a much larger scale than we can manage it; so I'm sure the Prince will see no defect in us for this. Why should the acts which constitute the heroism of one warrior be set down as accusations against another? We wear the jackets which God gave us, and fight with the arms which he supplied. But your Man-wasp robs the ostrich of his plumes, the Silk-worm of his silk, the Sheep of the wool that covers his back, and he even robs your hives of the honey stored therein."

So the Wasp was continuing, when the Queen Bee interrupted her, saying, "We are not here to insult the Prince, Mrs. Wasp, by recounting the acts of Princes or of men. We are here to do him honour, by displaying our own habits and works, and to raise ourselves by showing that we are worthy of his consideration."

"The dispute was begun by you," replied the Wasp; "and if I may not justify myself in the charges which you have brought against me by referring to the practices of men, I can prove that your own tribes are sometimes robbers quite as much as are the Wasps whom you condemn. Mrs. Humble Bee here tells me of an instance in which the good-nature of her species

was shamefully imposed upon. It was in a time of great scarcity, when none of us could get sufficient sweets to live upon. A lot of you Hive Bees set off to a nest of Humble Bees, and not only pillaged, but took possession of their nest. The poor, tired, good-tempered creatures allowed the depre-
dators to have everything their own way; and even when, after the Humble Bees had been robbed of all that their nest contained, some of them went out to recruit their broken fortunes, they were followed and robbed by your people, who surrounded them, and 'persuaded' them to deliver up the contents of their honey-bags. They didn't exactly say, 'Your honey, or your life;' but they looked as if that was the thing they meant. It was a system of picking pockets; and although this game was kept up for three weeks, as there are witnesses to prove,* the poor Humble Bees submitted to the injustice."

"That's true," said the Humble Bee; "'twas very unjust treatment."

"I remember the circumstance, Mrs. Humble Bee," said the Queen; "and let me remind you, that as soon as the Wasps found out what was going on, they joined in the plunder, and the result was, that while previously my subjects took only a part of your store, and never once used their offensive weapons, no sooner did the Wasps come into the nest, than they treated you with so much ferocity, that you were all obliged to quit."

"That's true again," said the Humble Bee; "you're six one, and half-a-dozen the other!"

"As to you, Mrs. Humble Bee," said the Wasp, getting sorely vexed at the charges made against her, "you are fair game for anybody. Look what a slovenly creature you are. Look into your nest, and see the jars of honey tumbling about all in disorder, not placed in that regular and careful array which marks the arrangement of my nest, nor that of 'Her Majesty,' as she calls herself, there. Why, the other day I fell in with a party of your tribe, quite drunk. They were feasting upon the

* M. Huber.

juice of a passion flower, and had got completely intoxicated; their conduct was disgraceful. Not content, like decent Wasps or Bees, they plunged their great hairy heads into the goblet, pushing each other aside, or climbing over each other's shoulders to get at the drink. Some became so stupid, that it was in vain to pull them out by the skirts of their coats, and to advise them to go home, instead of wasting their time in tippling.*

"I know, my friends, the Humble Bees have a weakness that way," remarked the Hive Queen; "but they are perfectly good-natured in their cups. All they care about is, to be allowed to enjoy themselves; and if you pull them away, they crawl back to the Bacchanalian feast, even though they tumble down repeatedly in the attempt. And if you insist upon pulling them off, they set up a sort of noisy song, which may be interpreted into—

‘ We won't go home till evening,
Till starlight does appear ! ’ ”

"Well, well," replied the Humble Bee, "you needn't expose one to the Prince like that; we all have our faults; I would rather get drunk any day than rob my neighbour."

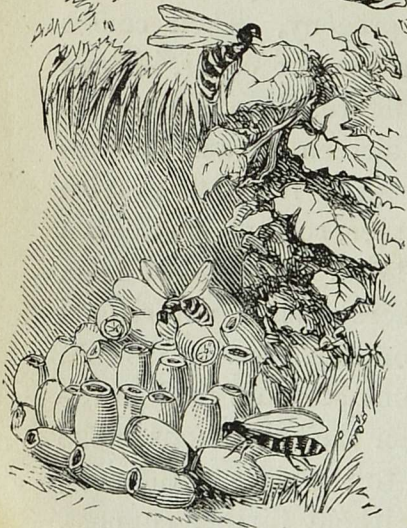
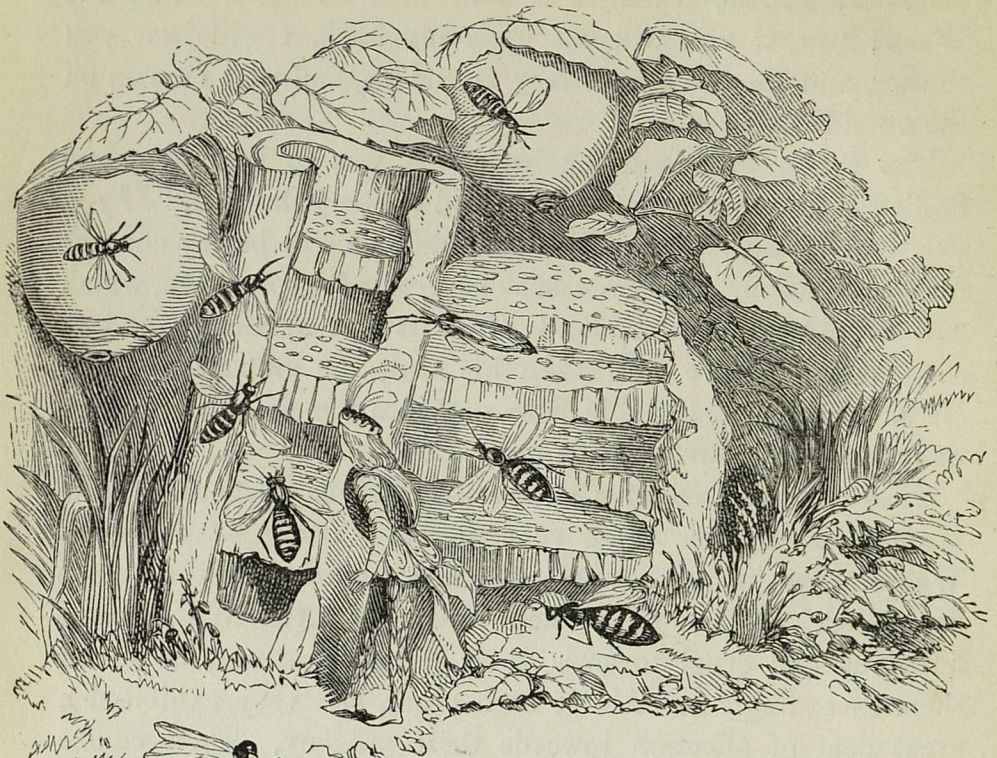
The Prince was greatly amused at this recrimination, which gave him a pretty good insight into the faults of the three tribes of competitors before him. At length he interceded to produce harmony of feeling and purpose. He thought that if he could first appease the Wasp, that a troublesome creature would be got rid of; that the excessive good-nature and patience of the Humble Bee entitled her to a hearing; and that afterwards the chief portion of his time could be devoted to the Hive Bees, as the highest species. So he put the proposition involved in this view in such a clever manner that nobody was offended, but the order of proceeding was at once arranged in accordance therewith.

* Anecdote in the *Gardener's Chronicle*, 1841, p. 519.

“Now, Prince, my nest is very near at hand,” said the Wasp; “so, if you will get upon my back, I will bear you thither, and all the others may attend us, and wait for you on the outside.”

The Prince examined the back that was to bear him, and finding it rather narrow, smooth, and slippery, he said, “If you won’t be jealous, Wasp, Mrs. Humble Bee will be my charger for the occasion. She has a back covered with soft down, which will supply an easy saddle.” Thus it was arranged; and as soon as the Prince had taken his seat, the swarms of Hive Bees, Wasps, and Humble Bees rose into the air, and sounding their trumpets, started off in great glee.

They soon arrived at a spot where various nests of Wasps, Humble Bees, &c., were constructed. There were several Wasps’ nests in the ground, and into one of them the Prince descended. Although he had heard that the Wasps were ferocious and cruel towards their fellow-creatures, he found them exceedingly amiable to each other, and they exhibited a great deal of affection towards their progeny. Their combs consisted of hexagonal cells, made of a kind of paper, instead of wax. The nest was of an oval figure, from sixteen to eighteen inches long, by twelve or thirteen broad. It was rendered warm and dry by a thick coating of leaves of grayish paper, placed a little apart from each other, so that it affords a perfect protection from rain. The interior consisted of from twelve to fifteen circular combs of different sizes, not ranged vertically as in a Bee-hive, but horizontally, forming distinct and parallel stories. The Wasps do not store up food in the cells of the combs, which serve merely for the habitations of the young. Although the combs are fixed to the sides of the nest, they would not be sufficiently strong without further support. The ingenious builders, therefore, connect each comb to those below it by a number of strong cylindrical pillars, or columns composed of the same paper-like material used in other parts of the nest, but of a stronger substance. The middle combs



are connected by a rustic colonnade of from forty to fifty of these pillars; the upper and lower combs of a smaller number. The cells in a populous nest are not fewer than 16,000, and are of different sizes corresponding to those of the three orders of individuals which compose the community, the largest for the grubs of females, the smallest for those of workers. The last always occupy an entire comb, while the

cells of the males and females are often intermixed.

Besides openings which are left between the walls of the combs, to admit of access from one to the other, there are at the bottom of each nest two holes, by one of which the Wasps uniformly enter,

and through the other issue from the nest, and thus avoid all confusion or interruption of their common labours. As the nest is often a foot and a half under ground, it is requisite that a covered way should lead to its entrance. This is excavated by the Wasps, who are excellent miners, and is often very long and tortuous, forming a beaten road to the subterraneous city, well known to the inhabitants, though its entrance is concealed from incurious eyes. The cavity itself, which contains the nest, is either the abandoned habitation of moles or field-mice, or a cavern purposely dug out by the Wasps, who exert themselves with such industry, as to accomplish the arduous undertaking in a few days.

When the cavity and entrance to it are completed, the next part of the process is to lay the foundations of the city to be included in it; which, contrary to the usual custom of builders, Wasps begin at the top, continuing downwards. The coatings which compose the dome are a sort of rough but thin paper, and the rest of the nest is composed of the same substance, variously applied. The Wasps are manufacturers of the article, and prepare it from the fibres of wood. These they detach by means of their jaws, from window-frames, posts, and rails, &c.; and when they have amassed a heap of the filament, moisten the whole with a few drops of a viscid glue from their mouth, and kneading it with their jaws into a sort of paste, or *papier maché*, fly off with it to their nest. This ductile mass they attach to that part of the building upon which they are at work, walking backwards, and spreading it into laminae of the requisite thinness, by means of their jaws, tongue, and legs.

This operation is repeated several times, until at length, by aid of fresh supplies of the material, and the combined exertion of so many workmen, the proper number of layers of paper that are to compose the roof is finished. Not fewer than fifteen or sixteen sheets of it are usually placed one above each other, with slight intervening spaces, making the whole upwards of an inch and a half in thickness. When the dome is com-

pleted, the uppermost comb is thus begun, in which, as well as all the other parts of the building, precisely the same material and the same process, with little variation, are employed. For the structure of the connecting pillars, there seems a greater quantity of glue made use of than in the rest of the work, doubtless with the view of giving them a superior solidity. When the first comb is finished, the continuation of the roof or walls is brought down lower; a new comb is erected; and thus the work successively proceeds, until the whole is finished. As a comparatively small proportion of the society is engaged in constructing the nest, its entire completion is the work of several months; yet, though the fruit of such severe labour, it has not been finished many weeks before the winter comes on, when it merely serves for the abode of a few benumbed females, and is entirely abandoned at the approach of spring, Wasps never using the same nest for more than one season.*

While this description was being given, the Prince closely inspected the galleries of the Wasps' nests, and became greatly interested in their structure.

"Tell me," said the Prince, "upon what class of your community does the duty of constructing this interesting dwelling fall?"

"Upon the first-born of the brood," replied the Wasp. "It is one of the most remarkable arrangements of Providence, that the first-born of our members are destitute of sexual instinct; they are *neuters*, erected apparently for the purpose of assisting their common parent in enlarging the nest, constructing fresh cells, and feeding their younger brethren in the larvæ state, while the mother Wasp continues to deposit eggs, and increase the brood. And, true to their instinct, no sooner do these neuter Wasps assume the winged form, then they set about their work of cell building with untiring industry, and wait upon their younger brethren with the most devoted care."

"An admirable instinct," remarked the Prince, "and one

* Kirby and Spence.

that is rather exceptional: for though parents almost universally regard their offspring with affection, it is a rare provision for a generation of elder children to take upon themselves the sole duty of providing for the younger offspring. But what of your males and females, the parents of the community?"

"It is not until the latter part of the summer," replied the Wasp, that the development of our males and females takes place. We do not, like the Hive Bees, drive the females forth from the nest as soon as produced."

The Hive Bees here made a loud buzz of disapprobation, which indicated that they desired the Wasp to keep to "the question," and not to interfere with their matters.

"Our females," continued the Wasp, "remain in the nest until the beginning of the autumn. The males and females then pair, and wander in search of some new settlements; but the males are short-lived, and the females are soon left in widowhood. But they survive the males only for a short period: out of three hundred females, the number usually in a nest, not more than a dozen are supposed to live through the winter, to become the founders of new colonies in the ensuing year."

"And the neuters?" inquired the Prince.

"Soon after their work is completed," replied the Wasp, "they disperse and die, and when winter approaches, the nest which they constructed becomes a deserted ruin."

"Ah! what a history," exclaimed the Prince, "a city built, peopled, and ruined, between spring-time and winter! The life of man, how similar,—save for a longer season.

'The glories of our birth and state
 Are shadows, not substantial things;
 There is no armour against Fate;
 Death lays his icy hand on kings.
 Sceptre and crown
 Must tumble down,
 And in the dust be equal made
 With the poor, crooked scythe and spade.

‘Some men with swords may reap the field,
 And plant fresh laurels where they kill ;
 But their strong nerves at last must yield ;
 They tame but one another still.

Early or late,
 They stoop to Fate,
 And must give up their murmuring breath,
 When they, pale captives, creep to death.’”

The Prince had turned away, and appeared in a meditative mood, when the Wasp aroused his attention by continuing :—

“My story has not yet ended. I must tell your Highness of some of the varieties of our species ; for, like men, we differ in our habits. The *Britannic Wasp*,* instead of burrowing in the ground, or building in the hollows of old trees, or thatched roofs, prefers to swing its nest from the branch of a tree. The materials and the construction of the nest are nearly identical with our own ; but the choice of a situation is somewhat ambitious and remarkable. The tree usually selected is the silver fir, the broad, flat upper branches of which seem to protect the nest from the falling rain. There are others that associate only in small numbers,† constructing a little nest, nearly globular, enclosed beneath a saucer-like covering, which is usually placed in the interior of granaries, or attached to the beams of unfrequented apartments. There is another species,‡ that forms a nest, and attaches it to a branch of a tree, the nest being quite destitute of any outer covering, so that the cells are exposed to the sun, air, and rain.”

“A careless and improvident section of your tribe, I suspect,” remarked the Prince.

“Not so,” rejoined the Wasp, “for it exercises a wonderful sagacity in adapting its nest to the exposed position in which it is placed. The terraces, or cells, are formed similar to those in our own nests, but, in consequence of being exposed to the weather, they are laid nearly *vertically*, instead of *horizontally*,

* *Vespa Britannica*.

† *Vespa holsatica*.

‡ *Epipone nidulans*.

so that the rain does not materially affect them; besides, the nests are invariably placed so as to face the north or the east, whereby they are less exposed to rains, which most frequently come with southerly or westerly winds. And further, being destitute of an outer covering, this description of nest is thoroughly varnished, to prevent moisture from soaking into the texture of the cell-paper. The laying on of this varnish forms a considerable portion of the labour of the colony, and individuals may be seen occupied for hours together in applying this protective coat with their tongues."

"Why, you appear," said the Prince, "to be good paper-makers, house-builders, miners, and meteorologists withal; and a social and orderly race among yourselves."

"We are not all social," exclaimed the Wasp. "No! some of us prefer a hermit life, but are not the less deserving your Highness's attention. For instance, there is the Mason Wasp,* who chooses to live in solitude; and for this purpose she will excavate a hole in a stone or a brick, and carefully carry away the bits produced while making the excavation, so that no mark of a nest may be exhibited externally; for there are spiders and flies that wander about to find and devour the eggs of other species. When she has made her excavation, and laid her eggs, two in number, she imprisons a few caterpillars for the young grubs to feed upon as soon as hatched, and stops the aperture with clay, to keep in the prisoners, and to exclude intruders. And now, Prince, if you will follow me, I will show you the nests of which I have spoken, and you shall witness with your own eyes our remarkable works."

The Prince followed, and made a lengthened inspection, during which he found that all which he had heard was true, and became acquainted with many curious facts of which the Wasp had not found time to speak.

* *Odynerus*, LATR.

CHAPTER VIII.

A HUMBLE COMMUNITY—HIVES OF INDUSTRY—DIVISION OF LABOUR—CREATING A QUEEN—A DEADLY COMBAT—THE BEST HAVE ENEMIES.

WHILE the Prince was occupied examining the nests of the various kinds of Wasps, the Humble Bee* kept up a continual buzz, and appeared desirous to tell her story. So the Prince, turning to her, said, "Now, Madame, proceed."

Her ladyship looked like a giant among the pigmy Wasps and Honey Bees that surrounded her. There were three or four varieties of Humble Bees present, whose bodies appeared to be covered with a very rich velvet, some black and brown, and others distinguished by a rich orange colour.

"I am the mother of a brood," remarked the Humble Bee, "and around me are my children, differing from me in appearance and size; these are the males, small females, and workers. As the small females produce only male eggs, while we, the larger ones, produce the three varieties, we claim to be considered the founders of our several colonies."

"The Queens, I presume," observed the Prince.

"Not so," replied the Humble Bee; "we have no notions of royalty, and our communities are much smaller in number than those of the Honey Bee. We are simply nations, and several of us live upon friendly terms in the same nest. We are less regarded by man than the Hive Bees, though we have many qualities in common with them. Our nests are very simple, generally formed by an excavation in an earthy bank, consisting of a little chamber about six or eight inches in diameter, which is approached by a long, winding passage, capable of permitting the ingress and egress of two Bees at a time. When we have found a suitable excavation, we construct

* *Bombus terrestris*.

cells, and collect honey and pollen for our future young. As with the Wasps, the first of our brood consists of workers, which soon aid us in our labours, and then the small females and males begin to appear. And capital helps these workers are; they form and repair the cells, cover the roof of our dwelling with wax, and nurse the young Bees in their helpless state, not only by supplying the grubs with food, but by attending them in every difficulty, even watching their progress, and cutting open their cocoons, that they may the more readily escape from confinement when they are fully developed."

"But you have not mentioned your formation of honey-comb," remarked the Prince.

"We make no comb," replied the Humble Bee; "we lay our eggs in cells, into which we put a supply of honey and pollen as food for the grubs; when the grubs pass into the pupa state, they form for themselves cocoons, and when the young Bees are matured, we make the empty cocoons serve for honey pots, and so avoid the labour of constructing a comb."

"A lazy habit!" broke forth several Hive Bees, that were waiting to engage the Prince.

"Lazy! not at all," rejoined the Humble Bee; "they answer all our wants, and it would be a folly for us to do more, since our villages are small, and our demands limited. In my nest now there are from forty to sixty honey pots, filled with as delicious nectar as ever enriched a hive."

Upon hearing this confession, a party of Wasps appeared inclined to quit the company, and go on a plundering excursion; but the Humble Bee, watching their movements, expressed her suspicion to the Prince, who persuaded them to desist.

"I was remarking, Prince," continued the Humble Bee, "that our numbers are small, and if we do not seek to make a large store, we are also careful not to let our numbers outstrip our means. No sooner are the eggs deposited,—I mean the eggs that follow the hatching of the workers,—than the latter

go around the nest, and taking as it were an estimate of the future population, destroy as many eggs as they find to be in excess of the number that the nest will accommodate."

"Is not that a suicidal policy?" asked the Prince.

"Not exactly so," replied the Humble Bee, "though, as in other communities, when destructive propensities are aroused, the work of spoliation is sometimes carried too far. I have had to battle with my workers to prevent their devouring too many eggs; but there is this to be said in their favour, that when the embryos in the eggs are only slightly developed, the lives of the young ones are held sacred—there is no more destruction then; but the process of hatching is watched with the most tender care."

"I see," said the Prince, "your lives are simple, and you are aptly called *humble* bees; but with all your simplicity, you are political economists, and will not suffer the increase of your communities beyond your means of sustenance."

The Humble Bee and her allies, delighted by this compliment, gave way to a swarm of Hive Bees that had begun to manifest signs of impatience. The crowd of Bees that now advanced, headed by the Queen, was so large and dense, and the murmuring noise they made so deafening, that the other insects withdrew to a distance, for peace and safety.

"Allow me," said the Queen, "to present myself and my tribe before you, and to claim your Highness's consideration, as the most interesting of the insect families."

"I have heard of your fame," replied the Prince; "while yet in my nurse's arms I was taught to sing,—

'How doth the little busy Bee
 Improve each shining hour;
 And gather honey all the day,
 From every opening flower.
 How skilfully she builds her cell,
 How neatly spreads the wax;
 And labours hard to store it well
 With the sweet food she makes!'

A loud buzz of applause from the swarm followed the recital of these lines.

“How many of you are now present?” inquired the Prince.

“The whole population of a large hive,” answered the Queen, “about thirty thousand.”

“And are these all your children?” inquired the Prince.

“They are at once my children and my subjects,” answered the Bee. “I am their mother and their Queen.”

“Give me, then, an account of your community, and their laws,” observed the Prince.

“Our communities consist,” responded the Queen Bee, “of a Queen mother, or fertile female, a small number of males, and a much greater number of neuters or workers, these being unproductive females.* The males are, in some respects, harshly treated, for after a short life they are driven from the hive, and killed by the workers, who also destroy the male larvæ and pupæ, produced from the eggs of the Queen. These males are commonly called drones, and they are the more easily destroyed by the workers, since, being stingless, they cannot defend themselves.

“When the males are driven off, the hive consists of the Queen, and workers; but of the latter there are two classes,—the wax-makers, who secrete the materials for building the cells, and also store them with food, when completed; and also the nurses, whose duty it is to feed the young, and attend to the domestic concerns of the hive.

“Our nests—for the term hive applies only to the places provided for us by man—consist of a continued series of combs arranged vertically, each of which is composed of a vast number of cells, joining to ranges, backed against each other, and consequently placed in a horizontal position. A sufficient space is left between each of these double layers and cells, to allow a

* Some of the workers occasionally deposit eggs, which invariably produce males.

couple of Bees, occupied upon the opposite cells, to work without incommoding each other. In addition to these spaces, the combs are perforated in various places, so as to clear a passage for the Bees from one street or gallery to another.

“In the construction of the cells, it is admitted by the profoundest philosophers and mathematicians, that the most admirable instinct is displayed. The greatest number of cells are crowded within the limits of a given space; and the smallest amount of wax employed in their construction, that is compatible with their dimensions and arrangement.

“In a new colony the design of every comb is sketched out, and the first rudiments laid, by a single Bee, and the work is afterwards taken up by the other wax-makers, and the nurse Bees, which bring the cells to completion. And so expeditious are our proceedings, that a comb, twenty-seven inches long by seven or eight inches wide, is built in about four-and-twenty hours. The combs are attached to the roof and sides of the dwelling by a very tenacious resinous substance, collected from pines and other trees, and the whole is thoroughly varnished with a thinner coating of the same material.

“Of the cells, there are three sorts: the first are for the larvæ of workers, and for containing the honey; the second for the grubs of the males and drones; the third are for the females, or Queens, of which there are usually three or four.

“A Queen deposits her eggs separately in the bottom of each cell; the eggs are of a lengthened oval shape, with a slight curve, and of a bluish colour. Those which are laid during the first eleven months consist of workers only; these hatch in a few days, and become little white grubs. Each of these is now attended by the full-grown workers, and fed assiduously. At the end of six days, the workers roof in the cells containing these grubs, and the latter spin silken cocoons within, and at the further expiration of eleven days, the insect becomes perfect, eats through the roof of the cell, and comes forth a perfect worker, ready to assist in the labours of the nest.

“The male bee passes three days in the egg state, six and a half in the larvæ, and makes his appearance at the further expiration of fifteen days.”

“And of your own royal birth?” inquired the Prince.

“Perhaps,” interrupted a crowd of workers, “you will allow one of us to tell the story of the nativity of our Queen, since it is mainly to our peculiar nurture of the royal nestlings that they owe their distinction, and their dominion over us.”

The Queen Bee and the Prince assented, and the workers forming a circle around the Queen, one of their number advanced a little way from the rest, and standing near the Queen, in the midst of the arena thus formed, gave the following interesting explanation:—

“For nearly twelve months the original Queen of a swarm deposits only workers’ eggs, after which period she commences laying male eggs; and as soon as we, the workers, observe this change—for we instinctively know the nature of the eggs,—we begin to construct royal cells, in each of which, as soon as the chambers of royalty are ready, her Majesty deposits an egg, destined to produce a future Queen.

“During the royal progress from cell to cell, for the purpose of depositing eggs, her Majesty is accompanied by from four to twelve workers, who supply her with honey, and take care that she lays only one egg in each cell. Should she deposit more, we remove all but one, and place the others elsewhere.

“The cells provided for the new Queens considerably exceed in height the ordinary ones, and they are not interwoven with them, but suspended perpendicularly, their sides being nearly parallel to the mouths of the common cells, several of which are sacrificed to support them. Our Queens pass three days in the egg state, and five as larvæ; they are then occupied twenty-four hours in forming their cocoons, the cells having been previously closed by us. During nearly the whole of the three following days, the embryo Queens repose in their cocoons; after which they are transformed into pupæ, in which

state they remain between four and five days, appearing in the perfect state on the sixteenth day after the eggs are deposited.

“When the sixteen days have expired, the workers guarding a royal cell learn from the movement within that a new Queen is about to appear. The intelligence flies through the compact city, and the Bees crowd to welcome the royal stranger. During the development of the new Queen, she has been assiduously fed by the Nurse Bees with a royal jelly, denied to other Bees. It is a pungent food, prepared by the workers expressly for the queenly appetite, and is more stimulating than the food given to the common grubs. This jelly is the nectarean juice, whose magic properties infused through common veins make royal blood.

“For should it happen, as is sometimes the case, that a Queen be killed, or a hive in any other manner deprived of her, during the first eleven months of her existence, and before she has deposited any royal eggs, intense excitement prevails throughout the hive; work is abandoned, every Bee traverses the hive at random. This state of confusion sometimes continues for several days; then we gather in knots, and hold consultation, in the course of which we resolve to create a new Queen. A council of workers select one of the ordinary eggs, which had been previously deposited by the lost sovereign; three cells are immediately thrown into one for its reception, the eggs in the two other cells being destroyed. The favoured grub, when hatched, is liberally fed with royal jelly, and lo! becomes a Queen!

“Even if a grub had been hatched, and partly fed as a worker, and had only received two or three days’ allowance of royal food, the result would be the same. It would come forth as a perfect Queen; whereas, had it remained in the cell which it originally inhabited, it would have turned out a worker; having form, instinct, and organs of generation entirely different.”

“A wonderful provision,” remarked the Prince; and then he

meditated. "How like events with human beings! Are not our Kings and Queens of the same common stock as all mankind? Do not our *workers* make them? Are not rich viands, gold, silver, silk and ermine, pomp and splendour, together with mental fashioning, the *royal jelly* by which men impart a magic influence to regal blood?" But the Prince kept these meditations to himself.

The Bee continued:—"Among the crowd that gathers around the royal cell, to welcome the distinguished stranger, comes the Queen-mother, accompanied by her body-guard. She approaches, however, not to caress and nurture her offspring, but with the determination to commit infanticide. She knows that the young Queen will claim the homage of her subjects, and divide the government of the Queendom; she, therefore, marches forth at once to exterminate the heir presumptive, and maintain the dignity of her crown. But the workers, faithful to the interests of the community, gather round the royal cell, and defeat the murderous purpose; they guard the entrance of the cell where the young Queen lies, and, if necessary, block it up with wax, and feed the young Royalist with honey, until the irate monarch retires.

"When the Queen-mother finds that her offspring—now her rival—is beyond her power, she wanders to and fro the hive in a state of great excitement; and calling those of her subjects together who are still loyal to her, she quits the hive, to found a new colony, and establish an independent Queendom.

"It sometimes happens that two young Queens make their exit from their respective cells simultaneously. And then there arises a great commotion in the hive. Two monarchs cannot reign together, but each finds supporters. There is but one mode of settling the difficulty—York and Lancaster must fight for the kingdom. But among Bees there is this excellent rule, that

‘Those who make the quarrels are
The only ones to fight!’

“The two communities, headed by their sovereigns, draw up in battle array. But every sword, save those of the rivals, is sheathed — the assembled thousands are mere spectators, waiting the settlement of the new dynasty. The rivals advance towards each other, at first warily; but a blow is soon struck, anger begets rage, and then comes deadly determination. They endeavour to seize each other at all vulnerable points; legs are broken, and wings chipped; stings are thrust and parried with wonderful skill; as the battle heightens, a loud buzzing attests the excitement of the divided ranks; at length one of the two bodies, locked in a death grasp, quivers, and then curls up. The sting of the victor, devoid of its venom, vibrates in triumph—one of the Queens is dead. The divided ranks draw together, mingle, fraternize, and become the subjects of an undivided and absolute monarchy.”

“Well,” remarked the Prince, “yours is, indeed, a wonderful polity; and great are the lessons that may be gathered from your ways and works. Order, industry, and providence, are your characteristics; these three great qualities combined would go far to uphold any state, and confer upon its subjects prosperity and happiness. But as yet you have given me no account of that honied store, which is the reward of all your labours.”

“We obtain honey,” explained the Bee, “from flowers, which generally secrete a sweet nectareal fluid. This we suck up by our tongues; a portion of this we consume immediately as food, but the greater part we deposit in the cells of the hive, to feed our young, and afterwards to sustain our community during winter, when flowers have passed away, and the inclement weather prevents our issuing from our hives. The cells, which are to contain our winter store, are placed in the most inaccessible parts of the hive, and are closed with waxen lids; but the honey destined for the use of the nurses, workers, and drones, is deposited in unclosed cells.

“We also gather pollen from the anthers of flowers, and

with this, mixing it with honey, we form bee-bread, with which we feed our grubs. And there is one great service which we render, while pursuing our industrial toils, for which we are seldom credited. In many instances it is only by our travelling from flower to flower, that the pollen, or farina, necessary to the fecundity of plants, is carried from the male to the female flowers; and thus, while we glean nectar for our use, we are indirectly the means of propagating plants, and multiplying the number and increasing the beauty of flowers."

"A delightful and a peaceful mission," remarked the Prince.

"Not altogether peaceful," observed the Bee, "for we have our enemies to contend against. Wasps and Hornets frequently rob our hives; and in spite of the guards we set at the entrance, there are several kinds of Moths that intrude themselves in our cities, and depositing their eggs in our combs, a plague of young grubs, protected from our stings by strong vestments of silk, devour the food we have gathered. Then there is our great and dreaded enemy, the Death's Head Hawk Moth, which boldly makes its way into our hives, and emitting a fearful sound, completely paralyzes us, and then proceeds to ransack and rob our stores.

"And this reminds me, Prince, that the evening is drawing on, and that the Moths are beginning to move about. We have left our hive unprotected; so we must hasten back, and barricade the entrances with wax, or our present store will be despoiled."

So saying, the swarm rose, and carolled round the Prince:—

"Thus to their toils, in early summer, run
The clust'ring Bees, and labour in the sun;
Led forth in colonies, their buzzing race,
Or work the liquid sweets, and thicken to a mass.
The busy nation flies from flow'r to flow'r,
And hoards, in curious cells, the golden store:
A chosen troop before the gate attends,
To take the burdens, and relieve their friends.

And now, farewell. We hasten home to drive
The lazy robber from our well stored hive."

The last words were faintly heard in the distance; and then the Robin, on a neighbouring bough, poured forth in mellifluous notes a hymn to evening.

CHAPTER IX.

LIVING LAMPS—A GRAND ILLUMINATION—SACRED CHARACTERS
—LABOURERS IN DIAMONDS—THE OLD SEXTON.

As soon as the Bees had departed, the air was filled with thousands of forms differing in size, shape, and colour, and in their advance towards the Prince, exhibiting the most singular and various habits of flight and progression. They were of every variety of hue, from the blackness of coal to the delicate tints of the rainbow; some sparkling like diamonds, others shining with the soft hues of pearl, and others glowing like flames of fire.

Upon the leaves of a beautiful passion flower, which adorned the oriel, there suddenly appeared a thousand silver lamps, shining like mimic stars; while similar lamps moved backward and forward through the air.

The company now assembling consisted of Beetles and Crickets, Grasshoppers and Locusts; and the lights which the Prince beheld were contributed by Fire-flies and Glow-worms, that headed the train.

"Soon did night display
More wonders than it veil'd: innumerable tribes
From the wood-cover swarmed, and darkness made
Their beauties visible: one while they streamed
A bright blue radiance upon flowers that closed
Their gorgeous colours from the eyes of day;
Now, motionless and dark, eluded search,
Self-shrouded; and anon, starring the sky,
Rose like a shower of fire."

And of this wonderful throned first spoke the Sacred Beetle,* the revered Beetle of the Egyptians.

“I am,” said the Beetle, “permitted first to address your Highness, because my fame is of the greatest antiquity. Portraits of my family are found upon ancient models, carvings, and amulets: and we have been for centuries the companions of the honoured dead, being enclosed with human bodies, and laid in tombs, in which we are now frequently found with dried mummies of the human race. I have come from the margins of the Nile to attend your Highness, and to give an account of my tribe.”

“Receive my homage,” said the Prince; “your presence carries me back in contemplation to a period of which history furnishes no other record than the monuments that have withstood the perils of ages. A land where idolatry reigned, in all its fulness, yet where civilization commenced its spread; the land where Alexander achieved great conquests, where the Macedonian, Roman, Turkman, and Mameluke dynasties prevailed in succession. Where are they now? Their pride, their power, swept away! And yet man has progressed in art and civilization; has adopted new modes of life, and achieved vast works of skill; but you are still a Beetle, clad in the habiliments of old, pursuing to-day the life which five thousand years ago your progenitors led.”

“True, O Prince! the same God which fashioned our forms, and limited our instincts, gave to man his wondrous powers of reason; and with the growth of reason we have ceased to be objects of superstition. But, as a part of God’s work, we are eminently worthy of study and admiration. Nor were the ancients so blind in their adoration of us, as may be supposed. The estimation in which they held us arose from the fact, that we enclosed our eggs in round balls, of decomposing vegetable matter, and as we had one uniform method of rolling these balls along the ground, to find depositories for them in the

* *Scarabæus sacer.*

earth, we were supposed to mystically represent the motions of the sun and planetary bodies.

“Our family of Beetles is most incredible in point of numbers, there being no less than 80,000 varieties known to and classified by man; some are very remarkable for projections or horns growing from the head; we are mostly winged, flying with much rapidity and force; our wings are generally of the most delicate gauze-like structure, but are protected by horny cases or shells. We are all produced from eggs, which become grubs, and are afterwards changed into chrysalides; finally, we burst our prison-houses, and fly forth in full maturity. And now, Prince, I will leave a few of my congeners to speak of their peculiar habits.”

Upon this there advanced a trio of the most distinguished members of this interesting family; the Hercules,* the Atlas,† and the Goliath‡ Beetles. Great Hercules was clad in a coat of mail, of a deep shining black, except the elytra which covered his wings,—these were of bright green, bordered and spotted with black. The next, powerful Atlas, was covered with a similar coat, but of a black colour tinted with a deep green bronze, especially upon his wing cases; and the third monster, Goliath, had his black coat splendidly bordered with silver, while his wing cases were of a rich brown.

“Your proud appearance,” said the Prince, “reminds me of knights of the days of chivalry; but surely never knights in armour clad looked half so gorgeous. But to your story.”

“We are no knights, Prince,” rejoined Hercules; “but, though proudly clad, are humble workers in the scheme of great Creation. The lances and spears which we bear about us are not for the purpose of running a tierce against an enemy, or of unhorsing a rival at a tournament, but are the tools with which we work. We use them to burrow in the earth, and are content during the day to live like hermits in our cells. At

* *Scarabæus Hercules.* † *Scarabæus Atlas.* ‡ *Goliathus magnus.*



night we venture forth, and explore the stores of vegetable matter that accumulate round the trunks of trees; and sometimes taking wing, we soar into the air, and hum a glad, though apparently monotonous song. We subsist chiefly upon putrescent wood and other decayed vegetable matter, and are in fact busy wood-cutters and scavengers, clearing away old trees, and removing accumulations of vegetable substances undergoing decay."

“And so proudly clad for such an humble office?” observed the Prince.

“Why not?” rejoined Hercules. “You give crowns to royalty, stars to nobility, medals to valour; and yet royalty may do great wrongs; nobility be a mere accident of birth; and valour be a brute determination, employed without conscience or sense of right. Think you, Prince, if one or the other must needs be done without, would mankind fare better in the absence of scavengers, or kings?”

“Indeed, the problem perplexes me,” the Prince answered; “and it would be vain to pursue it now, though I must confess that we should hold it strange to see a man clothe himself in fine raiment to descend into a sewer.”

“Ah! there man has the advantage. He can clothe himself as he lists—be clad in fustian by day, and silk and velvet by night. We have but one suit; and our great Maker has made it beautiful, to show that the humblest creatures, dwelling in the lowliest places, are objects of His regard. And yet the disadvantage which we labour under is more apparent than real; for whatever kind of earth or soil we pass through, our coats are never damaged, but shine as brightly as before.”

“But are you all vegetable feeders?” inquired the Prince.

“Not so; here comes old Necrophorus, the Sexton, who will acquaint your Highness of the habits of his tribe, and of many others of our family.”

Here the Sexton, or Burying Beetle,* stepped forward. He was appropriately attired in a suit of dull black, and commenced his story with remarkable gravity:—

“They call me Sexton, Prince,” said he, “because myself, my wife, and young ones feed upon dead animal matter, and we frequently bury what we find, that we may have a lasting store. We are not above paying a visit to churchyards occasionally; for I confess that all flesh comes alike to us, human or other. But the graves are so deep, and the bodies

* *Necrophorus Germanus.*

so well confined, that we find our churchyard labours severe, and therefore we hunt for food of easier access, and a dead horse or dog affords to us an acceptable repast, and a lasting store; but these are too seldom found, so we turn to the smaller creatures, such as dead mice, rats, birds, frogs, and moles. Have you never remarked, Prince, that though millions of living creatures must die daily, how rare it is, when taking a country ramble, to see a dead bird, rabbit, rat, mouse, or weasel?"

"I have repeatedly made that observation," replied the Prince.

"Well, then," continued Necrophorus, "the disappearance of their bodies is to a great extent due to us, and to our burying operations. Though it is true we are assisted in our sanitary operations by other insects of various kinds, and it would not be right to omit mention of their services. No sooner does life depart from the body of any creature, than myriads of different sorts of insects attack it in different ways. First come the Histers, or Mimic Beetles, and pierce the skin; then follow the Flesh Flies, some depositing upon it their young, already hatched; others covering it with millions of eggs, whence in a day or two proceed innumerable devourers. And so numerous are the eggs, and so voracious the grubs that proceed from them, that a great naturalist has declared it as his opinion that three flies would devour a dead horse as quickly as would a lion!

"Soon as the various tribes of flies have opened the way, a whole host of Beetles actively second their labours; Wasps and Hornets also come in for the spoil; and even Ants rival their larger competitors in the quantity consumed by them.

"But to return to ourselves, and our burying operations. I spoke of my wife—for we invariably move about in couples, and hunt together. We find our food by scent only, and in the neighbourhood of towns, the garbage that is thrown out attracts us. As soon as it begins to smell, we find our way to

it, and begin to work for its removal. Supposing, now, we are hunting together, and I first discover a dead bird, I fly around it, just as a vulture would hover over a carcass; my wife sees me from a distance, though it is night, and she knows by my movements the discovery I have made. She then makes her way to me, and settles upon the carcass at once; I just fly around once or twice more, to see that all is safe, and then join my mate, and we have a hearty meal.

“As soon as we have fed, we explore the earth in the neighbourhood, to find a place suitable for the interment of the remains. I then perform the operation of burying almost entirely by myself, my spouse either hiding herself in the body of the animal about to be entombed, or sitting quietly upon it, and allowing herself to be buried with it.

“I begin by digging a furrow all round the carcass with my head, in which I have enormous power, turning the earth towards the outside. After the first furrow is completed, I make another within it, and throw the earth into the first furrow; then I make a third, and this generally brings me to operate immediately under the body, so that, while working, I am out of sight; but my movements may be detected by the heaving of the earth, which forms a little rampart round the dead body.

“As the earth is moved from beneath, and the surrounding rampart increases in height, the bird sinks. After toiling for about four hours, it becomes necessary for me to go up and see how the work is proceeding, which I accordingly do; I get upon the body, and see at what point of my work a further excavation is necessary, and then I proceed to complete it.

“As soon as the excavation is large enough, I descend into the hole, and pull down the body of the bird, or other animal, by seizing it by the feathers or the skin, and when I have drawn it down deep enough, I again ascend to the top, take another survey, and, after resting for a time, shovel in the earth forming the ramparts, until every part of the carcass is covered.

Then, having buried the body, and immured my own wife, I dig a passage and descend to her, to see how she fares; and there we live, so long as the carcase lasts, and feed and rear our progeny. For these peculiarities they call us Sextons, and very useful we are, or the face of nature, instead of being like a respectable cemetery, would resemble a disordered field, strewed with the wreck of battle, and the putrid remains of dead bodies!"

"Thou art a worthy labourer," said the Prince, "and a great teacher, too, since you illustrate the close connection of death and life—the unbroken links that bind the past and present. And it is a noble task, that which you fulfil—for what would the living be with spectacles of death constantly before their eyes? Youthful ardour would be chilled, ambition checked, love blighted. And yet we are permitted to see enough of the 'valley and shadow' to comfort those who mourn, or who sink from bodily infirmity:

‘There is a calm for those who weep,
A rest for weary pilgrims found;
They softly lie, and sweetly sleep,
Low in the ground!’

"And then for man there is this glorious awakening reserved:—

‘The *soul*, of origin divine,
God’s glorious image, freed from clay,
In heaven’s eternal sphere shall shine,
A star of day!

‘The sun is but a spark of fire,
A transient meteor in the sky;
The soul, immortal as its Sire,
Shall never die!’”

The Glow-worms, that had extinguished their pale fires during the Sexton’s gloomy recital, now put forth their brightest radiance, and a throng of Fire-flies moved upwards and downwards—to and fro, like brilliant meteors.

The *Glow-worms** told the Prince that their light is chiefly emitted by the females, and serves as a signal-lamp by which they call them to their presence; and the *Lantern-flies*† told how they had come from South America, where, sometimes, flying in large numbers, they light up the woods with a brilliant glare; and the *Fire-flies*‡ displayed their peculiar lamps, which threw an intense illumination, through what resembled “bull’s eyes,” borne upon their bodies; and they assured the Prince, that the light emitted from these tubercles is so considerable, that in the West India Islands, where they are very numerous, the natives were formerly accustomed to employ them as living lamps, instead of candles, in pursuing their evening household occupations; and that, in travelling at night, they used to tie one Fire-fly to each toe, and thus were able to find their way in spite of darkness.

After these wonderful stories, the *Crickets* and the *Locusts* came, and repeated their narratives. The great Migratory Locust§ was regarded with deep interest, as being the cause of plagues and famine, so frequently reverted to in Holy Writ, and especially by the prophet Joel in the following sublime language:—“A day of darkness and of gloominess, a day of clouds and of thick darkness, as the morning spread upon the mountains: a great people and a strong; there hath not been ever the like, neither shall be any more after it, even to the Jews of many generations. A fire devoureth before them; and behind them a flame burneth: the land is as the garden of Eden before them, and behind them a desolate wilderness; yea, and nothing shall escape them. Like the noise of chariots on the tops of mountains they shall leap, like the noise of a flame of fire that devoureth the stubble, as a strong people set in battle array. Before their faces the people shall be much pained: all faces shall gather blackness. They shall run like mighty men; they shall climb the wall like men

* *Lampyrus noctigena*.

† *Fulgora lanternaria*.

‡ *Elatei noctigenus*.

§ *Gryllus migratorius*.

of war; and they shall march every one on his ways, and they shall not break their ranks: neither shall one thrust another; they shall walk every one in his path: and when they fall upon the sword, they shall not be wounded. They shall run to and fro in the city; they shall run upon the wall; they shall climb up upon the houses; they shall enter in at the windows like a thief. The earth shall quake before them; the heavens shall tremble: the sun and the moon shall be dark, and the stars shall withdraw their shining!”

But it was pleasant to hear—after the story of the Locust—the cheerful note of our own fire-side Cricket,* playing a sharp *rataplan* upon its wing cases. It awoke in the Prince’s mind pleasing recollections:—

“ Little inmate, full of mirth,
Chirping on my kitchen hearth,
Wheresoe’er be thine abode,
Always harbinger of good,
Pay me for thy warm retreat,
With a song more soft and sweet;
In return thou shalt receive
Such a strain as I can give.

“ Thus thy praise shall be express’d,
Inoffensive, welcome guest!
While the rat is on the scout,
And the mouse, with curious snout,
With what vermin else infest
Every dish, and spoil the best;
Frisking thus before the fire,
Thou hast all thine heart’s desire.

“ Though in voice and shape they be
Formed as if akin to thee,
Thou surpassest, happier far,
Happiest grasshoppers that are;
Theirs is but a summer song,
Thine endures the winter long,
Unimpaired, and shrill, and clear,
Melody throughout the year.”

* *Gryllus domesticus*.

CHAPTER X.

A GLORIOUS ASSEMBLY—THE PERILS OF BEAUTY—WONDERFUL METAMORPHOSIS—A MOURNFUL TRAIN, AND A TRANSFORMATION—THE POET AWAKES.

IT was already morning, and the early Butterflies were abroad, flying heavily, for their wings were wet with dew. The Night Moths, too, were still roaming, and, joining in the winged throng, contributed by their sombre though silken appearance, to make their gaudier allies look all the more beautiful. It was, indeed, a splendid gathering. There were Kings, Queens, Emperors, Princes, Admirals, and Painted Ladies, and right beautiful were the robes that they wore—gold, silver, silk, velvet, and pearls. Some were distinguished by zoological nomenclatures, as the Elephant Moth, the Peacock Butterfly, the Leopard Moth, the Tiger, the Hawk, and the Puss. They were preceded by a herald, and followed by speckled footmen, and lacqueys without number.

“Welcome!” said the Prince, “you fair companions of my childhood—the happiest, sunniest hours of life! How often I have watched you, hovering and fluttering over beautiful flowers, which you more than rivalled in the splendour of your gaudy colours!”

“Ah! Prince,” spoke the beautiful Swallow-tail,* we are accounted beautiful, but our very beauty is often the cause of our destruction. We are at once the sport and admiration of youth, and the coveted pride of the naturalist, to say nothing of the thousand enemies we have among the feathered tribes that seize and destroy us, in the few short days of our perfect life.”

“Tis even so,” said the Painted Lady;† “we are cruelly treated on account of our charms; often robbed of our liberty,

* *Papilo machaon*.

† *Cynthia cardui*.

and closed in a glass prison, that our tyrannical possessor may gratify himself by contemplating our charms; and when dead we are transfixed with a murderous weapon, and are kept like beautiful effigies, until the worm which devours all things makes us his food."

"Aye," thought the Prince, "and not only among your tribes is beauty thus enslaved. How many painted and proud ladies of the human race are pursued only for their external attractions, prisoned amidst false splendour in glass houses, and allowed only to move out in glass coaches, for ever under the jealous and suspicious eye of selfish man! But you have one advantage—death does not immediately prey upon your living glory—you remain like beautiful things asleep, waiting ——"

"Waiting only the worm which devours us," replied the Lady; "for our heaven and our ultimate bliss are but a summer's day, of which it is a sin to deprive us."

"We have all our fate," replied the Prince, "and must bend to it. But pray let me know something of those wonderful transformations through which you pass."

"It has been said," replied the Lady, "that were a naturalist to announce to the world the discovery of an animal, which for the first five years of its life existed in the form of a serpent, which then penetrating into the earth, and weaving for itself a thread of pure silk of the finest texture, contracted itself within this covering into a body without external mouth or limbs, and resembling more than anything else an Egyptian mummy; and which, lastly, after remaining in this state without food and without motion for three years longer, should at the end of that period burst its silken cerements, struggle through its earthy covering, and start into day a winged bird,—such an announcement would be received with universal distrust; and yet all these conditions are pretty nearly fulfilled in the life of a Butterfly.

"It is even so, Prince," said the beautiful Purple Emperor;*

* *Apatura iris*.

“and there are many other facts connected with us, which are even more surprising. For instance, what a wonderful instinct is that which, seeing the many plants that grow, guides the females of our species to select as the receptacle for their eggs, the leaves, or stems, or crevices of that plant which is suited as food for their young, though the parent feasts upon totally different diet herself. And yet it is so; the White Butterfly deposits her eggs upon the cabbage, and the young grubs begin to eat directly they are hatched; the Tortoise-shell and Peacock Butterflies lay their eggs upon nettles, and in like manner their young ones find appropriate food immediately they begin to crawl. But were the depositories of these eggs to be respectively changed, the young of each species would die of starvation, since neither can subsist upon the food appropriate to the other.”

The Swallow-tail again resumed her narrative. She said:—
“The caterpillars which emerge from the eggs are for the most part of a dark colour, but they cast their skins several times in the course of their growth, and the first moulting takes place a few days after they are hatched, when their new skins begin to display the colours and the markings by which the several tribes are distinguished. As the caterpillars grow, they feed heartily upon leaves, gnawing them to pieces with their wonderful jaws. When arrived at their full size, they prepare for those singular changes of form and function which are so remarkable. They cease to eat, and leave their accustomed haunts to find places of shelter and seclusion. Some suspend themselves beneath leaves; others retire to holes in trees; many resort to fissures in old walls, while some bury themselves in the ground; and here they pass into the form and state of what is called the chrysalis, in which even more wonderful changes are undergone.”

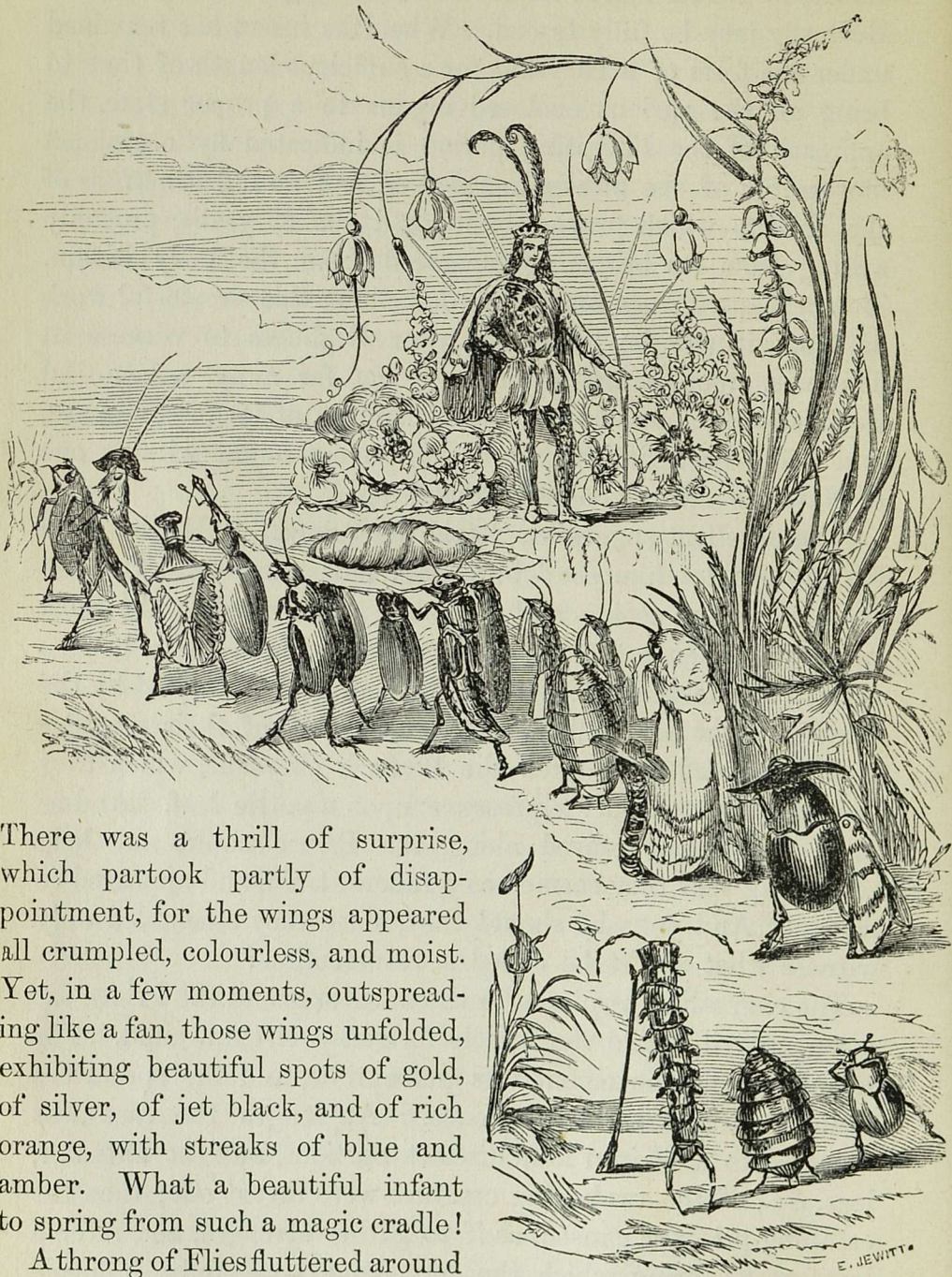
“The newly-formed chrysalis contains only a mass of fluid; it would seem as if the body of the caterpillar had been dissolved therein. But the outer case of the chrysalis exhibits a kind of

mould, in which marks of the external organs of the future Butterfly may be fully traced. When the insect has remained under the form of a chrysalis for a sufficient length of time to bring all the various enclosed organs to a proper state, the approach of the liberating period is indicated by occasional movements of the awakening sleeper, and an indistinctness of the colours which previously marked the chrysalis, probably arising from its becoming separated from the body within. But perhaps, Prince, instead of describing this wonderful work of God, it will be better for your Highness to witness it. There is, upon a nettle growing not far away, a beautiful Tortoiseshell, about to burst the confines of its prison-house, and being brought hither, your Highness might witness one of Nature's most wonderful operations."

"An excellent suggestion," said the Prince. "'He that hath eyes to see, let him see;' but, alas! how many walk through Nature's paths seeing and realizing nothing, while the most wonderful phenomena are taking place around them."

So a whole host of insects, who had been attracted by the beauty of the Butterflies, and the account of their singular history, started off to fetch the Peacock chrysalis, which they brought to the Prince's presence upon a nettle leaf. And as their tiny forms moved along, the Prince could not help remarking that they seemed as a funeral train, and appeared to mourn. And yet why should they, since they assembled only to witness what might be called a resurrection?

The chrysalis was placed in the warm sun, and the Prince sat down near it, while the insects formed a circle around. For some time no movement was perceptible, and the spectators maintained a breathless silence. At length the case was observed to split into four distinct portions, and the antennæ, legs, &c., of the awakening creature were thrust out; then the escaping prisoner paused, as if to gather strength, and after a brief rest, during which the sun shone powerfully, it made another effort, and crept from the pupæ-case on to the leaf.



There was a thrill of surprise, which partook partly of disappointment, for the wings appeared all crumpled, colourless, and moist. Yet, in a few moments, outspreading like a fan, those wings unfolded, exhibiting beautiful spots of gold, of silver, of jet black, and of rich orange, with streaks of blue and amber. What a beautiful infant to spring from such a magic cradle!

A throng of Flies fluttered around the lovely stranger, until he, tempted by their example, began to vibrate

his wings, and rose silently, and somewhat feebly, upon the air. He scarcely yet possessed strength, so he soon alighted, to rest upon the cheek of a rose, close by the Prince's side.

Ah! thought the Prince; how wonderful is Creation, and how great must be its Author!

The Blackbird and the Thrush, having satisfied their morning's hunger, and drunk from the crystal brook, sat upon the branches of the hawthorn, and rivalled each other in song.

The Poet began to arouse from his reverie, and felt himself to be no more a Prince, but a mortal. And yet he had been instructed and exalted by what he had seen, and resolved that from thenceforth no creature of God's creation should be deemed unworthy of his regard. "The earth," he exclaimed, "is a beautiful garden, and life our portion therein. In everything that lives and grows there may be found beauty, utility, and instruction." He took his pen, determined to improve what he had witnessed, and gave expression to his poetic imaginings in these beautiful lines:—

THE BUTTERFLY'S BIRTH-DAY.

The shades of night were scarcely fled;
 The air was mild, the winds were still;
 And slow the slanting sunbeams spread,
 O'er wood and lawn, o'er heath and hill:

From fleecy clouds of pearly hue
 Had dropt a short but balmy shower,
 That hung like gems of morning dew,
 On every tree and every flower:

And from the blackbird's mellow throat
 Was poured so loud and long a swell,
 As echoed with responsive note
 From mountain side and shadowy dell;

When bursting forth to light and life,
 The offspring of enraptured May,
 The BUTTERFLY, on pinions bright,
 Launched in full splendour on the day.

Unconscious of a mother's care,
 No infant wretchedness she knew,
 But as she felt the vernal air,
 At once to full perfection grew.

Her slender form, ethereal, light,
 Her velvet-textured wings unfold,
 With all the rainbow's colours bright,
 And dropt with spots of burnished gold.

Trembling with joy awhile she stood,
 And felt the sun's enlivening ray,
 Drank from the skies the vital flood,
 And wondered at her plumage gay !

And balanced oft her broidered wings,
 Through fields of air prepared to sail ;
 Then on her venturous journey springs,
 And floats along the rising gale.

Go, child of pleasure ! range the fields ;
 Taste all the joys that spring can give ;
 Partake what bounteous summer yields ;
 And live, whilst yet 'tis thine to live.

Go ! sip the rose's fragrant dew ;
 The lily's honied cup explore ;
 From flower to flower the search renew ;
 And rifle all the woodbine's store.

And let me trace thy vagrant flight ;
 Thy moments, too, of short repose ;
 And mark thee, then, with fresh delight,
 Thy golden pinions ope and close.

But hark ! whilst thus I musing stand,
 Pours on the gale an airy note ;
 And, breathing from a viewless band,
 Soft, silvery tones around me float !

They cease—but still a voice I hear,
 A whispered voice of hope and joy,—
 “*Thy* hour of rest approaches near ;
 Prepare thee, mortal, thou must die !

“ Yet start not ! on thy closing eyes
 Another day shall still unfold,
 A sun of milder radiance rise,
 A happier age of years untold.

“ Shall the poor worm that shocks thy sight,
 The humblest form in Nature's train,
 Thus rise in new-born lustre bright,
 And yet the emblem teach in vain ?

“ Ah ! where were once her golden eyes,
 Her glittering wings of purple pride ?
 Concealed beneath a rude disguise ;
 A shapeless mass, to earth allied.

“ Like *thee* the hapless insect lived,
 Like thee he toiled, like thee he spun ;
 Like thine his closing hour arrived ;
 His labour ceased, his work was done.

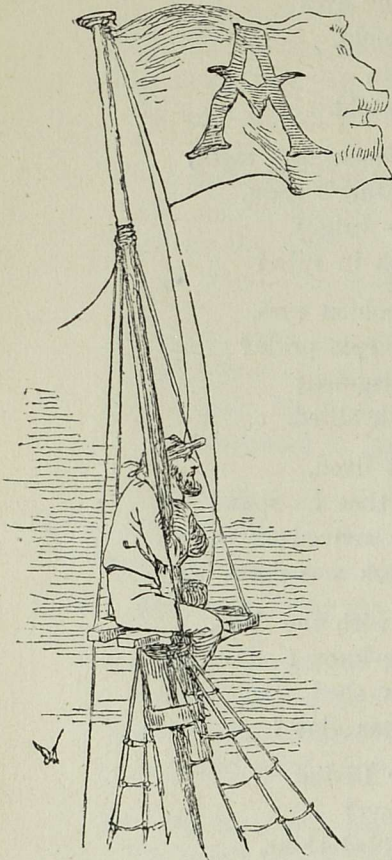
“ And shalt thou, numbered with the dead,
 No happier state of being know ?
 And shall no future morrow shed
 On thee a beam of brighter glow ?

“ Is this the bound of Power Divine,
 To animate an insect frame ?
 Or shall not He, who moulded thine,
 Wake, at His will, the vital flame ?

“ Go, mortal ! in thy reptile state,
 Enough to know to thee is given ;
 Go ! and the joyful truth relate,
 Frail child of earth ! high heir of Heaven !”*

* By the author of “The Butterfly's Ball.”

THE OCEAN.



GRAND object for contemplation is presented by the mighty ocean. Though at first view it seems merely a boundless expanse of water, without anything to allure curiosity, a little farther acquaintance with its wonders opens a vast field for scientific research. The elephant upon the land does not equal in size or strength the huge monsters which roll and gambol in the depths of the ocean. And full as is the wilderness with animated life, it does not in this respect surpass the waters, every drop of which is filled with living beings. The various and ever-shifting currents of the atmosphere are, perhaps, not more numerous or more inexplicable than the currents of the ocean.

The exhalations of the ocean moisten the air and fertilize the ground, replenish the springs and supply the ceaseless flow of the rivers.

The waters of the ocean cover about two-thirds of the earth's surface. They everywhere have the same level, except when agitated by winds or some other local causes. Geographers have assigned different names to different parts of this great body of water, such as the Pacific, the Atlantic, the Frozen, the Southern, and the Indian Ocean. It is unnecessary,

however, in the prosecution of the present object, to notice those divisions.

When a person stands for the first time upon the shore, and looks over the wide rolling wave, he is lost in wonder at the sublimity of the scene. His next movement is to taste of the water. He finds it to be salt and brackish. By chemical decomposition its component parts are found to be, Lime, 2·9 gr.; magnesia, 14·8; soda, 96·3; sulphuric acid, 14·4; muriatic acid, 97·7. The waters of the ocean are generally composed of these ingredients at all times and in all places, but not always in the same proportions. By boiling sea water common salt is precipitated. The boilers of steam-boats have sometimes been nearly filled by a solid incrustation of salt deposited upon their sides. Immense quantities of salt are manufactured every year, by evaporation of sea water in the open air. In this way natural beds of salt of immense extent and depth have been formed. In colder latitudes the saltness of the sea is, in general, less than between the tropics. There are, however, exceptions; and it has been observed that those large gulfs, into which many rivers empty, are less salt than other parts of the ocean.

From these observations it appears that there is a very considerable difference in the saltness of the sea, even where the waves are continually meeting and mingling. As a general rule, however, in going from the equator to the poles, the saltness of the sea diminishes. It has also in many places been found that the water on the surface of the ocean is less salt than on the bottom. Some of these variations are easily accounted for; others at present are entirely unknown. It is perfectly natural that a bay, into which many large rivers are constantly pouring a supply of fresh water, should not be so salt as other parts of the ocean. But why there should be a difference between the tropical and arctic seas, or between the surface and the depths of the ocean, in this respect, no satisfactory reason has as yet been assigned.

Neither is it easy to discover the origin of the saltness of the sea. The beneficent design of our Creator is manifest in this arrangement, as without this saltness, and the continued agitation produced by winds, tides, and currents, the waters would become tainted, and the ocean would prove the boundless reservoir of contagion and death. But whence comes this saltness? Some have supposed it proceeds from immense beds of salt in the bottom of the ocean. Such beds have indeed been found; but they appear to be rather deposits of salt, which the ocean has formed by precipitation. Instead of being the cause, they are the effect of the ocean's saltness. The corruption of river water has been absurdly assigned as the cause. By this theory the ocean is represented as a vast lake, filled by the ceaseless flow of rivers of fresh water, which by corruption has become salt and brackish. This theory originated from the fact that the fresh water which is discharged into close lakes, by some process of decomposition deposits salt. It is, however said, that if this were the cause of the saltness of the ocean, it would be continually growing more salt; and there is no evidence that this is the fact. This opinion was first advanced by Halley, a celebrated English philosopher; and he inclined to the opinion that there was a progressive increase, though necessarily very slow. "Several modern philosophers," says Malte Brun, "consider the sea as the residuum of a primitive fluid, which must have held in solution all the substances of which the globe is composed; that these sea waters having deposited all the earthy principles, both acid and metallic, with which they were impregnated, there remains in their residuum (which is the present sea) some of these elementary principles too intimately combined with water to escape from it; and with respect to the *bitterness* of sea water as it diminishes in proportion to the depth, it can arise solely from the great quantity of decomposed and putrifying animal and vegetable substances which float in the ocean, and which the running waters never cease to bring into it." This is a kind of philosophizing in which we can

place but little confidence, for its basis is supposition, not fact. Men are generally unwilling to acknowledge ignorance; and the pride of human reason is more gratified with any theory, if it have but the air of philosophy, than with none at all.

The bottom of the ocean is like the surface of the dry land. Islands are but the summits of mountains rising above the waves. If a person were wafted along in a balloon, just above the region of the clouds, the Alps and the Andes would be the islands of his vapoury sea. In some places from his airy flight he would in vain drop the sounding line; and again, when passing over some high land, with the lead and line, he would find soundings. Thus it is with the navigator of the ocean. He sails over lofty mountains and deep valleys, and mighty monsters gambol in these valleys, and roam in the fastnesses of these submarine mountains. Sometimes the lofty summit of some table mountain presents a shoal, upon which the navigator anchors his ship. Again, the precipitous summit of some granite cliff pierces through the surface of the ocean; and when the ship is dashed by the storm against this rock, the drowned mariner rolls down the declivity of the mountain till he finds a grave far below, in the depths of the valley at its base. Again, the summit of the ocean mountain rises above the wave, and becomes the fertile island, thronged with inhabitants, and all the variety of animated life. In most parts of the open ocean it is so deep, that no bottom has been found by any line yet used. In consequence of the great depth of the ocean, it has frequently been called bottomless, and by the ignorant it has been supposed to be literally without a bottom. The mountains of the dry land do not rise above 20,000 feet; and, reasoning from analogy, it is exceedingly improbable that the depth of the ocean, in any part, can exceed 30,000 feet. But it would hardly be in our power to find the bottom even at one-third of that depth. Lord Mulgrave—who had distinguished himself upon the floor of Parliament, as well as upon the deck of his ship—threw a sounding-line in the

Northern Ocean, of greater length than had ever before been used. He heaved a very heavy sounding lead, and gave out along with it a rope of 4,680 feet, but he found no bottom.

The currents of the ocean are almost as numerous and various as the ever-shifting breezes of the air. Some of these are undoubtedly caused by particular winds. But others cannot be ascribed to this cause, neither is it easy to ascertain their origin. These currents are found flowing in all directions, east, west, north, and south, being formed by various and often unknown causes. Sometimes the waters on the surface of the ocean are flowing in one direction, while beneath these is a current of equal rapidity and strength, flowing exactly contrary. In navigation, the business of currents requires special attention; for a ship often unknowingly gets into one of them, and is borne far from her true course, and is sometimes carried backward by its force when apparently rapidly approaching the wished-for port. Much attention has therefore been devoted to this subject; and the direction of currents and their rapidity have been carefully marked.

Sometimes two strong currents meet in such a way, that a whirlpool is formed. These formerly inspired navigators with unspeakable terror. Many of them, which were celebrated in most extravagant strains in ancient poetry, are now, in consequence of the superior knowledge of the art of navigation, deemed perfectly harmless. There is one, however, on the coast of Norway, which still holds out terror to the seaman. The famous Maelstrom is indeed a dreadful and voracious vortex. "The name it has received from the natives signifies the *throat of the sea*; since they suppose that a great share of the water of the sea is sucked up and discharged by its vortex. A minute description of the internal parts is not to be expected, since none who were there ever returned to bring back information. The body of the waters that form this whirlpool are extended in a circle above thirteen miles in circumference. In the midst of this stands a rock, against which the tide in

its ebb is dashed with inconceivable fury. At this time it instantly swallows up all things that come within the sphere of its violence—trees, timber, and shipping. No skill in the mariner, nor strength of rowing, can effect an escape; the sailor at the helm finds the ship at first go in a current opposite to his intentions; his vessel's motion, though slow in the beginning, becomes every moment more rapid; it goes round in circles still narrower and narrower; till at last it is dashed against the rocks, and instantly disappears; nor is it seen again for six hours, till, the tide flowing, it is vomited forth, with the same violence with which it was drawn in. The noise of this dreadful vortex still farther contributes to increase its terror, which, with the dashing of the waters, and the dreadful valley, if it may be so called, caused by their circulation, makes one of the most tremendous objects in Nature."

The periodical ebbing and flowing of the waters of the ocean is ascribed primarily to the influence of the moon, which tides are in some degree increased or diminished by the action of the sun.

The dependence of tides on the moon was first explained by Newton, and has been illustrated and confirmed by the labours of later mathematicians. The general principle of attraction, which binds the myriads of revolving worlds together, and curbs their rapidity, and guides them in their courses, affects not merely the united mass of any particular world, but also the particles of which that mass is composed. When the moon is in the meridian, the water of that place, being immediately under the moon, is nearer it than any other part of the globe is; consequently it is attracted more powerfully than any other part of the globe. The waters will, therefore, be attracted by the moon, and rise in a heap. As the moon moves along its path, this high wave, created by her influence, will follow. Thus it is that the waters of the sea move from all parts to the point over which the moon is. Obstructions from the land, and the opening of bays and inlets,

operate in various ways in modifying the regularity, rapidity, and extent of tides.

This, however, accounts for but one tide in the twenty-four hours, when in fact there are two. While it is high tide in that hemisphere over which the moon is placed, and thus is operating by its immediate attraction, it is also high tide in the opposite hemisphere, at the point farthest distant from the moon. This second tide does not admit of so simple an explanation, and we shall not here attempt to elucidate it, but only allude to the fact.

If the ocean covered the whole earth, and were everywhere equally deep, the water would uniformly follow the influence of the sun and moon, and great regularity in the height of the tides would be the consequence. The great diversity in the height of the tides, which really exists, is owing to the unequal depth of the actual bed of the ocean, the situation of continents and islands, the various breadths and depths of channels between different seas, the direction of winds, &c.

Lakes and seas have very small tides, because the moon attracts all parts alike, or because the strait connecting the sea with the ocean is too narrow to allow great quantities of water to pass and repass before the influence of the moon ceases. In some parts of the Mediterranean the tides are scarcely perceptible; in the eastern part, at Naples, they sometimes rise a foot, at Venice, two feet.

Whenever tides meet with any direct obstacle, the waters often rise far above the ordinary level of the sea, especially if a considerable momentum had been previously acquired by their passage onward. The Severn Sea in England extends far into the land, and is very narrow at the extremity; the tide there rises to the height of thirty feet. The Bay of Fundy is hemmed in by a high rocky shore, and as tides come in from its broad sweep over the Atlantic, it rises sometimes to the height of 100 feet, and so rapidly, that animals, feeding on the shore, have not time to make their escape.

The momentum acquired by the tides admits of familiar illustration. All who have stood on the sea-shore, and watched the approaching wave, have observed its apparent sudden increase of power, as it rippled up upon the sand beach, or dashed against the rocks; its strength was not perceived until resistance was presented. Tides, also, frequently rise to a great height at the mouths of wide rivers, which open in the direction of the stream of the tide.

The influence of the tides is felt in the Amazon to the distance of 100 miles from where it empties into the ocean, the progressive motion of the water no more impeding the progress of a wave against a stream, than the velocity of the wind prevents sound from being carried in a direction opposite to it.

The luminous appearance, which the waters of the ocean at times assume, is a magnificent and surprising spectacle. The ship, driven impetuously through the billows, seems to throw out furrows of fire, and leaves behind her a brilliant and fiery wake. There is almost an endless variety of beauty in those appearances. When a calm glasses the surface of the ocean, the dipping of an oar, or any other agitation of the water, causes a thousand spangles to glitter upon the surface. But nothing can exceed the grandeur of the scene, when the tumultuous waves are breaking and dashing in fiery foam. The light afforded by this luminous phenomenon is so great, that at times persons have been able to read by it.

The cause of this phenomenon was long a subject of speculation among men of science, but is now satisfactorily ascertained to be sea-animalcula of the luminous tribe, particularly the species *medusa*. The *medusa pellucens* of Sir Joseph Banks, and the *medusa scintillans* of Mr. Macartney, emit the most splendid light. The degree and brilliancy of the exhibition are supposed to depend on the state of the atmosphere and sea. A more grand display than that which we have witnessed, probably seldom, if ever, takes place.

This phenomenon has been ascribed to various causes; but

the explanation presented by Mr. Stuart is the one now most generally admitted. The little animal, by which this light is produced, is sometimes called *the glow-worm of the sea*. This animal is exceedingly small, thin, and transparent, and, like the fire-fly, with which we are all acquainted, emits a brilliant light. The sea contains many animals of this nature, of different species. The *medusas* have little antennæ or horns, from which they dart a strong light, while the rest of their body remains in obscurity. All the zoophytes appear to be in a greater or less degree phosphorescent. Some accurate observers have also thought that, in addition to this *glow-worm* light, there is a luminous appearance originating from the decomposition of vegetable and animal substances, similar to the phosphorescence of *light wood*. It is by no means improbable that there is the combination of various causes in gilding the ocean with such fiery splendour.

GIGANTIC SEA-WEEDS.

ON the north-west coast of North America there is a tangle, named *Nereocystis*, having a stem which measures, when full-grown, 300 feet in length, and bears at its extremity a huge float six or seven feet long, shaped like an enormous cask, and crowned by a tuft of more than 50 forked leaves, each of them from 30 to 40 feet long! Among this submarine foliage the sea-otter lies in wait for its prey, and, when tired, delights to rest and sleep on the enormous bladders. Yet all this mass of vegetation is moored by a stem as thin as a whipcord. The Aleutians use these thread-like stalks for fishing-lines. Prodigious as are the dimensions of this "sea otter's cabbage" (the name by which it is popularly known), they are surpassed by those of the *Macrocystis*, a sea-weed exceedingly remarkable on account of its extensive range, being distributed along the American shores of the Pacific from the Arctic to the Antarctic Oceans. This astonishing alga grows to a length of nearly

1,000 feet. Such giants strike the beholder with wonder. Not less calculated to excite our admiration are the dwarfs and atoms of vegetable life that cluster around them. Few forms of organized beings are more delicately beautiful than many of the smaller sea-weeds, and the study of them, with the aid of the microscope, is a source of never-failing delight to all who engage in it.

WHY FISH CANNOT LIVE OUT OF WATER.

PERHAPS you will think it odd that any one should inquire why fishes die when they are taken out of the fluid in which they have hitherto lived; but this inquiry is one which will be useful to us, if, in seeking for the answer, we are led to a better acquaintance with any of God's wonderful works.

George admits he is somewhat puzzled; but Catharine, and Sarah Ann, and Joseph, have given a ready answer; but the readiest reply is often the most erroneous, and hasty conclusions are seldom in accordance with truth. And so it is in this instance. George says he does not know, and is determined to inquire further; while some of the rest of our young audience, like many older heads, having got hold of a plausible answer, are satisfied with it, and examine the matter no more.

Catharine and her party say that the fish dies for want of water, and they laugh at their grandfather for expressing an opinion that it dies for want of air. "Grandpapa must be joking," say they; "because a fish has more air than it ever had, when it is taken out of the water, so it can't die for want of breath."

A boy caught a little minnow, and put it into a bottle, in which it lived very comfortably for a short time; but one day its young keeper corked the bottle for awhile, upon which the little fish quickly died. It has been observed, too, that if the mouth of the globe in which gold fishes are confined is covered with varnished silk, and the surface of the water thus excluded

from the air, the fish soon manifest signs of uneasiness, and shortly afterwards die.

It is related that some wicked men once stole a large quantity of oil from a gentleman's warehouse, and hid the barrels in which the liquid was contained, by sinking them in some fish-ponds in the vicinity. The oil escaped, and, floating, spread itself in a thin layer over the surface of the ponds, and in a few hours afterwards, a large number of the fish were found to be dead. The oil had excluded the air from the surface of the pond, and the fish were suffocated, just as was the minnow in the boy's bottle; they died for want of air.

But some may raise the objection, that if fishes required air, they would live best where they had most, namely, when taken out of the water. We will endeavour to explain how it is that the breathing apparatus of the fish, though exquisitely adapted to act upon the air contained in water, becomes inefficient when exposed to dry air.

Fishes breathe by their gills—those curious, bright-red fringes, which lie under the plates on each side of their head. These organs correspond to the lungs of other animals, and decompose the air exposed to them in the current of water taken in at the mouth, and pushed back through the openings of the side of the neck.

If you watch gold-fish in a globe, you will find that they are constantly opening and closing their mouths—in fact, breathing. While the water containing air is thus driven past and between the blood-vessels of the gills, the blood is forced into these organs by the action of the heart, which is constructed upon the most perfect form of a force-pump.

The gills, or lungs of fishes, are formed of an immense number of small blood-vessels, arranged in loops, like fringe, and covered with a thin and transparent membrane, resembling goldbeater's skin. This membrane loses its transparency when it becomes dry, and, in drying, contracts, and thus impedes the circulation of the blood through the vessels. Moreover, the

blood, in its passage through the gills, when the fish is out of water, dries up, and becomes thickened, and unfit to circulate. Thus it is that these organs become unable to abstract oxygen from the air, and that the fish can no longer breathe. It dies from suffocation, or want of air.

The power of living out of the water, nevertheless, in different species, is traceable to the peculiar requirements of the animal in its "native element." The fishes which are in the habit of swimming near the surface of the water require and consume much more oxygen, and hence die almost immediately when taken out of the water; on the other hand, those fish which live near the bottom of the water, or in the mud, have a comparatively small requirement for oxygen, and sustain life for a long while after they are caught.

The proverb, "Dead as a herring," has probably arisen from the suddenness of the death of that fish upon its removal from the water. Mr. Yarrell states, that perch (a common fresh-water species) has an extraordinary power of retaining life; and that these fish are "constantly exhibited in the markets of European countries, and if not sold, are taken back to the ponds from which they were removed in the morning, to be reproduced another day."

A rare little fish, known by the name of the Anglesea morris, has been known to live after having been carried in brown paper in a gentleman's pocket for three hours. The carp, a common resident in the ponds of the west of England, is also singularly tenacious of life, as might be anticipated from its ground-haunting habits.

The class of animals called *Fishes* are, for the most part, *oviparous*. This term is derived from two words, meaning "egg," and "to be born;" it signifies that the young are produced from eggs. Almost every person has seen the *roe* of the common herring. This is a mass of eggs, and it would take a very long time to count its contents. In a common perch, weighing half a pound, the number of eggs was discovered to

be no less than two hundred and eighty thousand! In a moderate sized cod fish it is estimated that the number is usually several thousands of thousands!

These arrangements for the reproduction of the species prove how necessary those animals are; for such a provision for their multiplication would not have been made, unless they fulfilled some important part in the great system of Nature. What that part, or what the purpose of the Creator, in so carefully guarding against their extinction, may be, has not yet been discovered, and must be left for the enlightenment of future time to determine.

In the meanwhile, let us learn patiently to use such light as may be given to us, assured that the most significant portions of the great plan of Nature are necessary and important parts of a grand scheme which ministers to our benefit and joy. Yet let us not arrogate to ourselves the sole right to happiness in this beautiful scene, but remember, that the lowliest living thing has, in its sphere, a happiness of its own, that we do wrong to destroy *in mere sport*.

THE MORNING CALL.

THE summer's sun is shining bright,
 And golden clouds are flying;
 Heedless of day, upon her couch,
 A slumbering maid is lying;
 Glad songsters by her lattice flit,
 And seem to long to open it,
 Asking for Laura.

The Woodbine round her window creeps,
 The modest Jessamine, too, peeps,
 Asking for Laura.

The Daisy and the Buttercup,
 With modest eyes are looking up,
 Asking for Laura.

The Bees pass loudly humming by,
And many a gorgeous Butterfly,
Asking for Laura.

The Robin sings his morning lay,
And by their dams the Lambkins play,
Asking for Laura.

Oh, who would waste the joyous hours,
Cherished by insects, birds, and flowers,
To see a maiden lost in sleep?
It makes the drooping willow weep,
To ask in vain for Laura.

“GO FORTH INTO THE FIELDS.”

Go forth into the fields,
Ye denizens of the pent city's mart!
Go forth, and know the gladness nature yields
To the care-wearied heart.

Leave ye the feverish strife,
The jostling, eager, self-devoted throng:
Ten thousand voices, waked anew to life,
Call ye with sweetest song.

Hark! from each fresh-clad bough,
Or blissful soaring in the golden air,
Bright birds, with joyous music, bid you now
To spring's loved haunts repair.

The silvery, gleaming rills,
Lure with soft murmurs from the grassy lea,
Or gaily dancing down the sunny hills,
Call loudly in their glee.

And the young, wanton breeze,
With breath all odorous from her blossomy chase,
In voice low whispering 'mong th' embowering trees,
Woos you to her embrace.

Go! breathe the air of heaven,
Where violets meekly smile upon your way;
Or on some pine-crown'd summit, tempest-riven,
Your wandering footsteps stay.

Seek ye the solemn wood,
 Whose giant trunks a verdant roof uprear,
 And listen, while the roar of some far flood
 Thrills the young leaves with fear !

Stand by the tranquil lake,
 Sleeping 'mid willow banks of emerald dye,
 Save when the wild bird's wings its surface break,
 Checkering the mirror'd sky ;—

And if, within your breast,
 Hallow'd to Nature's touch, one chord remain ;
 If aught save worldly honours find you blest,
 Or hope of sordid gain,—

A strange delight shall thrill,
 A quiet joy brood o'er you like a dove ;
 Earth's placid beauty shall your bosom fill,
 Stirring its depths with love.

O, in the calm, still hours,
 The holy Sabbath hours, when sleeps the air,
 And heaven, and earth, deck'd with her beauteous flowers,
 Lie hush'd in breathless prayer,—

Pass ye the proud fane by,
 The vaulted aisles, by flaunting folly trod,
 And, 'neath the temple of the uplifted sky,
 Go forth and worship God !

HYMN OF NATURE.

God of the earth's extended plains !
 The dark green fields contented lie ;
 The mountains rise like holy towers,
 Where man may commune with the sky ;
 The tall cliff challenges the storm
 That lowers upon the vale below,
 Where shaded fountains send their streams,
 With joyous music in their flow.

God of the dark and heaving deep !
 The waves lie sleeping on the sands,
 Till the fierce trumpet of the storm
 Hath summon'd up their thundering bands ;
 Then the white sails are dash'd like foam,
 Or hurry, trembling, o'er the seas,
 Till, calmed by Thee, the sinking gale
 Serenely breathes, Depart in peace.

God of the forest's solemn shade !
 The grandeur of the lonely tree,
 That wrestles singly with the gale,
 Lifts up admiring eyes to Thee :
 But more majestic far they stand,
 When, side by side, their ranks they form,
 To wave on high their plumes of green,
 And fight their battles with the storm.

God of the light and viewless air !
 Where summer breezes sweetly flow,
 Or gathering in their airy might,
 The fierce and wintry tempests blow ;
 All—from the evening's plaintive sigh,
 That hardly lifts the drooping flower,
 To the wild whirlwind's midnight cry—
 Breathe forth the language of thy power.

God of the fair and open sky !
 How gloriously above us springs
 The tented dome, of heavenly blue,
 Suspended on the rainbow's rings !
 Each brilliant star that sparkles through,
 Each gilded cloud that wanders free,
 In evening's purple radiance, gives
 The beauty of its praise to Thee.

God of the rolling orbs above !
 Thy name is written clearly bright
 In the warm day's unvarying blaze,
 Or evening's golden shower of light.

For every fire that fronts the sun,
 And every spark that walks alone,
 Around the utmost verge of heaven,
 Were kindled at Thy burning throne.

God of the world! the hour must come,
 And Nature's self to dust return;
 Her crumbling altars must decay;
 Her incense fires shall cease to burn:
 But still her grand and lovely scenes
 Have made man's warmest praises flow,
 For hearts grow holier as they trace
 The beauty of the world below.

BIRDS' NESTS.

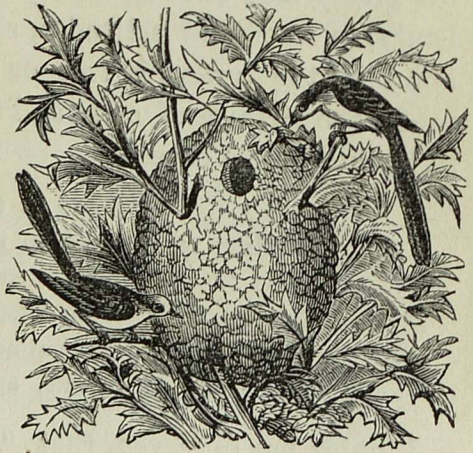
ALL lovers of Nature must remark that the nests of birds are constructed with so much art, as to baffle the utmost exertion of human ingenuity to imitate them.

“Mark it well, within, without,
 No tool had he that wrought, no knife to cut,
 No nail to fix, no bodkin to insert,
 No glue to join, his little beak was all—
 And yet how nicely finished!”

Birds of the same species collect the same materials, arrange them in the same manner, and make choice of similar situations for fixing the places of their temporary abodes. In forming the nests, they make use of dry wood, bark, thorns, reeds, thick hay, and compact moss, as a foundation, and on this, as a first layer, they spread and fold in a round form all the most delicate materials—as down, wool, silk, spiders' webs, feathers, and other light substances adapted for the purposes for which they are intended, and to the climate in which the nests are situated. Thus the ostrich in Senegal, where the heat is excessive, neglects her eggs during the day, but sits on them in the night. At the Cape of Good Hope, where the heat is less, the ostrich, like other birds, sits upon her eggs both day and night.

In countries infested with monkeys, many birds, which in other countries build in bushes and clefts of trees, suspend their nests upon slender trees, and thus elude the utmost art of their enemies.

Mr. Pennant, in his "Indian Zoology," gives us the following wonderful account of the Tailor Bird:—"Had Providence left the feathered tribe unendued with any particular instinct, the birds of the torrid zone would have built their nests in the same unguarded manner as those of Europe: but there the lesser species, having a certain prescience of the danger that surrounds them, and of their own weakness, suspend their nests



at the extreme branches of the trees, conscious of inhabiting a climate replete with enemies to them and their young—snakes that twine up the bodies of the trees, and apes that are perpetually in search of prey; but, heaven-instinctive, they elude the gliding of the one, and the activity of the other. Some form their pensile nest in the shape of a purse, deep and open at the top; others with a hole in the side; and others, still more cautious, with an entrance at the very bottom, forming their lodge near the summit. But the little species here described seems to have greater diffidence than any of the others. It will not trust its nest even to the extremity of the slender twigs, but makes one more advance to safety, by fixing

it to the leaf itself. It picks up a dead leaf, and, surprising to relate, sews it to the side of a living one, its slender bill being its needle, and its thread some fine fibres: the lining, feathers, gossamer, and down."

The instinct, which guides every species of the feathered tribe in contriving the most proper habitation for the hatching of their young, instructs them also to repair to the situation the most suitable for them, with respect to their food, their pleasure, and their safety. Hence the choice of each species is invariably the same. Some repair to the rude thicket; some to the cleft or hollow tree; some weave their humble nests in the grassy dale or roughening waste; others delight in shaggy banks, in woodland solitudes, and unfrequented glooms; some build in the towering tree or inaccessible rocks; and others prefer the vicinity of man, and take shelter in his chimneys, or in his hospitable eaves.

"Some to the hilly hedge
Nestling repair, and to the thicket some;
Some to the rude protection of the thorn
Commit their feeble offspring; the cleft tree
Offers its kind concealment to a few,
Their food its insects, and its moss their nests."

Bingley has observed, that "the act of nest-building is one of those wonderful contrivances of Nature that would compel us, however we might otherwise be inclined to doubt it, to believe that we, and every other part of the creation, are constantly under the protection of a superintending Being, whose goodness knows no bounds. Without this, what can we suppose it is that instigates a creature that may never before have had young, to form a hollow nest to contain eggs (things that as yet it knows nothing of), and to concentrate a proper proportion of heat for the incubation? Without this, what can we suppose it is that dictates the necessity of forming the outside with coarse materials, as a foundation, and of lining it within with more delicate substances? How do these animals

learn that they are to have eggs, and that these eggs will require a nest of a certain size and capacity? Who is it that teaches them to calculate the time with such exactness, that they never lay their eggs before the reception for them is finished? No person can surely be so blind as to observe all this, and not be able to perceive the superintendence of a Beneficent Wisdom influencing every operation. If such be the case, he must have the powers of his understanding totally obliterated, and his mind enveloped in impenetrable darkness."

The truant schoolboy, when he steals the tender nest, little thinks of the pangs he causes the bird who placed the embryo brood in the snug retreat. He carries home in triumph this precious gem, to decorate a niche in the cupboard, and the poor bird

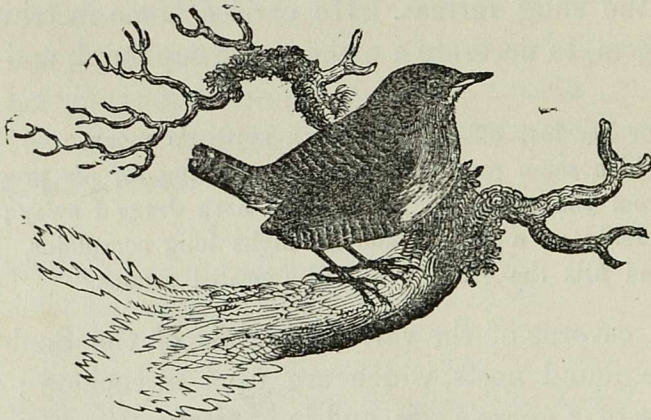
“For her lost offspring pours a mother’s moan,
Which some rough ploughman, marking for his prey,
From the warm nest, unfledg’d, hath dragg’d away;
Perch’d on a bough, she all night long complains,
And fills the grove with sad repeated strains.”

In the caverns of the various islands of the Soolo Archipelago are found nests, which are used in cookery; they are of the size of a goose’s egg, and in substance much resembling isinglass. The Chinese gather these nests, and carry on a great traffic in them. They dissolve in broths, and make a kind of jelly of a very delicious flavour. Their value is chiefly ascertained by their uniform fineness, and delicacy of their texture; those that are white and transparent being most esteemed, and often fetching in China their weight in silver. The birds that build these nests are small grey swallows. Authors differ much as to the materials of which these nests are composed. Some suppose them to consist of seaworms of the mollusca class; others of the sea plant called agal-agal. It has also been supposed that the swallows rob other birds of their eggs, and, after breaking the shells, apply the white of them in the composition of these structures.

AT WHAT HOUR DO BIRDS AWAKE?

To this question, who can reply? Can you, indefatigable travellers, who by night and day, like the wandering Jew, are marching onward, onward? No; in your journey through this world you enjoy the merry note which the bird of God flings out upon the air, and ask no more.

Can you, intrepid hunters, who, at early dawn, taking fusil and pouch, start off in pursuit of game which is up and away before you? No; for at the hour when your foot treads the



plain, the lark is already chanting above your head its daily matin song.

Can you, indolent lady? Oh! no; for if your lips modulate a nocturnal melody beneath the shady avenues of the park, by the soft moonlight, the nightingale alone replies; and besides, what imports to you the hour in which the concert commences? Do you not at your awakening hear its full harmony?

Well! what you, early traveller, you, modern Nimrod, you, beautiful *chatelaine*, have left undone, has been accomplished by an academician, who has just informed the French Academy at what hour birds awake, and at what hour they commence their songs.

This academician is M. Dureau de la Malle. For thirty

years past he has been in the habit, spring and summer, of retiring at seven o'clock in the evening, and rising at midnight. Many would call this a singular eccentricity; I would say that this is the way to acquire knowledge.

M. Dureau de la Malle, rising at midnight, has evidently had an opportunity to anticipate the rising of the birds who inhabit his garden. I ought to add that he had previously provided himself with the means of discovering the secrets of their little households. The largest hospitality, the most attentive cares, had familiarized the wildest birds, so that he could with impunity visit them in their nests, touch their eggs and their little ones; and the birds, on their part, returned his visits: a touching reciprocity which opened to one, science in prospective, and to the others, the doors of the cupboard. Finally, and this last feature has perfected their union, M. de la Malle has, to protect the families of the birds who come to ask his hospitality, arranged an apparatus against the attacks of the cats, who, in preceding years, had made great carnage in their nests. So the academician has been able, by visiting the nests, to determine the causes of the early or late awakening of each species.

We will mention the ordinary hours of awakening of the most common. These hours, from the first of May to the sixth of July, the period during which the experiment took place, were,—

For the greenfinch, from one to half-past one in the morning;

For the linnet, from two to three;

For the quail, from half-past two to three;

For the blackbird, half-past three to four;

For the red-headed linnet, three to half-past three;

For the sparrow, five to half-past five;

For the tom-tit, five to half-past five.

It will be seen that the greenfinch is the earliest and the sparrow the latest riser among the birds observed. Who would believe that the sparrow, that hungry and thievish

bird is at the same time the laziest of his species? So observation tells us.

But this general rule of the rising of birds is subject to exceptions; that is to say, the birds often anticipate the hour: to what shall we attribute this fact? M. Dureau de la Malle is able to inform us: we will allow him to speak for himself:—

“On the fourth of June, the linnet and the blackbird commenced their song at half-past two in the morning. Struck with this anomaly, I went to inspect their nests, and found their broods. I thought at first that it was a manifestation of parental joy; but I soon became convinced of my error. The necessity of labouring more hours to feed the increasing family, had hastened their rising by an hour and a half; and I could see by the moonlight the parents constantly occupied in seeking on the grass and flower-beds the insects and other aliments which were to serve as nourishment for their offspring.”

On the 26th of June, the same fact was observed with regard to the quail. Admirable instinct of animals, which teaches them to sacrifice their repose to the necessities of the family, and to anticipate the dawn, that the wants of their little ones may, on awakening, be supplied! What a profound and poetic lesson for man!

Sometimes the birds are deceived in the hour. Thus, a linnet awoke at half-past twelve, and began to sing on an acacia, a few paces from the window where the lamp of the observer was placed; it had mistaken the light of the lamp for that of the sun; but very soon perceived its error, and, confused and ashamed, went to sleep again. At our own abode, in the vicinity of London, we are often delighted by the songs of the blackbird or thrush, at eleven or twelve o'clock at night, when the moon shines brightly upon the quiet earth.

A tame blackbird, which was in the habit of returning every evening to its cage, was forgotten in the court. At midnight the lamp was lighted, and the blackbird, which had, until then,

slept profoundly, awoke, and aroused the whole house by singing the air which had been taught him.

To these songs the untamed blackbirds replied, and from midnight till seven o'clock in the morning the tame bird and the wild ones sang as loud as they could. The wild birds were certainly guided by a mistaken leader. It was not the sense of sight, struck by the light, which occasioned the musical exhibition; for their nest was at some distance from the library, and in clear weather, and at the full moon, blackbirds sing only half an hour before day, except when they have young, and need more time to procure food.

Our readers will understand why we have not mentioned the nightingale. Every one knows that this bird commences when other birds cease, and sings only while the female is setting, as if to beguile the fatigues of maternity. As soon as the little ones have pierced the shell, the songs cease; for the parents must seek nourishment for the young family during the time when the nightingale had flung on the evening breeze the winged strophes of his admirable songs.

LOVE OF BIRDS.

IN birds, the passions are very acute and perceptible. It is when we enter the umbrageous woods, and look around amongst its feathered inhabitants, that sounds of joy and indications of love open before us. A thousand varied notes—and some of the sweetest melody—reach our ears; while all—from the soft cooing of the dove to the cackling of the common hen—express some latent feeling of tenderness or fear, hope or expectation. The turtle dove woos his bride with his plaintive song, placing himself in the most winning attitude, and overwhelming her with caresses; while the little love-parrot sits beside his mate, and feeds her, by disgorging into

her bill. If one dies, the other is impressed with the deepest sorrow, and seldom survives his beloved partner. Many of the parrot family are well known to evince a strong and lasting affection towards each other. Bonnet mentions the mutual affection of a pair of those called love-birds, who were confined in the same cage. At last, the female falling sick, her companion evinced the strongest marks of attachment: he carried all the food from the bottom of the cage, and fed her on her perch; and, when she expired, her unhappy mate went round and round her, in the greatest agitation, attempting to open her bill, and give her nourishment. He then gradually languished, and survived her death only a few months.

AN ASYLUM FOR BIRDS.

A LOVER OF BIRDS gives the following account of Captain Waterton, the eminent naturalist, and the "happy family" he has gathered around him:—

"I have just been on a visit of a few days at Walton Hall, and this time Captain Waterton was at home. The old traveller ran out and gave me his hand, saying, as he grasped it, 'Welcome to Walton Hall.' Perfectly unostentatious and unceremonious, he makes his visitors welcome, and they can dispose of their time as they please. When I was a boy, I used at times to go hunting birds' nests—not to plunder them, though—but such birds'-nesting as we have had here is a little ahead of everything in my boyish days. In little less than three hundred acres, within his park walls, I believe there are over 5,000 birds, and of every species that good fare, good houses, a hearty welcome, and absence of dogs and guns will entice to this bird asylum. Sitting in the parlour, Mr. Waterton turned a large seven-foot telescope towards me, and

adjusting it to a point in his forest, he asked me to look through it. I did, and saw a large heron standing on the edge of her nest, feeding her young.

“We have just had a walk in the forest, and a lesson in ornithology, illustrated with plenty of live specimens. What thousands of starlings there are! These look very much like blackbirds. Then the scattering trees near the house are filled with crows’ nests. These are a little smaller than crows. There are, however, some that are like our ‘corn-pullers,’ and these they call ‘carrion crows.’ Then there are wild geese, ducks, water-hens, magpies, pigeons, doves, pheasants, partridges, owls, chaffinches, wrens, robins, blue jays, jackdaws, yellow-hammers, sparrows, blackbirds, thrushes, and many more.

“On getting a little way into the wood, by the margin of the stream, a wild goose was a little ahead of us, going into the water. On coming near, we saw her nest full of large eggs, nearly a dozen. The gander was close by in the stream, and they met and sailed along together, eyeing us with apparent interest, but not alarm. They were but three or four rods from us, and kept up a kind of purring noise, as much as to say, ‘I know you of old; you are no duck-egging, poaching set; and I know you’ll not disturb our nest.’ Another wild goose left her nest in the same way, a few yards from the first. A water-hen had built a nest in a tuft of grass that grew up out of the water, and by the addition of more grass, and fastened to that which grew up through the water, there was a nest actually floating on the surface, but fast at anchor.

“In another piece of the wood is the ‘heronry.’ Here a hundred or more herons have a fine social colony. This bird is similar to the crane of the Northern States; but its plumage is more variegated, and brighter colours. Their nests are in the tops of trees, and built of sticks. There are forty or fifty nests. Mr. Waterton says, that each nest produces about five birds. A finely increasing colony. The herons live almost

entirely on fish; principally eels. In one case I was sure I could see a long writhing fellow a prisoner to dame heron, and she was just offering him up a living sacrifice to the little herons, who are always fond of a fish dinner. The herons fish but little in the waters about Walton Hall; but take long flights, no doubt in many instances flying quite to the German Ocean, over thirty miles eastward.

“These birds, like most of Mr. Waterton’s feathered friends, seem to be little afraid of man, having learned by experience that here they are safe from the fowler’s ‘murder-aiming eye.’ How curiously and ingeniously Mr. Waterton has provided places for the nests of his free and favoured colonists. In several places he has the butt log of very large oak trees, some of which he purchased miles away from Walton Hall; and these (some twelve or eighteen feet high) are set up on end, like a tall stump, and a hole bored out of the top of it. Soon after this is done, the beautiful little barn-owl comes and builds a nest in the house made for him. One of these oak butts, that he purchased at a wood pile in the country, he was obliged to leave over night at a village before he got it home, and some old women peeled nearly all the bark off of it before morning, to kindle their fires to boil their tea-kettles. He hollowed it out and roofed it over, making a hole for Mr. Owl. Then he goes out early in the morning, and takes his stand in this hollowed stump, which is in the middle of the wood, and here he watches the birds, and observes their habits.

“Although he has nearly every variety of birds, carnivorous, graminivorous, and piscatorial, yet he very seldom knows of their committing depredations on one another. The water-hen keeps her tender eggs out of sight of the thieving crow, and even the stoat and the ferret seldom prey upon the eggs of the wild goose. He has little stone towers built up, and holes in these are left for the starlings and jackdaws. A stone is put in as a sort of door, where Mr. Waterton can go and take it out, and see the young broods get along. The holes for the

birds to go in are independent of these, and those for starlings are small, while those for the jackdaws are larger ;—

“ Like the man who cut two holes through his wall,
To admit two cats, one great, t’other small ;
He cut a big hole for big puss to pass through,
And he cut a little for the little cat too.”

“ Mr. Waterton having made birds his study all his life, knows their habits, and just how and in what places they construct their nests. It seems, though, very curious that they all build just where he lays a plan for them. He has scarce a hollow tree but has an owl for its tenant. The instinct of animals stops short at reason. The jackdaw will have a certain number of sticks for his nest. He takes a stick in his bill, and flies up to the door of his stone castle ; and if he happens to strike the end of the stick in the hole, it goes in all right : but if the side goes against the wall, it is often too long to go in, and the bird flies back, and tries it over again. Quite likely his stick hits side foremost across the hole again, and then the bird is discouraged and drops it, and flies away for another ; but he never thinks of putting one end of the stick into the hole. The ground around these stone castles built for the birds’-nests is all covered with sticks. Now, say that Mr. Waterton is not leading the life of a Christian philosopher. Here the birds of heaven have an asylum, where barking dogs never come, and powder is never burned. A dozen such parks in England, walled in like Mr. Waterton’s, would be the means of preserving many species of birds that, amid the ‘ slaughtering guns ’ of the fowler, are destined to become extinct. Throughout the entire year, summer and winter, the songs of birds never cease around Walton Hall. The crow pleads his cause by setting up a caw ; the blackbirds sing ; the jackdaws chatter ; the pigeons coo ; and when night wraps the earth in his sable blanket, the owl comes out and enlivens the scene with his solitary hoot. There is a small

grove of holly trees near the house, where the starlings take up their night quarters. A little after sunset they are seen gathering in flocks, and after taking one or two sweeping circles in the air, down they will pitch into the thick bunch of holly. But they have not gone to roost yet; up they flutter and fly off again, and repeat the operation three or four times before ('like good children') they 'go quietly to bed.' All the time they are flying about, they are making a constant chipping.

SONG-BIRDS KILLED BY MISTAKEN KINDNESS.

WE have very frequently seen birds hung outside a window, with an open top, and with open sides to their cages, admitting not only the scorching rays of a meridian sun, but strong eddies of winds and drenching showers. Many a bird falls sick from such gross neglect; and however fine his song may have been, it will, if he is thus exposed, soon be for ever silenced or ruined. In no one instance is this unpardonable neglect more observable than in the case of the skylark—the very prince of our songsters. He unfortunately has the reputation of being a "hard" bird, and therefore is hung out of the window, as we may see daily, the first time the sun shines, and in a cage with open wires on both sides. The currents of air passing the live-long day through the cage, over his head, and against his breast (the pressure of which he frequently cannot withstand), are enough to ruin his constitution and his song for ever. The natural consequence of this is, the bird gets puffy, and his voice becomes wiry, husky, and hoarse. He may rather be said to shriek than to sing: melody there is none. It is truly wonderful to observe the almost universal practice prevailing in this matter. It is not less impolitic than it is cruel.—*Kidd's Own Journal.*

THE SPARROW AND THE CAGED BIRD.

FOUNDED ON AN ANECDOTE RELATED IN THE NATURALIST'S MAGAZINE.

I DOTE on every little bird
That twitters in the sun ;
I love them all, from having heard
The simple tale of one !

In cage that 'neath the eaves was hung
When morn put forth her smiles,
A little yellow warbler sung
A song of distant isles !

One morn, when loud his melody,
There came on idle wing
A sparrow, and, from sympathy,
Thus seem'd to say or sing :—

“Fair captive ! why this joyous lay,
When sad should be thy heart ?
Art thinking of a happier day,
Forgetful what thou art ?

“Perchance while high thy music floats,
Where ne'er thy wings may flee,
Thy spirit rises with thy notes,
For they, at least, are free !

“Thy song goes forth among the trees,
And up to heaven's high dome ;
And haply bears thee o'er the seas
To thy own island home.

“Poor bird ! could'st thou come forth with me,
I'd lead thee to the grove,
Where all that's known of slavery
Is servitude to love.

“How sweet to join our airy chase,
 Or cower within thy nest ;
 Yet only bound to that one place,
 Because thou lov’dst it best.

“Alas ! alas ! the wish is vain ;
 Thy prison bars are strong :
 But I will come to thee again ;
 Adieu, sweet bird of song !”

Away it flew ; but, day by day,
 Return’d with gather’d food :
 And through long months, the watchers say,
 Pursued this work of good.

I felt my holiest thoughts ascend,
 Such heaven-taught love to trace ;
 And deem’d perchance, this captive’s friend,
 The Howard of its race !

THE PARROT AND THE CHILD.

A WANDERER, who had long been gone,
 Brought back from o’er the sea
 A Parrot, green and golden-hued—
 A gift to Mabel Lee.

A child she was of pensive mood,
 And soft and lovely eye,
 That always made you think upon
 The beauty of the sky.

The bird had grown morose and sad
 And show’d its tiny rage,
 By flapping with uneasy wing
 Against its gilded cage.

She fed it from her dimpled palm,
 With sweet indulgent care,
 Until it would not taste a crumb,
 Unless she laid it there.

She taught it to pronounce in tones
Of tenderness, her name,
Till you would think from human lips
The accents surely came.

But sorrow does not spare the young ;
It comes alike to all :
And often are the fairest flowers
The very first to fall.

The Parrot miss'd her gentle care,
And call'd her loud and long :
And "Mabel"—"Mabel Lee!" was still
The burden of its song.

But yet she heeded not the call,
Though pleadingly it came ;
And those around her shrank to hear
The pathos of her name.

For o'er the cheerful home the gloom
Of sudden grief was spread ;
Her ear could catch no earthly sound—
Sweet Mabel Lee was dead !

Yet still the bird pronounced her name
With an unwearying tongue ;
And strangely through the sad, still house,
The mournful echo rung.

They strove to silence it in vain ;
Its voice they could not stay,
Until they bore it to the spot
Where sleeping Mabel lay.

At once the plaintive call was hush'd
That stirless form before ;
The iterating tongue grew dumb—
Her name was heard no more.

And ere another day had seen,
Above the child's fair head,
The churchyard sod laid smooth and green,
The pining bird was dead !

THE HUMMING BIRD.

OF all animated beings, this is the most elegant in form and most splendid in colouring. Precious stones and metals artificially polished can never be compared to this jewel of Nature, who has placed it in the order of birds at the bottom of the scale of magnitude—while all the gifts, which are only shared among others—nimbleness, rapidity, sprightliness, grace, and rich decoration—have been profusely bestowed upon this little favourite. The emerald, the ruby, and the topaz, sparkle in its plumage, which is never soiled by the dust of the ground, for its whole life being ærial, it rarely alights on the turf. It dwells in the air, and flitting from flower to flower, seems to be itself a flower in freshness and splendour; it feeds on nectar, and resides in climates where flowers blow in perpetual succession; for the few which migrate from the tropics during summer, make but a transitory stay in the temperate zones. They follow the course of the sun, advancing or retiring with him, and flying on the wings of zephyrs, wanton in eternal spring.

“Humming Birds,” says Sir William Jardine, “appear to have excited the admiration of their discoverers, and, indeed, of every one who has observed them, either revelling in their native glades, or at rest in the mere artificial display of our museums, by the spirited proportions of their form, and the dazzling splendour of their plumage,

‘Delicate and beautiful,
Thick without burden, close as fishes’ scales.’”

The nation of the Aztecs call their capital Tzinzunzan, from the number of humming birds in its vicinity, with which the statues of their gods are adorned; and the Indians of Patz-

quara are still famous for this art. They compose figures of saints with the feathers of the colibri, which are remarkable for the delicacy of the execution and the brilliancy of the colours.

The ancient Mexicans used their feathers for superb mantles in the time of Montezuma, and the pictures so much extolled by Cortes were embroidered with their skins; the Indian could appreciate their loveliness, delighting to adorn his bride with gems and jewellery plucked from the starry frontlets of these beauteous forms. Every epithet which the ingenuity of language could invent has been employed to depict the richness of their colouring; the lustre of the topaz, of emeralds and rubies, have been compared with them, and applied in their names. "The hue of roses steeped in liquid fire," and even the "cheveux de l'astre du jour" of the imaginative Buffon, fall short of their versatile tints. Let us inquire, however, whether an exterior of "gorgeous plumery" is all which they possess, and if there is no beautiful adaptation of structure to supply the wants of so frail a tenement?

These birds are nearly confined to the tropical portions of the New World; and, according to our best information, that great archipelago of islands between Florida and the mouths of the Orinoco, with the mainland of the southern continent, until it passes the Tropic of Capricorn, literally swarms with them. In the wild and uncultivated parts, they inhabit those forests of magnificent timber, trunks clothed with a rich drapery of parasites, whose blossoms only give way in beauty to the sparkling tints of their airy tenants; but since the cultivation of various parts of the country, they abound in the gardens, and seem to delight in society, become familiar, and destitute of fear, hovering over one side of a shrub, while the fruit or flower is plucked from that opposite. There appears to exist great familiarity in their manners. They are of a lively and active disposition, almost constantly on the wing, and performing all their motions with great rapidity: their flight is in darts, and it is at this time, in a brilliant sun, that the

variations of their plumage are displayed with the greatest advantage :—

“ Each rapid movement gives a different dye;
Like scales of burnished gold they dazzling show,
Now sink to shade—now like a furnace glow.”

But when performing a lengthened flight, as during migration, they pass through the air in long undulations, raising themselves for some distance, and then falling in a curve. When about to feed, or in search of a favourite flower, they hover stationary, surveying all around, and suddenly dart off to the object. “ I have often stopped,” says Wilson, “ with pleasure, to observe their manœuvres among the blossoms of a trumpet flower. When arrived before a thicket of these, that are in full bloom, he poises or suspends himself on wing for the space of two or three seconds so steadily, that his wings become invisible or only like a mist.” And Bullock says, “ they remain suspended in the air in a space barely sufficient for them to move their wings ; and the humming noise proceeds entirely from the surprising velocity with which they perform that motion, by which they will keep their bodies in the air, apparently motionless, for hours together.” An older writer, Fermin, a Surinam physician, compares this action to the balancing of the beautiful bee-like flies over the waters ; perhaps it may be also likened to the motions of a large hawk-moth before alighting on a flower.

They seldom alight upon the ground, but perch easily on branches. The ruby-throated humming birds settle on twigs and branches, where they move sideways in prettily measured steps, frequently opening and closing their wings, pluming, stroking, and arranging the whole of their apparel with neatness and activity. They are particularly fond of spreading one wing at a time, and passing each of the quill-feathers through their bill in its whole length, when, if the sun is shining, the wing thus plumed is rendered extremely transparent and light.

THE LIFE OF A PLANT.

WHEN the eye of man has rested with delight and wonder on the beauty which a rosebush in bloom presents, or an apple-tree puts on in spring or in autumn ; when he has gazed, without being satisfied, on the tall lily or the gorgeous tulip ; there yet remains a great part of this daily-repeated miracle unknown, until a look through a magnifying-glass opens the doors to the treasure-chamber of this hidden wonder. A little fragment of a leaf or blossom, placed within the field of view of a microscope, represents in its inner texture a work of high art, the spectacle of which holds our willing attention no less powerfully than that of the delicately formed leaves and many coloured flowers. There we see plainly how the forces of life consort with the minute and the tender, how they have their sphere in a manifold variety of parts, which are united into an organized whole that is subservient to the working of a universal soul. In such a specimen of vegetable structure one sees a collection of cells, of tube-shaped and screw-like vessels, of the ingenious arrangement of which the naked eye knows nothing.

In the internal structure of the less perfect plants, such as the mosses and sponges, only such sap-vessels as resemble little cells, such as the cells in a bee-hive, and which are arranged along-side and over one another, compose the body of the plant. In the external surface of more perfect plants, and in the leaves and stems of the same, numberless similar cells are observable, frequently expanding into a tube-shape, into bag-like sap-vessels, the sides or walls of which, scarcely distinguishable to the naked eye, possess, taken together, such solidity and strength, that the under layer of the bark of many trees may be manufactured into rope ; and the fibre of flax,

hemp, the nettle, and the paper-mulberry tree, may be spun into thread and used in various kinds of weaving. But among all these cell-shaped and cylindrical structures, appear the above-mentioned, screw-like, spiral vessels, which seem to be designed more for the sake of communication with the gaseous substances, which plants require for their nourishment, than for the transmission of earthy or salty particles, rendered liquid, and dissolved in water.

By the long, cell-shaped sap-vessels one is led to imagine a sort of polarization of these delicate structures, upon which, ultimately, the whole vital activity of material things is based. The several sacks, or little tubes, do not open one into another; they do not, like the veins of an animal body, form one continuous canal, but they are closed at their ends with a fine membranous texture, through which the sap must transpire from one of these little sacks into another.

Within, into the minutest parts, as well as on the largest scale, the life of the plant, its nourishment and formation, all rest on the polaric opposition of a higher and a lower, by which a constant ascending and descending of sap, a kind of circuit, is effected. The tree receives its nutriment, receives water, for instance, carbonic acid and nitrogen, not out of the ground alone, but also from the air; the ascending sap, derived from the earth, requires, if it is to receive the peculiar properties by means of which the different kinds of plants are distinguished, the polaric influence which comes from above, and is generated and maintained by the sunlight, and those substances received from the air. If the trunk of a tree is cut round and deprived of a portion of its bark, it becomes apparent that there is an effort to form new bark, by the issuing of the sap from the upper as well as the lower edge of the cut; the tree, however, dies if the cut is so broad as to obstruct the polaric interchange between the sap from above and the sap from below, and thus to break the circuit.

That the green leaves of plants attract the chief means of

vegetable life, carbon and water, from the atmosphere, is proved by many observations. It may be seen, on a small scale, how vine-leaves, when enclosed in a glass globe, withdraw from the air that passes through the globe, all the carbonic acid which the air contains, even though the air passes through with the greatest rapidity. And not only carbon, but nitrogen also, in so far as it exists as a component part of the sap, fruits, or bark of plants, is drawn by them from the air, and incorporated into their own substance.

Liebig, in his chemical letters, points us to those facts by which this consumption of air by vegetables is ascertained. Our better sort of meadow land, without manure containing carbon or nitrogen, yields yearly a rich produce in hay; among the component parts of which chemistry discovers forty-six per cent. of carbon, and one and a half per cent. of nitrogen. The amount of nitrogen in the produce of a meadow of this sort, which receives no manure containing nitrogen, is much larger than that of a wheat-field which has been manured in the usual way. For centuries, in Hungary, tobacco and wheat are obtained from one and the same field, without the use of manure containing nitrogen. That substance, the plants obtained not from the soil, but from the air.

Every year our beach, chestnut, and oak forests put forth leaves; the leaves, sap, chestnuts, oak and beech acorns, the cocoa nut, and the fruit of the bread-tree, abound in nitrogen, not obtained from the ground. From an acre of land, which we plant with mulberry trees, we get, in the form of the silkworms and their produce, the nitrogen of the leaves on which the worms were fed; the silk alone contains over seventeen per cent. of nitrogen, and this crop is renewed every year without the necessity of furnishing the soil with nitrogen from manure. With the consumption of nitrogen through the leaves, proceeds also the consumption of carbon; the latter, the proportion of which, in our ordinary cultivated fields, exceeds more than thirty and even forty times the proportion of nitrogen,

can as little proceed from the ground as the nitrogen. When, therefore, in the case of beets and potatoes, we bring into account the carbon and nitrogen, not merely of the roots, but also of the leaves and stems, it appears that in these vegetables, with all the carbon and nitrogen contained in the manure, no greater quantity of these substances is found than in the grasses and weeds which are produced within the same space, and which have received for their nourishment no manure at all, but only atmospheric substances, and the particles of a mineral nature in the soil.

While from these facts it appears that these plants imbibe in part, at least, from the atmosphere the nourishment which they require, which certainly may be aided by the electric agencies of the atmosphere, we must, nevertheless, not overlook the undoubtedly favourable influence which the supply of nourishment through the roots has upon the growth of plants. The consumption of the carbon of the atmosphere depends entirely on the superficial size of the leaves. A plant, the superficies of whose leaves is only half as large as that of another and more flourishing plant of the same kind, probably imbibes only half as much atmospheric carbon as the other. The young plant of our fields, if it had to receive its support merely from the air, could take, in proportion to its small green surface, only a very small quantity of carbon, and its growth would be very slow, if it did not at the same time receive carbonic acid from the more or less richly-manured soil. But as, with the aid of this richer source of nourishment, its superficies is enlarged, its power also of imbibing that means of nourishment from the air increases, and this power it preserves after the supply of carbon through the roots decreases, or ceases altogether.

Besides the power of the leaves to imbibe nourishment, there is the power of the soil to do the same, which must not be overlooked. The clod, broken up and crumbled by the plough and other instruments, attracts the gases of the atmosphere

with considerable force, especially the heaviest first, and condenses the same; the nitrogen combines not only in the atmosphere, but also in the little interstices between the particles of earth, with hydrogen; and by this combination it becomes capable, as ammonia, of being taken in an especial degree into the substance of plants, and into the circulation of their sap.

But the carbon, although in respect of weight it appears to be, as a component part of vegetable bodies, far more considerable than nitrogen, which is much more rare, nevertheless receives its virtue to nourish and unfold vegetable life only through a polaric connection with other substances, which come chiefly not from the air but from the soil. The produce of our meadows may be doubled by being strewed with ashes and gypsum, and by being copiously watered at the same time. In a similar way quick-lime has been used as a manure in England for a century.

After October, the fields may be seen to be white, as with fresh fallen snow, covered with slackened lime, which, during the wet winter months, decomposes and mingles with the soil. To one unacquainted with the effects of this mixture, it can hardly seem otherwise than that the caustic lime should act injuriously upon the soil, because it destroys that in it which has always been considered as the only means of fruitfulness, the mould composed of organic elements, and containing carbon and nitrogen. In direct opposition to this previous supposition, the produce of land, to which lime has been applied, is everywhere increased.

How this happens, Liebig has clearly explained in his chemical letters. All our vegetables, the different kinds of grain, turnips, peas, and clover, require for their growth, as already mentioned, besides water and the atmospheric elements, certain peculiar substances in the soil. A field that yields wheat plentifully, and peas only scantily, with the same manuring, will prove well adapted for turnips, but not for clover or tobacco.

The same land that has borne a good crop of wheat, or other grain, for years, will gradually become less productive, although furnished with the same or even a greater quantity of manure. The reason is, that the supply of mineral substances in the soil, so far as it is capable of decomposition, is exhausted. What these mineral components are, which take such a part in the nature of certain plants, may be ascertained by a chemical examination of the ashes left after burning these plants. It is thus discovered that the different kinds of grain are composed in parts of silicic acid (silica), and that besides this acid, in its easily soluble combinations with the alkaline earth, lime for example, various salts form essential parts in the structure of many of our grains.

Some kinds of silicious soils are more readily decomposed by the influence of the air, and the rain, and of mineral substances, in their vicinity, than others. In some parts of Hungary there has been sown, since the memory of man, one year wheat, and another tobacco, without any diminution of the crop. The granite of Corsica crumbles to powder, many kinds of sandstones are decomposed, while other rocks of the same kind, exposed to the same influences, remain solid and unwasted. Wherever the decomposition of the silicious parts of the soil, and their combination with alkalies, thus fitting them to nourish vegetation, goes on steadily but slowly, it is necessary that the land, before being used for grain, should lie fallow from time to time, or be planted alternately with potatoes and turnips, which do not take from the soil a particle of the silicious matter, but render a supply of the same possible for the next year.

But the generation of such a supply may be effected without these means, if human art comes in aid of the decomposition which is going on. Thus the heavy, clayey soils contain an abundance of silicious and alkaline substances, and yet the beds of potter's clay are very unfavourable to many plants, because those mineral substances are in a state not adapted to

vegetation. By burning clay into bricks, this state is changed; the burnt clay is, in contact with the air, exposed to a continuous decomposition, by which salts, formed from the alkalies, and carbonic or sulphuric acids, appear on the surface of the burnt clay, and are highly favourable to vegetable growth. A decomposition of this sort shows itself chiefly in those parts of walls where lime, as mortar, comes in contact with bricks; and this indicates the advantageous effect which the mixing of lime with a clayey soil has upon the decomposition of the latter.

A man—whose merits are equally great in science and in civil affairs, because in all his profound scientific inquiries he never loses sight of utility—the celebrated chemist, Fuchs, of Munich, has discovered that a solution of potter's clay or pipe-clay, when mingled with milk of lime, is immediately converted into a thick fluid, and that after some time the alkalies mingled with the clay are disengaged, and the clay itself possesses the power to form a gelatinous substance in union with acids. The same thing, which the silicious particles frequently found in clay undergo, happens to them when, in the mode of manuring, the slackened lime remains a longer time in contact with the clay and silica of the soil. There goes on a decomposition which is aided by the breaking up of the earth by the plough and other instruments; the decomposition of such kinds of stones as contain silica and alkalies is accelerated, and thus, just as by strewing ashes on the land, the necessary supply of mineral substances is afforded for vegetable growth.

But the transmission of these substances into the bodies of plants is rendered possible only by the water contained in the damp soil. From the surface of leaves the evaporation of water goes on without ceasing; the greater the heat is, the stronger and more rapid is the evaporation; while at the same time the root-fibres work like suction-pumps, into which there rises from the damp soil as much water as suffices to fill the vacuum caused by the evaporation. In the water that rises

from the ground, mineral substances exist in a state of solution. They are not evaporated, but they remain in the plant as component parts of its substance. When with these mineral substances the substance of organized manure is taken up in a state of solution, and contributed to the plant, the growth of the latter is, of course, still further accelerated.

From the account here given of the process of vegetable growth, it appears probable that the electric fluid must act beneficially upon plants. The variety of their nourishment, coming also, as it does, from the earth and the air, must be the basis of a polaric opposition necessary to vital activity, upon which electricity cannot be without influence.

LEAF BUDS.

It is usually thought that the buds which produce the leaves and branches of plants are formed in spring; but this is the time of their expansion, not of their formation. Buds are formed—some in the early part of the summer, others late in autumn—before the leaves fall from the trees, in the axilla of the leaves, that is, in the angle formed by the leafstalk and the stem. Examine the branch of any tree before it has cast its leaves, and you will find at the base of the petiole, or leafstalk, the buds for the ensuing year. Hence in autumn, after the leaves have fallen, these buds remain attached to the branches through the winter months in a state of torpidity, and give birth, on the approach of spring, to the young shoots and foliage which constitute the growth of the season.

The investigation of buds discloses much beauty to the eye, and is calculated not only to interest, but to instruct. It is autumn; the leaves have been cast from the trees, and there remains nothing on their naked and exposed branches but

buds. Already the first snows of winter have fallen, and soon the keen, cold winds will sweep along through the leafless forest. But let us not suppose that the plants have made no provision for winter, and are without the means of defence against the inclemency of the season ; for the vitality that is in them has induced a most beautiful adaptation of their organs to the circumstances in which they are placed.

Let us examine the buds left on the leafless trees.

Linnæus called buds the *hybernaculum*, or winter's residence of the branch ; and the term is very appropriate, because it expresses admirably the purposes for which buds are formed.

Every branch begins with a bud, and is terminated by a bud ; a bud is, therefore, an undeveloped branch. It requires no very extensive acquaintance with Nature and her marvels to know that leaves are produced symmetrically at certain definite points on the stem, called nodes (*nodus*, a knot) : so called because these parts of the stem are internally more solid and compact than the other parts, in consequence of the vertical fibres of the skin being interwoven with those which are sent off horizontally into the leaf. These nodes are very conspicuous in the bamboo, Indian corn, and all plants with hollow stems, which stems, on examination, will be found to be solid at these points. The naked intervals of stem between the nodes are termed internodes.

Now the bud or undeveloped branch or stem is made up of a succession of these leaf-bearing points or nodes, the internodes between which have not been developed, so that these nodes or leaf-bearing points are brought into close proximity, and the leaves themselves, developed in a rudimentary state, assume a scale-like appearance, and overlap each other symmetrically, in accordance with their natural arrangement on the stem.

The formation of buds is the natural result of the cessation of the growth of the internodes, and the partial development of the leaves at the nodes.

Buds are usually of an ovoid form, covered exteriorly with scales or rudimentary leaves, and contain in their interior, in an embryo state, all the leaves and branches, or the growth of the next season. On the approach of winter, the vegetable machinery stops; but there is no disarrangement of its parts—on the contrary, all is ready in the bud, and awaiting the stimulus of the returning light and heat.

The young leaves are beautifully folded together in the bud, in such a manner as to occupy the least possible space, the peculiar mode varying in different plants. The arrangement of the leaves in the bud is termed their vernation or perfoliation. Any one can examine it in the spring, with the certainty of being very much interested, by cutting across the leaf-buds with a sharp knife when they are swelling, and before they have begun to expand.

That the scales of buds are leaves in an imperfectly formed or rudimentary state, is evident from the fact that they are the last leaves of the season, developed at a period when the sap is ceasing to flow, and when the vital powers of plants have become almost torpid. The transition of scales into the ordinary leaves of the stem is well seen in spring, in the expanding buds of the horse-chestnut tree, where the gradual passage of one into the other may be distinctly traced.

The scales which envelope the bud are clearly designed to protect the embryo branch and leaves of the next season, which they surround, against the humidity and cold of winter. They vary in their texture, external covering, and thickness, in different plants. In the beech and lime-tree, the bud scales are thin and dry; in the willow and magnolia, thick and downy; and in the horse-chestnut and balsam poplar, they are covered externally with a plentiful exudation of gummy resin, and thickly clothed internally with a woolly substance, by which beautiful provision both wet and cold are effectually excluded.

In the plants of tropical countries, the leaf-buds are naked,

and without scales. Scaly buds belong to trees and shrubs which are exposed to cold. This rule is not without its exceptions; thus the buds of the *Ailanthus glandulosa*, or tree of heaven, of the *Gleditschia triacanthos*, or honey locust, and of the *Robinia pseudoacacia*, or common locust-tree, are naked; but in these instances the buds are protected, by being imbedded in the bark through the winter, and are scarcely visible until they begin to develop in early spring.

Buds originate in the horizontal or cellular system, and may be distinctly traced in young branches to the pith or medullary rays, at the extremities of which they are invariably found, when they take a lateral development. This may be easily verified, by making a section through the centre of one of the lateral buds, at right angles to the surface of the stem, when the medullary ray will be seen on the surface of the section, in the form of a white line, which, proceeding from the centre of the bud, traverses the several rings or annual deposits of wood, and terminates in the pith at the centre of the stem. The central cellular portion of every bud is, therefore, in direct communication with the interior pith of the young shoot, by means of the medullary rays, at the extremities of which they are formed.

There is nothing now on the trees but buds, and these buds will remain dormant through the winter months; but, on the approach of spring, the gummy resin will be melted off by the heat of the sun, the leaf-buds will throw off their scales, and the leaves, now crowded and packed together, will become separated from each other by the elongation of their axis of growth, or the formation of internodes or naked intervals of stem between them, much after the mode in which the joints of a pocket telescope are drawn out one after the other; whilst at the base, or in the axilla of every leaf-stalk, will be seen to form, as the season advances, buds capable in their turn of being developed into branches, or a provision for the growth of the ensuing season.

Plants, in common with animals, exercise the functions of nutrition and reproduction. Both appear to be governed by similar organic laws in the development of their tissues, or the substance which composes their fabric; and although a nervous system has not yet been discovered in plants, yet the formation of buds on every tree, and the preparation which plants make for winter, clearly evince an internal power of modifying their organs, so as to protect themselves against the injurious effects of the cold and humidity of this season of the year. The higher powers of life are, it is true, suppressed in plants; yet they are certainly faintly foreshadowed in the above phenomena. The life in plants seems to be only a modification of the same universal principle of vitality which pervades all animated nature.

THE FLOWING RIVER.

Down within an olden valley,
 Where the shadows are at play,
 Glides a brooklet musically,
 All the blooming Summer day;
 There the sweetest murmurs dally
 In the glowing morns of May.

Down its winding course it floweth
 To its parent in the deep;
 Like a silver flash it gloweth,
 When the sunbeams o'er it creep;
 Starry night its music knoweth,
 When the world is rock'd in sleep.

And the fairy tune it singeth
 Trembles in the upper air,
 And an echo ever ringeth
 From the forest everywhere,
 Telling all it only bringeth
 Echoes to a holy prayer.

Thus the soul is flowing ever,
 Breathing music's undertone,
 Down the valley of Life's river,
 Where the phantom shadows moan,
 And its echoes seem to quiver
 Upward to the Holy One !

And it floweth upward, onward,
 To its Parent, still and broad ;
 And its breathings, gliding sunward,
 Are the whispers to its God—
 Are the whispers scatter'd downward,
 But to sanctify the sod.

THE PEBBLE AND THE ACORN.

"I AM a Pebble ! and yield to none !
 Were the swelling words of a tiny stone !—
 "Nor time nor seasons can alter me ;
 I am abiding, while ages flee.
 The pelting hail, and the drizzling rain,
 Have tried to soften me, long, in vain ;
 And the tender dew has sought to melt
 Or touch my heart ; but it was not felt.
 There's none that can tell about my birth,
 For I'm as old as the big, round earth.
 The children of men arise, and pass
 Out of the world like the blades of grass ;
 And many a foot on me has trod,
 That's gone from sight, and under the sod.
 I am a Pebble ! but who art thou,
 Rattling along from the restless bough ?"

The Acorn was shock'd at this rude salute,
 And lay for a moment abash'd and mute ;
 And she felt for a time at a loss to know
 How to answer a thing so coarse and low.
 But to give reproof of a nobler sort
 Than the angry look or the keen retort,

At length she said in a gentle tone,
 "Since it has happen'd that I am thrown
 From the lighter element where I grew,
 Down to another so hard and new,
 And beside a personage so august,
 Abased, I will cover my head with dust,
 And quickly retire from the sight of one
 Whom time, nor season, nor storm, nor sun,
 Nor the gentle dew, nor the grinding heel,
 Has ever subdued, or made to feel!"
 And soon in the earth she sunk away,
 From the comfortless spot where the Pebble lay.

But it was not long ere the soil was broke
 By the peering head of an infant oak!
 And, as it arose, and its branches spread,
 The Pebble look'd up, and wondering, said,
 "A modest Acorn—never to tell
 What was enclosed in its simple shell!
 That the pride of the forest was folded up
 In the narrow space of its little cup!
 And meekly to sink in the darksome earth,
 Which proves that nothing could hide her worth.
 And, oh! how many will tread on me,
 To come and admire the beautiful tree,
 Whose head is towering towards the sky,
 Above such a worthless thing as I!
 Useless and vain, a cumberer here,
 I have been idling from year to year.
 But never, from this, shall a vaunting word
 From the humble Pebble again be heard,
 Till something without me or within,
 Shall show the purpose for which I've been!"
 The Pebble its vow could not forget,
 And it lies there—but is silent yet!

MIGNONETTE.

It is not yet an age since this fragrant weed of Egypt first perfumed the European gardens, yet it has so far naturalized itself to our climate as to spring from seeds of its own scattering, and thus convey its delightful odour from the parterre of the prince to the most humble garden of the cottager.

In less than another age we predict (without the aid of Egyptian art) that the children of our peasants will gather this luxurious little plant amongst the wild flowers of our hedgerows.

The *Reseda odorata* first found its way to the south of France, where it was welcomed by the name of *Mignonette* (Little darling), which was found too appropriate for this sweet little flower to be exchanged for any other. By a manuscript note in the library of Sir Joseph Banks, it appears that the seed of the mignonette was sent in 1742, by Lord Bateman, from the royal garden at Paris, to Mr. Richard Bateman, at Old Windsor; but we should presume that this seed was not dispersed, and perhaps not cultivated beyond Mr. Bateman's garden, as we find that Mr. Miller received the seed from Dr. Adrian Van Royen, of Leyden, and cultivated it in the Botanic Garden at Chelsea, in the year 1752. From Chelsea it soon got into the gardens of the London florists, so as to enable them to supply the metropolis with plants to furnish out the balconies, which is noticed by Cowper, who attained the age of twenty-one in the year that this flower first perfumed the British atmosphere by its fragrance.

The Author of the "Task" soon afterwards celebrates it as a favourite plant in London:—

"The sashes fronted with a range
Of orange, myrtle, or the fragrant weed."

The odour which this little flower exhales is thought by some, whose olfactories are delicate, to be too powerful for the house; but even those persons, we presume, must be delighted by the fragrance which it throws from the balconies into the streets of London, giving something like a breath of garden air to the "close-pent man," whose avocations will not permit a ramble beyond the squares of the fashionable part of the town. To such it must be a luxurious treat to catch a few ambrosial gales on a summer's evening from the heated pavement, where offensive odours are but too frequently met with, notwithstanding the good regulations for cleansing the streets, and the natural cleanliness of the inhabitants in general. We have frequently found the perfume of the mignonette so powerful in the better streets of London, that we have considered it sufficient to protect the inhabitants from those effluvia which bring disorders in the air. The perfume of mignonette in the streets of our metropolis reminds us of the fragrance from the roasting of coffee in many parts of Paris, without which some of their streets of business in that city would scarcely be endurable in the rainy season of the year.

Although it is so short a time since the sweet *Reseda* has been known in Europe, we find that it has crept into the armorial bearings of an illustrious family of Saxony; and, as Cupid does not so frequently bestow honours of heraldry as his father Mars, we cannot avoid relating the romantic tale which introduced this fragrant and modest little flower to the Pursuivant-at-Arms.

The Count of Waldstein was the declared lover and intended spouse of Amelia de Nordbourg, a young lady possessing all the charms necessary for the heroine of a modern novel, excepting that she took delight in creating little jealousies in the breast of her destined husband. As the beautiful Amelia was an only child of a widowed mother, a female cousin, possessing but few personal charms, and still less fortune, had been brought up with her from infancy as a companion, and as

a stimulus to her education. The amiable and humble Charlotte was too insignificant to attract much attention in the circles in which her gay cousin shone with so much splendour, which gave her frequent opportunities of dispensing a part of that instruction she had received on the more humble class of her own sex.

Returning from one of these charitable visits, and entering the gay saloon of her aunt, where her entry or exit was now scarcely noticed, she found the party amused in selecting flowers, whilst the Count and the other beaux were to make verses on the choice of each of the ladies. Charlotte was desired to make her selection of a flower; the sprightly Amelia had taken a rose; others a carnation, a lily, or the flowers most likely to call forth compliment; and the delicate idea of Charlotte, in selecting the most humble flower, by placing a sprig of mignonette in her bosom, would probably have passed unnoticed, had not the flirtation of her gay cousin with a dashing Colonel, who was more celebrated for his conquests in the drawing-room than in the field of battle, attracted the notice of the Count, so as to make his uneasiness visible, whom the amiable Charlotte, who, ever studious of Amelia's real happiness, wished to amuse, and to call back the mind of her cousin, demanded the verse for the rose. The Count saw this affectionate trait in Charlotte's conduct, took out his pencil, and wrote for the rose,—

“ Elle ne vit qu'un jour, et ne plait qu'un moment,—”

which he gave to the lovely daughter, at the same time presenting the humble cousin with this line on the mignonette:—

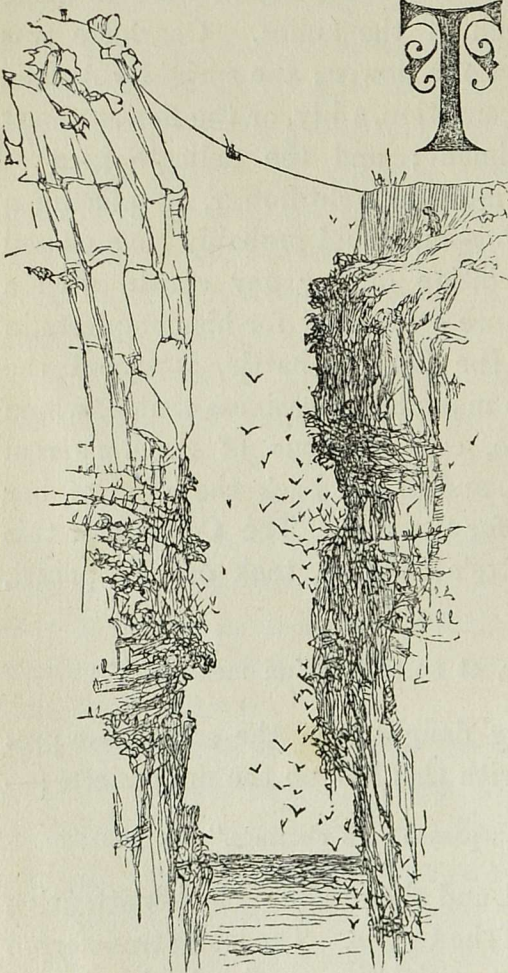
“ Ses qualités surpassent ses charmes.”

Amelia's pride was roused, and she retaliated by her attention to the Colonel, and neglect of the Count. The latter transferred his affections from beauty to amiability; and rejoicing in the exchange, and to commemorate the event which had brought

about his happiness, and delivered him from a coquette, he added a branch of the sweet *Reseda* to the ancient arms of his family, with the motto,—

“Your qualities surpass your charms.”

A BOTANICAL ADVENTURE.*



THE beauty of the scenery of Kynance Cove, near the Land's End, in Cornwall, and of the rare plants which grow on the rocks there having been named to me, I determined to see for myself whether the accounts which I had heard were true. Accordingly, without companion or guide, I started at eight o'clock in the morning, on what proved to be a perilous expedition. The weather was unpropitious; there was a good deal of wind stirring, and rain seemed to be impending. The rare occurrence of a holiday, however, and the hope of gathering with my own hands, from their

* From a charming little work, entitled, “A Week at the Lizard,” by the Rev. C. A. Johns.

native haunts, a number of plants which I had only heard of, or seen in the herbariums of the curious, encouraged me to proceed in spite of all adverse circumstances.

My equipment consisted of a walking-stick, a folio book for drying specimens in (which was slung over my back), a packet of sandwiches, and a small flask of brandy. Why I am thus particular in my inventory will appear by-and-by. After loitering by the way to collect and examine specimens of several plants then new to me, I found myself about mid-day drawing near the coast. The first point that I arrived at was the head of a valley, which appeared to answer the description I had received of Kynance, and making my way down with what speed I could, I soon found myself in the Cove, as I imagined, though, as I afterwards found, it was in reality Gue Graze, another cove.

The tide was out, as I expected; I accordingly began at once to explore for Asparagus Island, which, with the imperfect description I had received, I had no difficulty in recognizing in a high detached rock to the right of the Cove, the top of which was covered with vegetation. I soon climbed to the summit in search of asparagus, but failed, for the simple reason that it does not grow there. I was, however, well pleased to discover the tree-mallow, which I had never before seen growing wild. A few specimens of this I secured and laid out in my book to dry. All this occupied some time, and on my descent I found that the tide had begun to flow, and that my retreat to the Cove was cut off, unless I chose to wade through the water to the depth of about a foot.

I quietly took a survey of the cliff, and seeing that it was (as I imagined) easy of ascent, I thought I need not be in a hurry, but might as well rest myself after my eleven miles' walk, and discuss my sandwiches. This done, I began to mount the cliff, and at first made a rapid progress, there being plenty of grass as a holdfast for my hands, and of loose stones among which to

insert my feet. But when I had ascended some sixty feet, I found myself stopped by a slanting sheet of polished serpentine, on which I could gain no footing, though I made several attempts. I accordingly descended, with the intention of making a trial somewhere else, and proceeded further to the right.

But here I found myself entirely at fault, the sea having come in to the very base of the rocks, which were perpendicular. My only alternative was to turn back and regain the Cove by wading through the water. I found, however, that I had spent so much time in my ineffectual effort to scale the cliff, that the tide had risen considerably, and I could not now attempt to ford a passage without incurring great danger, and reluctantly came to the conclusion that I was in an awkward predicament. The tide had still four hours to flow, so that I should of course be detained ten or eleven hours. To add to my discomfort, it seemed to be on the point of raining; and recollecting with what difficulty I had found my way out by daylight, I could not lose sight of the fact that it would be yet more difficult to find my way home by night. Yet I had nothing to do but to sit still and wait, a task which I tried to perform, and took from my pocket Johnson's "Rasselas," in the hope of whiling away the time.

I soon found that the "History of a Search after Happiness" was little suited to the frame of mind to which I was then subjected, and quickly closed my book. As for sitting idle, it was quite out of the question; so I again climbed the island to explore, but discovered nothing to justify the hope of improving my condition. The only point where there appeared the least probability of the ascent being made by a human being, was that which I had tried and found impracticable. I again descended, scrambled over the rocks to the right and left as far as the tide would allow me, sat down, and endeavoured to compose my mind. Danger there was none, the island being large enough to afford refuge to a hundred men, and I knew

very well, from the character of the vegetation on the summit of the rock, that it was never swept by the sea, even in the stormiest weather.

An hour and a half I spent in this way, and at last, in spite of all my efforts, had worked myself up to such a pitch of excitement, by picturing to myself the misery of sitting ten or eleven hours in the rain, climbing over the rocks in the dark, and finally groping my way over an unknown country, with body and mind exhausted, that I resolved to make a fresh attempt where I had before been unsuccessful. I recollected, that when I made the first trial, I thought there were many other ways of ascending, and that I might, therefore, have been deterred by difficulties which, in my present emergency, would not seem so formidable. I accordingly began the ascent a second time, and in a bolder spirit. When I reached the shelving mass of rock mentioned previously, I stopped to take breath, and to meditate once more whether the personal inconvenience of spending the night on the spot, and the anxious suspense which my absence would occasion my friends, were sufficient to weigh against the risk I might incur in persisting in my attempt.

I had all but decided on returning, when I observed a small stone in a crack of the rock, which appeared to be loose; this I removed, and thus obtained one footstep, but not being satisfied with my precarious footing, resolved on desisting at once. To my utter horror I found this to be impracticable. The book which I had slung across my back so impeded my movements, that when I attempted to turn, the corner pressed against the cliff, and forced me outwards, and had I persisted, would inevitably have precipitated me to the bottom. I could not retain my posture for any length of time, resting as I was on one foot, and being obliged to hold fast with one hand in order to do even that: my only alternative was to proceed; but whither, I knew not.

By occasionally making use of my stick to loosen some stones, and to try the strength of others, which frequently peeled off

from the rock with a very slight pressure, I contrived to approach within eight or nine feet of the top. Here, however, I found myself in a situation in which few, I believe, have ever been placed, except in the most terrific dreams. I had gradually quitted that part of the rock which hung over the sloping grass; I had inserted the end of my stick in a crevice, and, being obliged to use both hands in clinging to the rock, I could not draw it out, and if my foot had slipped, I should have glided over a few feet of smooth stone, and then fallen seventy or eighty feet, whether into the sea, or on the shore, I could not turn my head to examine.

To add to my distress, I found my book much in my way; I was supported almost entirely by the muscular strength of my fingers, and a mass of apparently loose stones projected over my head. These I must surmount; but how? The only possible support for my feet was six feet below the summit of the rock, and not more than half an inch wide. I managed with great difficulty to set my foot on this, snatched at, and caught hold of, the top of the rock with the ends of my fingers, and was suspended, as it were, between heaven and earth directly over the precipice, when—the ledge under my feet gave way, or my foot slipped (terror prevented me from observing which). With strength more than natural I clung by my hands alone—I felt a shudder pass through my frame—my blood seemed to stagnate—and a spontaneous agitation of all the nerves in my body commenced, so violent, that this new horror now took possession of me, that the involuntary motion of my hands might loosen my hold.

During what appeared to me a long time, but what I dare say was, in reality, less time than my readers take in following my description, I was in this state, dangling my feet on every side in search of a resting-place, and dreading lest the stones, to which I clung with my fingers, should give way. Feeling that I could hold no longer by my fingers, I made a violent effort, and planted my knee, I know not how, just below my hands;

still I was not safe—I was now balanced on my hands and one knee on the edge of a cliff—one leg was still hanging over, idle—and my book, which I had not the means of getting rid of, slipped round in front, and inserted itself between my body and the rock. By dint of another effort, however, I contrived to throw myself forward, and was safe!

I had not, however, yet reached the top; I was scarcely half-way up; but I was resting at full length on a plot of green turf—the scene of an earnest thanksgiving as had ever been poured forth from my heart—and though I was for some time in such a state of nervous excitement, that I dared not look down, much less venture to move, yet the consciousness of imminent danger was gone, and with it all anxiety. Still my limbs were in a trembling state, my tongue was glued to my palate, and though I tried to swallow a little brandy, my throat refused to perform its office; all that I could do was to rinse out my mouth, and to long, as earnestly as a traveller in the desert, for a draught of water, that I might do so effectually.

I had not even yet accomplished all my task; a large portion of cliff still remained to be surmounted, scarcely, if at all, less precipitous than that which I had traversed. I was resolved, however, to run no more risk, and sat down calculating the probabilities of my being seen and rescued on the next day by a large party, who I knew were coming hither for a day's enjoyment. After resting a little while, though I had not yet mustered sufficient nerve to look down, I began to explore my position, and saw behind me a low but steep rock, which, not being very difficult, I ascended, and to my infinite joy discovered just before me a pathway worn by human feet, leading by a circuitous route from some part of the coast now covered by the sea to the summit of the cliff. It may readily be supposed that I was not long in reaching this. I ran, as well as the nature of the ground would permit, and soon reached the top; and now that I once more had the power of walking on level ground, all that I had before experienced seemed a dream; but

the roaring of the waves beneath me, which I dared not, even then, look down upon; the quivering of my limbs, and, above all, the tears of grateful emotion which involuntarily rose to my eyes, soon convinced me of the reality of my situation, and of my perilous expedition. A short time after I had left the coast, it began to rain, and continued till I reached home, between six and seven o'clock, drenched to the skin.

A word of advice to climbers. It is much *more difficult* to descend than to ascend the face of a precipitous cliff, and, therefore, *less dangerous*; and again, it is much *easier* to ascend a place of the same character than to descend, and, therefore, *more dangerous*. This will appear to be a paradox, and, on that account, it will, I hope, be remembered; but, nevertheless, experience will prove that the maxim is a sound one.

A climber, in descending, instinctively shrinks from climbing down any places where his body would be likely to be thrown off its balance, unless he can secure firm footing and a good holdfast for his hands; and if he reaches a spot which is impracticable, he can make sure of being able to return by the way he came. On the other hand, in ascending, his body is thrown forward, he can see the nature of the rock which he is climbing, and has a far greater command over his hands and feet; in addition to which he is not likely to become giddy, for there is no necessity for him to look down.

But if he arrives, after some laborious climbing, at an impracticable spot, and wishes to return, he may be called on to traverse a dangerous piece of ground, which he scarcely noticed during his ascent, a sloping, smooth rock, for instance, or of slippery turf, where, if he loses his balance, or his foot slips, the result must be most perilous. As a deduction from this, let him also bear in mind, that when a descent has been made with much difficulty, he had better return by the same route, rather than attempt another which only *appears* to be easier. He may be tolerably certain that, where he got down, he can get up; but if he tries the new route, he may be brought

up by some difficulty which he could not descry from beneath, and be compelled to return by a yet more perilous way than the first, and, after all, expend his labour in vain.

THE FALL OF THE LEAF.

THERE is no subject on which botanists have entertained a greater variety of opinion than on the fall of leaves. The causes which produce their excision from the stems and branches of plants are so exceedingly complicated, that a much more advanced condition of botanical science seems to be necessary before they will be clearly and accurately understood. It is obvious that leaves are thrown off by plants because they are no longer of any service to them; and the means by which Nature effects their separation are truly wonderful, and, at the same time, instructive.

The causes which produce the decay and fall of leaves are partly chemical and partly mechanical. The water which enters the roots of plants, as it percolates the soil, dissolves a small portion of earthy matter. This is deposited chiefly in the woody and fibrous tissues of the stem, but principally in the cellular tissue of the leaves, by the evaporation which is continually taking place at their surface. In this manner the interior walls of the leaf-cells become incrustated or thickened by deposits of mineral matter, just as earthy matter accumulates at the bottom of a pot used for culinary purposes, and the leaf is thus rendered finally unfit for the performance of its functions. The mineral matter deposited in the cells is sometimes beautifully crystallized, the earths or bases taken up by the roots uniting with the acids formed in the vegetable organs.

The most common kinds of crystals are those of the carbonate and oxalate of lime, which are of different sizes and forms, rhomboidal, cubical, and prismatic, but the most prevalent form is the acicular or needle-shaped. It is to this form that the term raphides (*raphis*, a needle) was originally applied by Decandolle, although it is now used indiscriminately in reference to all cellular crystals.

In the autumnal months the light becomes less powerful, the leaves lose their green colour, and their cells becoming gradually and entirely choked up with mineral matter, the sap no longer circulates through them. They absorb oxygen from the air, and the result of their different degrees of oxidation is seen in all that variety of autumnal tint which casts such a charm over the dying landscape.

Whilst these chemical changes are taking place, nature is, at the same time, preparing to effect the mechanical excision of the leaf from the plant. It is necessary to remark, that a leaf is simply an expansion of the green cellular bark of the young shoot, which is thus spread out by the divergence of the woody fibre ramified through its substance. This woody fibre issues from the side of the shoot in separate bundles, which, when the leaf is perfectly formed, unite together, constituting its footstalk. The points of issue of these woody bundles may be seen in the form of little, round dots on the leaf-scar, after the leaves have fallen.

Now, at first, all leaves are contiguous with the stem. As they grow, an interruption of their tissue takes place at the base of their footstalk, by means of which a more or less complete articulation is formed. The cause of this articulation is owing to the continuation of the growth of the stem after the leaf has attained its full growth, which it generally does in a few weeks.

The growth of the leaf being completed, all its functions languish, in consequence of the increased deposition of mineral matter within its cells, the base of the petiole, or footstalk,

being unable to adapt itself to the increasing diameter of the stem; the excision advances from without inwards, until it finally reaches the bundles of woody fibre, which are the main support of the leaf.

Whilst, however, nature is forming a wound, she is, at the same time, making provision to heal the same; for the cuticle or epidermis of the stem is seen to grow over the surface of the scar, so that when the leaf is detached, the tree does not suffer from the effects of an open wound. The provision for separation being thus completed, the leaf is detached by the growth of the bud at its base, by the force of the winds, or even by its own weight. Such is the philosophy of the fall of leaves, and we cannot help admiring the interesting and wonderful provision by which nature heals the wounds even before they are absolutely made, and affords a safe covering from atmospheric changes before the parts can be subject to them.

The decay and fall of leaves is, therefore, not the result of frost, as is commonly supposed, for leaves begin to languish and change colour (as happens with the red maple especially), and even fall, often before the autumnal frosts make their appearance; and when vegetation is destroyed by frost, the leaves blacken and wither, but remain attached to the stem; but the death and fall of the leaf is produced by a regular vital process, which commences with the first formation of this organ, and is completed only when it is no longer useful. There is no denying, however, that the frosts of autumn, by suddenly contracting the tissues at the base of the petiole, accelerate the fall of leaves. All must have noticed, on a frosty morning in autumn, that the slightest breath of air moving amongst the decayed and dying leaves, will bring them in complete showers from the trees to the ground.

In general, we may say that the duration of life in leaves is inversely as the force of the evaporation which takes place from their surface. For we find that the leaves of herbaceous plants, or of trees which evaporate a great deal, fall before the end of

the year; whilst the leaves of succulent plants, or of evergreens, which latter are of a hard and leathery texture, and evaporate but little, often last for several years. In pines, firs, and evergreen trees and shrubs, there is an annual fall of leaves in the spring of the year, whilst the growth of the season is taking place; but as this leaf-fall is only partial, consisting of one-half, or one-third, at a time, there is always a sufficient number left on such trees to keep them clothed with perpetual verdure. Hence it is that the entire foliage of such trees consists of leaves which have been attached to the stem from one to three or five successive years.

In the beech, and some others, the leaves wither in autumn, and hang on the branches in a dead state through the winter. Such leaves, when examined, will be found to be contiguous with the stem at the base of their petioles, and, therefore, without that articulation, or joint, which so materially aids in the disruption of the leaf from the stem. These dead leaves fall off when the new leaves expand in the spring.

Most of the trees of this country have deciduous leaves, and in winter our woods are bare, and no longer cast their shadows on the earth; but the forests of tropical climates are evergreen, and usually retain the same appearance throughout the year. A perpetual shade is thus afforded by nature, which, in some measure, gives relief against the continuous heat of these regions. In tropical countries, however, many trees lose their leaves during the dry season.

THE LESSON.

ALONG the line where slope and valley meet,
 My frequent steps have wandered with the stream
 Whose gurgle, lulling like the songs we dream,
 Makes all the dell a slumberous retreat.
 One day in spring, when winds were very sweet,
 My lady with me stroll'd ; ah, dearer gleam
 By fond eyes lent to daylight's wonted beam !
 Ah, pathway bless'd by touch of dainty feet !
 Gazing on her, I gave no transient thought
 To other beauty than her presence wore,
 Until by chance my crushing tramp was brought
 Upon a Violet, that meekly bore
 Within its leaves a twinkling dewdrop, caught
 In fragrant chalices from morning's store.

"Guard well thy feet," my peerless lady said,
 "Lest they mislead thee into hurtful haste,
 Through which thou scatter Nature's boons to waste,
 And spoil the charms her careful hand hath made.
 No tiniest flower in flushing bloom array'd,
 No springing spire wherewith the turf is graced,
 Once trodden into dust, can be replaced
 By boasting art or man's most cunning trade.
 Despise not, then, the meanest thing which lies
 Beneath thy step in life's uncounted ways ;
 For lowly creatures pour on earnest eyes
 A purer light than waning pride displays ;
 And silent hymns from odorous lips arise,
 That send reproof to languid notes of praise."

THE RAINBOW.

THE most glorious vision depending on the decomposition, refraction, and reflection of light, by the vapour of the atmosphere reduced to fluid drops, is the arch projected



during a shower of rain upon a cloud opposite to the sun, displaying all the tints of the solar spectrum. The first marked approximation to the true theory of the rainbow occurs in a

volume written by Antonius de Dominis, Archbishop of Spalatro, published in the year 1611, at Venice. Descartes pursued the subject, and correctly explained some of the phenomena; but upon Newton's discovery of the different degrees of refrangibility in the different coloured rays which compose the sunbeam, a pencil of white or compounded light, the cause of the coloured bands in the rainbow, of the order of their position, and of the breadth they occupy, was at once apparent. The bow is common to all countries, and is the sign of the covenant of promise to all people, that there shall no more be such a wide-spread deluge as that which the sacred narrative records.

“ But say, what mean those coloured streaks in heaven
 Distended, as the brow of God appeased?
 Or serve they, as a flowery verge, to bind
 The fluid skirts of that same watery cloud,
 Least it again dissolve, and shower the earth?
 To whom the archangel: Dexterously thou aim'st:
 So willingly doth God remit His ire,
 That He relents, not to blot out mankind;
 And makes a covenant never to destroy
 The earth again by flood; nor let the sea
 Surpass its bounds; nor rain to drown the world,
 With man therein, or beast; but when He brings
 O'er the earth a cloud, will therein set
 His triple-colour'd bow, whereon to look,
 And call to mind His covenant.”

It is happily remarked by Mr. Prout, in his “Bridgewater Treatise,” that no pledge could have been more felicitous or satisfactory; for, in order that the rainbow may appear, the clouds must be *partial*, and hence its existence is absolutely incompatible with *universal* deluge from above. So long, therefore, as “He doth set His bow in the clouds,” so long have we full assurance that these clouds must continue to shower down good, and not evil, to the earth.

When rain is falling, and the sun is on the horizon, the bow appears a complete semicircle, if the rain-cloud is sufficiently extensive to display it. Its extent diminishes as the solar altitude increases, because the coloured arch is a portion of a circle, whose centre is a point in the sky directly opposite the sun. Above the height of 45° the primary bow is visible, and hence, in our climate, the rainbow is not seen in summer about the middle of the day. In peculiar positions a complete circle may be beheld, as when the shower is on a mountain, and the spectator in a valley; or when viewed from the top of a lofty pinnacle, nearly the whole circumference may sometimes be embraced. Ulloa and Bouguer describe circular rainbows, frequently seen on the mountains which rise above the table-land of Quito.

When rain is abundant, there is a secondary bow distinctly seen, produced by a double reflection. This is exterior to the primary one, and the intervening space has been observed to be occupied by an arch of coloured light. The secondary bow differs from the other, in exhibiting the same series of colours in an inverted order. Thus the red is the uppermost colour in the interior bow, and the violet in the exterior. A ternary bow may exist, but it is so exceedingly faint, from the repeated reflections, as to be scarcely ever perceptible. The same lovely spectacle may be seen when the solar splendour falls upon the spray of the cataract and the waves, the shower of an artificial fountain, and the dew upon the grass. There is hardly any other object of nature more pleasing to the eye, or soothing to the mind, than the rainbow, when distinctly developed—a familiar sight in all regions, but most common in mountainous districts, where the showers are most frequent. Poetry has celebrated its beauty, and to convey an adequate representation of its soft and variegated tints is the highest achievement of the painter's art. While the Hebrews called it the Bow of God, on account of its association with a divine promise; and the Greeks, the Daughter of Wonder; the rude inhabitants of the North gave expression to a fancy which its

peculiar aspect might well create, styling it the Bridge of the Gods, a passage connecting heaven and earth.

The principles which account for the formation of the rainbow explain the appearance of beautiful iridescent arches which have occasionally been observed during the prevalence of mist and sunshine. Mr. Cochin describes a spectacle of this kind, noticed from an eminence that overlooked some low meadow-grounds, in a direction opposite to that of the sun, which was shining very brightly, a thick mist resting upon the landscape in front. At about the distance of half-a-mile from each other, and incurvated, like the lower extremities of the common rainbow, two places of peculiar brightness were seen in the mist. They seemed to rest on the ground, were continued as high as the fog extended, the breadth being nearly half as much more as that of the rainbow. In the middle between these two places, and on the same horizontal line, there was a coloured appearance, whose base subtended an angle of about 12° , and whose interior parts were thus variegated. The centre was dark, as if made by the shadow of some object resembling, in size and shape, an ordinary sheaf of corn. Next to this centre there was a curved space, of a yellow flame colour.

To this succeeded another curved space of nearly the same dark cast as the centre, very evenly bounded on each side, and tinged with a faint blue green. The exterior exhibited a rainbow circlet, only its tints were less vivid, their boundaries were not so well defined; and the whole, instead of forming part of a perfect circle, appeared like the end of a concentric ellipsis, whose transverse axis was perpendicular to the horizon. The mist lay thick upon the surface of the meadows; the observer was standing near its margin, and gradually the scene became fainter, and faded away as he entered into it. A similar fogbow was seen by Captain Parry during his attempt to reach the North Pole by means of boats and sledges, with five arches formed within the main one, and all beautifully coloured.

The lunar rainbow, the reflected light of the moon, is a much rarer object than the solar one. It frequently consists of a uniformly white arch, but it has often been seen tinted, the colours differing only in intensity from those caused by the direct solar illuminations. Aristotle states that he was the first observer of this interesting spectacle, and that he only saw two in the course of fifty years; but it must have been repeatedly witnessed, without a record having been made of the fact. Thoresby relates an account received from a friend of an observation of the bow fixed by the moon in the clouds, while travelling in the Peak of Derbyshire. She had then passed the full about twenty-four hours. The evening had been rainy, but the clouds had dispersed, and the moon was shining very clearly. This lunar iris was more remarkable than that observed by Dr. Plot, of which there is an account in his "History of Oxford," that being only of a white colour, but this had all the hues of the solar rainbow, beautiful and distinct, but fainter. Mr. Bucke remarks upon having had the good fortune to witness several, two of which were, perhaps, as fine as were ever witnessed in any country. The first formed an arch over the vale of Usk. The moon hung over the Bloreng; a dark cloud was suspended over Myarth; the river murmured over beds of stones; and a bow, illumined by the moon, stretched from one side of the vale to another. The second was seen from the castle overlooking the Bay of Carmarthen, forming a regular semicircle over the river Towy. It was in a moment of vicissitude; and the fancy of the observer willingly reverted to the various soothing associations, under which sacred authority unfolds the emblem and sign of a merciful covenant vouchsafed by a beneficent Creator.

PASTIMES AND HOLIDAYS.

“What is a gentleman without his recreations?”—OLD PLAY.

IN the games and diversions of a people, we may trace the distinguishing features of the national character; and the rude pastimes of our ancestors are a practical illustration of the courage and hardiness for which they were celebrated. Some of the old sports would be incompatible with the refinement of the present day, but others are of a nature less objectionable, and the memory of which is worthy of preservation. Many of the ancient games and holidays were rural festivities, commemorative of the return of the seasons, and not only innocent in themselves, but conducive to health and good fellowship. Of this description were the May Games, the Harvest Supper, the Feast of Sheep Shearing, Midsummer Eve rejoicings, and the celebration of the New Year: all these may be traced to the earliest times; indeed, they are coeval with society; and the Feast of Tabernacles among the Jews, and the ancient honours paid to Ceres, Bacchus, and Saturn by the heathens, were only analogous observances, under different appellations.

A revival of some of the old sports and pastimes would probably be an improvement in national manners; and some modern attractions, in the form of frivolous games of chance, be beneficially exchanged for the more healthy exercises of former ages. “Worse practices within doors,” as Stowe remarks, “it is to be feared, have succeeded the more open pastimes of the olden times.”

The amusements of our Saxon ancestors were such as were common among the ancient Northern nations; consisting mostly of robust exercises, as hunting, hawking, leaping, running, wrestling, and casting of darts. They were also much addicted to gaming, a propensity unfortunately transmitted

unimpaired to their descendants of the present day. Chess was a favourite game with them, and likewise backgammon, said to have been invented about the tenth century. The Normans introduced the chivalrous games of tournaments and jousts. These last became very prevalent, as we learn from a satirical poem of the thirteenth century, a verse from which has been thus rendered by Strutt, in his "Sports and Pastimes:"—

"If wealth, Sir Knight, perchance be thine,
In tournaments you're bound to shine;
Refuse—and all the world will swear,
You are not worth a rotten pear."

When the military enthusiasm which characterized the middle ages had subsided, and chivalry was on the decline, a prodigious change took place in the manners of the people. Violent exercises grew out of fashion with persons of rank, and the example of the nobility was followed by other classes. Henry VII., Henry VIII., and James I., endeavoured to revive the ancient military exercises, but with only ephemeral success.

We learn from Burton, in his "Anatomy of Melancholy," what were the most prevalent sports at the end of the sixteenth century. In his dry way, Old Burton says,—“Cards, dice, hawkes, and hounds, are rocks upon which men lose themselves when they are improperly handled and beyond their fortunes.” Hunting and hawking, he allows, are “honest recreations, and fit for some great men, but not for every base and inferior person, who, while they maintain their faulkoner and dogs, and hunting nags, their wealth runs away with their hounds, and their fortunes fly away with their hawkes.” Hunting, hawking, running at rings, tilts and tournaments, horse-races and wild-goose chases, were the pastimes of the gentry, while the lower classes recreated themselves at May Games, Wakes, Whitsun Ales; by ringing of bells, bowling, shooting, wrestling, leaping, pitching the bar, playing with keel-pins, quoits, trunks, wasters, foils, foot-ball, balown, and running at the quintain.

Speaking of the Londoners, Burton says,—“They take pleasure to see some pageant or sight go by, as at a coronation, wedding, and such like solemn niceties; to see an ambassador or prince received and entertained with masks, shows, and fireworks.” The following he considers common amusements, both in town and country,—namely, “bull-baiting, and bear-baitings, in which our countrymen and citizens greatly delight and frequently use; dancers on ropes, jugglers, comedies, tragedies, artillery-gardens, and cock-fighting.” The winter recreations consisted of cards, dice, tables, shovel-board, chess, the philosopher’s game, shuttlecock, billiards, music, masks, dancing, yule-games, riddles, cross-purposes, merry tales of knight-errants, thieves, witches, fairies, and goblins.

In addition to the May Games, morris-dancing, pageants, and processions, which were common throughout the kingdom, the Londoners had peculiar privileges of hunting, hawking, and fishing; they had also large portions of ground allotted to them in the vicinity of the city for the practice of such pastimes as were not prohibited, and for those especially that were conducive to health. On the holidays, during the summer season, the young men exercised themselves in the fields with leaping, archery, wrestling, playing with balls, and practising with their wasters and bucklers. The city damsels had also their recreations, playing upon their timbrels, and dancing to the music, which they often practised by moonlight. One writer says, it was customary for the maidens to dance in presence of their masters and mistresses, while one of their companions played the music on a timbrel; and to stimulate them, the best dancers were rewarded with a garland, the prize being exposed to public view during the performance. To this custom Spenser alludes,—

“The damsels they delight,
When they their timbrels smite,
And thereunto dance and carol sweet.”

The London apprentices often amused themselves with the

wasters and bucklers before the doors of their masters. Hunting with the Lord Mayor's pack of hounds was a diversion of the metropolis, as well as sailing, rowing, and fishing on the Thames. Duck hunting was a favourite recreation in the summer, as we learn from Strype.

ECHOES.

VARIOUS remarkable echoes, and some not very credible, have been described by different authors. Dr. Plott mentions an echo in Woodstock Park, which repeats seventeen syllables by day and twenty by night. The famous echo at the Marquess Simonetta's villa, near Milan, has been described both by Addison and Keyser. According to the last of these travellers, it is occasioned by the reflection of the voice between the opposite parallel wings of the building, which are fifty-eight paces from each other, without any windows or doors, and perpendicularly to the main body of the building. The repetition of the sound dwells chiefly on the last syllable. A man's voice is repeated about forty times, and the report of a pistol about sixty times; but the repetitions are so rapid, that it is difficult to number them, unless it be early in the morning, or in a calm, still evening.

A curious example of an oblique echo, not heard by the person who emits the sound, is described in the "Memoirs of the Academy of Sciences," as existing at Genefay, near Rouen. A person singing hears only his own direct voice, while those who listen hear only the echo, which sometimes seems to approach, and at other times to recede from, the ear; one person hears a single voice, another several voices; one hears the echo on the right, and another on the left, the effect constantly changing with the position of the observer.

One of the most remarkable echoes of which we have read,

is that which Dr. Birch describes as existing at Roseneath, in Argyleshire. When a person at a proper distance played eight or ten notes on a trumpet, they were correctly repeated, but a third lower; after a short silence, another repetition was heard in a yet lower tone; and after another short interval, they were repeated a third time in a tone lower still.

We extract the following account of two very interesting echoes from Herschel's work:—

“In the cathedral of Girgenti, in Sicily, the slightest whisper is borne with perfect distinctness from the great western door to the cornice behind the high altar, a distance of 250 feet. By a most unlucky coincidence, the precise focus of divergence at the former station was chosen for the place of the confessional. Secrets never intended for the public ear thus became known, to the dismay of the confessors and the scandal of the people, by the resort of the curious to the opposite point (which seems to have been discovered accidentally), till at length one listener, having had his curiosity somewhat over gratified by hearing his wife's avowal of her own infidelity, this tell-tale peculiarity became generally known, and the confessional was removed.

“Beneath the suspension bridge across the Menai Strait in Wales, close to one of the main piers, is a remarkably fine echo. The sound of a blow on the pier with a hammer is returned in succession from each of the cross-beams which support the road-way, and from the opposite pier, at a distance of 576 feet; and, in addition to this, the sound is many times repeated between the water and the roadway. The effect is a series of sounds, which may be thus described:—The first return is sharp and strong from the roadway overhead; the rattling which succeeds dies away rapidly, but the single repercussion from the opposite pier is very strong, and is succeeded by a faint palpitation, repeating the sound at the rate of twenty-eight times in five seconds, and which therefore corresponds to a distance of 184 feet, or very nearly the double

interval from the roadway to the water. Thus it appears, that in the repercussion between the water and roadway, that from the latter only affects the ear, the line drawn from the auditor to the water being too oblique for the sound to diverge sufficiently in that direction. Another peculiarity deserves especial notice, namely, that the echo from the opposite pier is best heard when the auditor stands precisely opposite to the middle of the breadth of the pier, and strikes just on that point. As it deviates to one or the other side, the return is proportionably fainter, and is scarcely heard by him when his station is a little beyond the extreme edge of the pier, though another person, stationed (on the same side of the water) at an equal distance from the central point, so as to have the pier between them, hears it well."

In treating the important subject of echoes in churches and public buildings, Herschel has exposed several prevailing errors, and laid down several useful principles, which merit the particular attention of the architect. In small buildings the echo is not distinguishable from the principal sound, and therefore serves only to strengthen it; but in very large buildings, where the original sound and its echo are distinctly separated, the effect is highly disagreeable. In cathedrals this bad effect is diminished by reading the service in a monotonous chant, in consequence of which the voice is blended in the same sound with its echo. In musical performances, however, this resource is not available. When ten notes are executed in a single second, as in many pieces of modern music, the echo, in the direction of the length of a room fifty-five feet long, will exactly throw the second reverberation of each note on the principal sound of the following note, wherever the auditor is placed. Under such circumstances, therefore, the performers should be stationed in the middle of the apartment.

CAVERNS.

CAVES or caverns are in a great measure peculiar to mountains, and are seldom or never found in plains. They frequently occur in the Archipelago, Azores, Canaries, and other islands, because they are usually the tops of mountains, and have been subject to volcanic action.

There are many and various causes for the formation of caverns. They may be produced by the same causes which occasion gulfs, apertures, or sinkings in the earth. These causes are the explosions of volcanoes, the action of subterranean vapours and earthquakes, which create such commotions as must necessarily produce caverns, fissures, and hollows of every kind. Caverns in limestone and gypsum are, unquestionably, the result of the dissolving power of water. The almost perfectly uniform direction, the gentle and equable declivity of most caves, which occur in these formations, appear to be the effect of long continuance of water in them, the action of which has widened the existing crevices.

The *form* of caverns depends partly upon the nature of the substance in which they are found, but it is frequently altered by external causes.

Many caves are remarkable only on account of their great extent, or sublime from the awful gloom which pervades them, and the echoes which roll like thunder through their vaulted passages. Others are famed for the extreme beauty and magnificence of their stalactitic figures and drapery, which, when illuminated by torches, resemble fairy halls of sparkling diamonds. From some, poisonous vapours exhale; from others, valuable medicinal salts are obtained. Caverns were the primitive places of burial. In Kentucky and Tennessee, there are many which appear to have been used for that purpose. At

the present day they are in all civilized countries regarded simply as objects of curiosity.

In limestone rocks, the water trickles through the roof, dissolving a portion of the lime, and again deposits it when dropping. It thus gradually forms a slender tube, like an icicle, called a stalactite, of pure and brilliant whiteness.

In the progress of time these stalactites are lengthened into large pillars, hanging from the roof. This class may be termed stalactite caves. The water which falls on the floor of these caverns makes a similar deposit, and forms a pedestal there, called a stalagmite, which often unites with a stalactite, and completes a column. These columns are frequently enlarged to a great size, varied in their shape, and sometimes beautifully fluted. In some cases the parts are imperfect. A stalagmite rising from the floor seems like an altar or a statue: or a number of stalactites depending from the roof are united into a curtain.

In this way the most interesting and fantastic forms are produced; and one of these cavities resembles an immense cathedral, lined with columns, or a magnificent palace in ruins. The deposit which forms the stalactites and stalagmites, is capable of being highly polished, and wrought into the most beautiful ornaments, and is usually called spar.

All the great calcareous formations, the mountain limestone as well as the modern, are excavated in many directions into large vaults and fissures, several of which have long been admired on account of their sparry roofs and stalactite projections. In the limestone districts of England there is a great number of such vaults and subterranean rivers. In Derbyshire there are twenty-eight remarkable caverns, and as many open fissures, which are called locally swallow-holes, from their swallowing up the streams that cross the limestone districts of that country. The fissures descend from the surface to a very considerable depth, and often expand into vaults, or communicate laterally with caverns.

The bone caverns of Germany in limestone districts, have excited the deepest interest among geologists. Numerous grottoes, brilliantly decorated with crystalline stalactites of every form, succeed each other to a great extent throughout the body of the Hartz mountains. The openings between rooms of magnificent extent are frequently so narrow that a man can hardly crawl through on his hands. Their floors are strewn with enormous heaps of the bones of animals of every size. These vaults of death are not peculiar to Germany, but are found in many places in far distant lands.

How these immense quantities of bones could have been accumulated in these vast caverns has been a most interesting inquiry to the ablest naturalists. They are generally supposed to have been the dens of Antediluvian *carnivora*, which dragged in thither and devoured animals, and parts of animals, that fell in their way.

Of all the bone caverns of Germany the astonishing Galenreuth is most extensively known.

This cavern is in the Hartz mountains, south-west of Hanover in Germany. It has long been celebrated for its immense quantities and varieties of fossil bones. The entrance is seven and a half feet high, through a vertical rock, which faces the east. There are six rooms or grottoes succeeding one another, varying in size, and connected sometimes by long, narrow winding passages, and sometimes it is necessary to descend fifteen or twenty feet almost perpendicularly in order to visit the room beyond. The two largest rooms are about 80 feet in length. The floors of all the rooms are thickly covered with the bones of the wolf, fox, glutton, hyæna, bear, and lion. The bones of the bear are more numerous than either of the other animals. Remains of the lion and of the hyæna are found principally in the last room. The opening was much too narrow for those animals to have entered by it. There must have been some other entrance, which is now closed, or else the present opening has, by some cause, been made smaller than it was originally.

Bones of men, horses, oxen, and sheep have been found in small quantities, but their state of preservation proves very clearly, that they must have been deposited at a much later period than those of the bears, hyænas, &c.

A very remarkable place is Ware's Cave, near the Shenandoah river in Virginia, and so called from its discoverer, Burnet Ware, who first explored it in 1804. The entrance is narrow and difficult, and when first discovered, the passage was impeded by stalactites; these have been, however, removed. As a person advances into the cavern, his course is first horizontal, then he descends 15 or 20 feet into a large echoing cavern; this is called Washington Hall, and is about 270 feet in length, 35 in width, and between 30 and 40 feet high. Stalactites of silvery whiteness are suspended from above, pillars of stalagmites are rising around, ledges of rocks form the floor, and the uneven walls are encrusted with a beautiful brown spar.

Passing through a narrow crevice, twelve other apartments are found, with as many creeping places between, differing in shape and size from the first, but resembling it in the irregularity of the walls, floor, covering, and the calcareous concretions, which, assuming fantastical shapes, displaying sparkling lustre, more vivid as the light grows stronger, give to the grotto the power of charming every beholder.

The cave is a mile and a half in extent, and extremely irregular in course and shape. The height varied from 30 to 40 feet, and the breadth from 20 to 30. Blue limestone is the ground-work of this cavern; the apartments are everywhere covered with incrustations of hard carbonates; these hang from the arched vault above in clusters, and often reach the ground in massive columns; stalagmites rise from the floor like statues; the irregular sides of the ledges of rocks have the appearance of banks of salt; the walk seems like a diamond pavement, and the foot-way round it of pebbles, which resembles the bed of a river which has deserted its channel; water comes dripping down from the ends of the stalactites, the echoing sound of

which is the only interruption to the profound silence which reigns in the cavern.

There is scarcely anything on earth to which these concretions may not be supposed to bear a resemblance, but yet they are unlike everything but themselves.

We may also notice the fortifications and Cave of St. Michael, Gibraltar, which are excavations in the solid rock. They were commenced during the reign of Napoleon, and are designed to prevent all approach on the land side. The entrance is at an old Moorish castle, about four hundred feet above the level of the sea. The principal avenues are large enough for a carriage to pass through, and are several thousand feet in length. These ascend gradually to the north-east; but so gentle is the ascent, that a mule loaded with cannon balls easily makes his way to the farthest extremity. From these principal avenues are cut lateral passages, terminating in small chambers with port-holes, in which lie guns of the largest size ready for action.

Towards the southern extremity of the rock is St. Michael's Cave, 1,000 feet above the level of the sea. The mouth of the cave is but five feet wide, but, descending a slope, it opens into a spacious hall, apparently supported in the centre by a large stalactitical pillar. Succeeding this is a series of caves, but the passages are so narrow and intricate, as to render them hardly accessible. The whole of the cave appears like a darkened church destitute of galleries. This cave is thought by some to extend under the bed of the sea to Apes' Hill, on the opposite continent. The notion had its origin in the frequent and mysterious appearance of African monkeys, which, as they have no other mode of reaching Gibraltar, are supposed to pass through the cave under the sea.

At Cheribon, in China, is a grotto built by order of the emperor. The grotto occupies more than an acre and a half. The entrance for a considerable distance is ornamented with the most unnatural figures of men and beasts. Beyond this is

a succession of grottoes, interior rooms, and subterranean passages. Throughout the whole are scattered pools of water, which reflect beautifully the objects around them. In one of the interior rooms is the bedstead of the emperor. This was so placed, that a current of water is conducted all round the top of the bed, which at pleasure might be permitted to fall in transparent curtains of rain, cooling the air in this sultry climate, and forming a drapery of glittering showers. The Cave of Surtshellir, in Iceland, is pointed out by a heap of stones near the entrance. The entrance to the cavern is about 40 feet in height, and 50 in breadth, which dimensions the cavern retains for more than two-thirds of its extent, which has been ascertained to be 5,034 feet. There are but two passages to the cavern, one through a deep pool of cold water, the other down a perpendicular wall 30 feet in height. After passing the main cavern, there are two passages leading to a room which was inhabited by robbers in former times. Entering these passages, the progress of the traveller is arrested by a wall, about three feet high, evidently artificial. There is a small door in the middle, opening into a room about 300 feet in extent, and 18 in height, and adorned with stalactites. Around the entrance to the room are heaps of bones of various animals, which were killed by the robbers for their subsistence.

Passing through pools of water, and over broken pieces of lava, and along a slippery descending floor, the traveller arrives at a place which amply repays him for all his toils. It is a cavern, the roof and sides of which are decorated with crystallizations of exquisite beauty; from the icy floor rise pillars of ice about four feet high, and two feet in thickness, generally pointed at the top. The crystallizations are of every possible form, some resembling objects in nature, others rivalling the finest works of art.

On the island of Hoongo, in the South Pacific Ocean, there is a very remarkable cavern, situated on the western coast. The entrance into this cavern is beneath the surface of the sea,

even at low water. The depth of the entrance below the surface varies with the different heights of the tide. The nature of this cavern will be better understood, if we imagine a hollow rock rising sixty feet or more above the surface of the water, into the cavity of which there is only one opening, and that opening on the side of the rock, several feet under the water, which flows into it, and consequently the base of the cavern may be said to be the sea itself. Mr. Mariner, a gentleman who was a resident several years in the island, gives an interesting account of a visit to this cavern. One afternoon, as he was walking towards the shore, he was greatly surprised at seeing some of the young chiefs diving into the water one after the other, and not appearing again. He hastily inquired of the last, as he was preparing to follow his companions, what it meant, what they were about. "Follow me," said the young man, "and I will carry you where you never were before, and where Finnow (the king) and his chiefs are assembled."

Mr. Mariner had entire confidence in him, and thinking it was undoubtedly the famous cavern which he had long wished to explore, gladly prepared to accompany him. The young chief dived into the water, and, guided by the light from his heels, Mr. Mariner followed, entered the opening in the rock, and having dived through the passage, several feet in length, rose into the cavern. He heard the voices of the king and his friends as soon as he rose above the water, and being directed by his guide, he climbed up a jutting portion of rock, and sat down. It was not very dark—a little light was reflected from the bottom. After remaining there a few minutes, he could discover, directed by the voice, the rest of the company, seated, like himself, around the sides of the cavern.

Wishing very much to examine it more thoroughly and with stronger light, Mr. Mariner dived out again, obtained a pistol, some light combustibles, and a torch, and wrapping them up so as to secure them from the water, returned to the cavern.

He then lighted his torch, and the place was illuminated, for the first time, perhaps, since its existence. It appeared to be about 40 feet wide in the centre, and branched off on one side into two narrower portions. The average height seemed to be about 40 feet. The roof was hung with stalactites in a very curious manner, resembling, upon a cursory view, the Gothic arches and ornaments of an old church. Mr. Mariner wished to ascertain whether there was not some concealed opening in the cavern, by means of which fresh supplies of air were obtained, and for this purpose swam round the cave with a torch in his hand, but without discovering any. He also climbed to every accessible place with as little success. Another individual visited this cavern at low water. He felt a current of air, and on examining for its source, found a hole about a foot in diameter, from which proceeded a steady breeze, but not the least glimmer of light. Through this hole there must have been some communication with the external air. When Mr. Mariner was there, it was nearly high water, and the hole was probably covered; and if it were not, air could only enter when the tide was going out.

AVALANCHES.

THESE are the most dangerous and terrible phenomena to which the valleys embosomed between high snow-topped mountain ranges are exposed. They are especially frequent in the Alps, owing to the steepness of their declivities, but they are also known in other mountain regions, as in the Pyrenees, and in Norway. They originate in the higher region of the mountains, when the accumulation of snow becomes so great that the inclined plane on which the mass rests can no longer support it. It is then pushed down the declivity by its own weight, and precipitated into the subjacent valley,—where it

often destroys forests and villages, buries men and cattle, and sometimes fills up rivers, and stops their course. Besides what is covered with masses of snow, persons are often killed, and houses overthrown, by the sudden compression of the air, caused by the incredible velocity with which these enormous masses descend. There are four different kinds of avalanches; viz., drift, rolling, sliding, and glacier or ice avalanches; of which the first commonly take place in the early part of winter, the second and third at the end of winter or in spring, and the last only in summer. The drift or loose snow avalanches take place when heavy snow has fallen in the upper region of the mountains during a still calm, and this accumulated mass, before it acquires consistency, is put in motion by a strong wind. The snow is driven from one declivity to another, and so enormously increased in its progress, that it brings down an incredible volume of loose snow, which often covers a great part of a valley. The damage caused by these avalanches is, however, generally not very great, because most of the objects covered by them may be freed from the snow without having sustained great damage; but they often produce such a compression in the air that houses are overturned, and men and cattle suffocated.

The rolling avalanches are much more dangerous and destructive. These take place when, after a thaw, the snow becomes caked, and the single grains or flocks stick to one another, so as to unite into large hard pieces, which commonly take the form of balls. Such a ball, moved by its own weight, begins to descend the inclined plane, and all the snow it meets in its course downwards sticks firmly to it. This new mass, increasing rapidly in its progress, and descending with great velocity, covers, destroys, or carries away everything that opposes its course—trees, forests, houses, and rocks. This is the most destructive of these avalanches, and causes great loss of life and property. In the year 1749, the whole village of Reuras, in the Canton of the Grisons, was covered, and at the same

time, removed from its site, by an avalanche of this description ; but this change, which happened in the night time, was effected without the least noise, so that the inhabitants were not aware of it, and on awaking in the morning could not conceive why it did not become light. A hundred persons were dug out of the snow, sixty of whom were still alive, the interstices between the snow containing sufficient air to support life. In 1806, an avalanche descended into Val Calanca, likewise in the Canton of the Grisons, transplanted a forest from one side of the valley to the other, and placed a fir-tree on the roof of a parsonage house. In 1820, sixty-four persons were killed at Fetta, in the high valley of Engadin, in the country of the Grisons ; and in the same year, eighty-four persons and four hundred head of cattle, in Obergestelen, and twenty-three persons at Brieg, both situated in the Canton of Wallis. In the same country, the village of Briel was almost entirely covered by an avalanche, in 1827.

Many thousands of strong trees are destroyed by these avalanches, either by being broken off near the ground, or by being rooted up, torn to pieces, and thus precipitated into the valley. Where these avalanches are of common occurrence, the inhabitants of the valleys know the places where they come down, and by observing the changes of the weather they are able to foretell the time of their descent.

The sliding avalanches originate on the lower and less steep declivities, when, after a long thaw in spring, those layers of the snowy covering which are nearest the ground are dissolved into water, and thus the bond is loosened which unites the mass to its base. The whole snowy covering of a declivity then begins to move slowly down the slippery slope, and to carry before it anything which is too weak to withstand its pressure. When an object does not directly give way to the mass, it is either borne down by the snow accumulating behind it, or the whole mass divides and proceeds in its course on each side of it. The ice or glacier avalanches are nothing but pieces of ice,

which formerly constituted a part of a glacier, but, loosened by the summer heat, are detached from the principal mass, and precipitated down with a noise like thunder. They are commonly broken into small pieces by the rocks which they meet with in their progress. When seen from a distance, they resemble the cataracts of a powerful stream. In the valley of Grindelwald, Bera, they may often be seen, and at the base of the Jungfrau, the thunder which accompanies their fall is almost continually heard. They are less destructive than the other avalanches, because they descend upon places which are not inhabited.

Occasionally the avalanches change their character in their progress. When the declivity is not too great, and the ground under it not too slippery, the mass of snow begins to slide, but arriving at a precipitous descent, its velocity and its masses are considerably increased, and it begins to roll. If, in this stage of its course, it meets a strong, craggy rock, the mass is instantly divided into innumerable small pieces, and thus it appears, at the end of its progress, like a drift avalanche.

The following account, from the diary of a traveller among the glaciers of Mont Blanc, will be read with interest:—

“The difficulty of breathing gradually increasing, and our thirst being incessant, I was obliged to stop half a minute to arrange my veil. In this interval my companion H—— and three of the guides passed me, so that I was now the sixth in the line, and of course the centre man. He was next before me, and as it was the first time we had been so circumstanced during the whole morning, he remarked it, and said we ought to have one guide at least between us, in case of accident. This I overruled, by referring him to the absence of all appearance of danger at that part of our march; to which he assented. I did not attempt to recover my place in front, though the wish more than once crossed my mind, finding perhaps that my present one was much more laborious. To this apparently trivial circumstance I was indebted for my life.

“A few minutes after the above conversation, my veil being still up, and my eyes turned at intervals towards the summit of the mountain, which was on the right, as we were crossing obliquely the long slope which was to conduct us to Mont Maudit, the snow suddenly gave way beneath our feet, beginning at the head of the line, and carried us down the slope to my left. I was thrown instantly off my feet, but was still on my knees, and endeavouring to regain my footing, when, in a few seconds, the snow on our right, which was of course above us, rushed into the gap thus suddenly made, and completed the catastrophe by burying us all at once in its mass, and hurrying us downwards towards two crevasses, about a furlong below us, and nearly parallel to the line of our march. The accumulation of snow instantly threw me backwards, and I was carried down in spite of all my struggles. In less than a minute I emerged, partly from my own exertions, and partly because the velocity of the sloping mass had subsided from its own friction. I was obliged to resign my pole in the struggle, feeling it forced out of my hand: a short time afterwards I found it on the very brink of the crevasse. At the moment of my emerging, I was so far from being alive to the danger of our situation, that on seeing my two companions at some distance below me up to the waist in snow, and sitting motionless and silent, a jest was rising to my lips, till a second glance showed me that, with the exception of Matthew Balmat, they were the only remnants of the party visible. Two more, however, being those in the interval between myself and the rear of the party, having quickly re-appeared, I was still inclined to treat the affair rather as a perplexing though ludicrous delay (in having sent us down so many hundred feet lower), than in the light of a serious accident, when Matthew Balmat cried out that some of the party were lost, and pointed to the crevasse, which had hitherto escaped our notice, into which he said they had fallen. A nearer view convinced us all of the sad truth. The three front guides, being where the slope was somewhat

steeper, had been carried down with great rapidity, and to a greater distance, and had thus been hurried into the crevasse, with an immense mass of snow upon them, which rose nearly to the brink. Balmat, who was fourth in the line, being a man of great muscular strength, as well as presence of mind, had suddenly thrust his pole into the firm snow beneath when he felt himself going, which certainly checked in some measure the force of his fall. Our two hindermost guides were also missing; but we were soon gladdened by seeing them make their appearance, and cheered them with loud and repeated huzzas. One of these had been carried into the crevasse where it was very narrow, and had been thrown with some violence against the opposite brink. He contrived to scramble out without assistance, and at the expense of a trifling cut on the chin. The other had been dragged out by his companions quite senseless, and nearly black from the weight of snow which had been upon him. In a short time, however, he recovered. It was long before we could convince ourselves that the others were past hope, and we exhausted ourselves fruitlessly for some time in fathoming the loose snow with our poles. When the sad truth burst upon us, our feelings may perhaps be conceived, but cannot be expressed."

RAPIDS.

"Row, brothers, row, the stream runs fast,
The rapids are near, and the daylight's past."

THUS sang, or rather wrote, the sweet bard of Erin, whose voice is now hushed in death. At the time these lines were written, the gifted poet was in a frail Canadian bark, descending the magnificent river St. Lawrence; the chaunt of the boatmen, and the noise of the foaming rapids, alone breaking the solitude of a scene which no imagination can realize for

grandeur and beauty. "I have heard," said Moore, later, "this simple air with a pleasure which the finest compositions of the first masters have never given me, and now there is not a note of it which does not recall to my memory the dip of our oars in the St. Lawrence, the flight of our boat down the rapids, and all those new and fanciful impressions to which my heart was alive during the whole of this very interesting voyage."

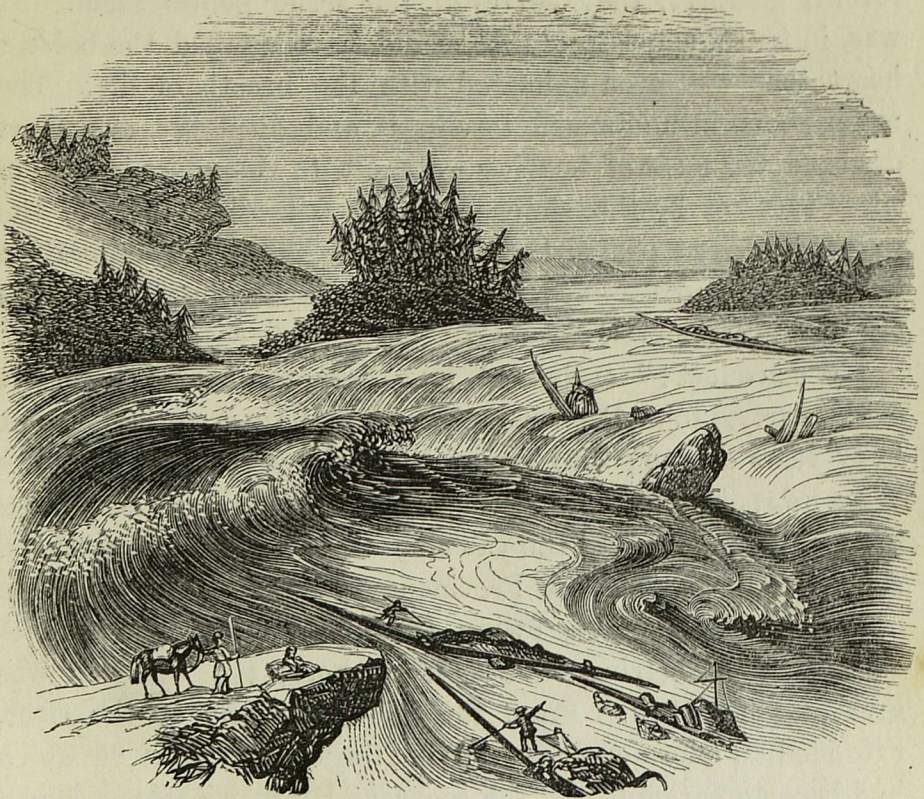
This is, indeed, a picture which the magic aid of poesy can render highly effective; but the wild impetuosity of those torrents, which swell the broad waters of the rivers in the western world, is beyond description. The origin of these rapids may be briefly noticed. Most large rivers have their source in very high mountains, or table lands, in descending from which a great difference with respect to the rapidity of their course, and the nature of the country traversed by them, is observed. Thus the course of such rivers has been divided into three divisions,—the upper, middle, and lower course. The upper course of such a river lies within a mountain region, and its source is consequently at a great elevation above the sea. The waters run with greater or less velocity, according to the greater or less extent of the mountain region; and when the elevation decreases with considerable rapidity, the current of the river presents a quick succession of cataracts and rapids; the latter

"Rushing alike untired and wild
Through shades that frown'd and flow'rs that smiled,
Flying by ev'ry green recess,
That woos them to its calm caress."

The adventurous travellers in these picturesque districts frequently trust themselves, in rough, flat-bottomed boats constructed for the purpose, to the power of these rapids, and are impelled through the agitated waters with fearful velocity, often at the peril of their lives; for the boat is in constant danger from the violence of the current, or may be dashed in pieces

against the masses of rock and huge piles of timber that are tossed about in the rapids.

A story is told of some *voyageurs* who narrowly escaped destruction in one of the rapids of the Mississippi. The party consisted of four hunters, who had embarked in a small boat to undertake what is termed an exploring expedition. It was a calm, autumnal evening, and as the boat drifted down the



stream, the rowers rested on their oars, and engaged in an animated conversation, which completely withdrew their attention from surrounding objects, and rendered them unconscious that the current was impelling the boat onward with increasing speed.

“Hist!” cried one of the hunters, suddenly starting from his seat, “we are approaching the falls! pull for your lives!”

In an instant every hand was engaged, and the hunters

glanced round in dismay. It was too true. The ominous sound of the foaming waters smote upon their ears, while every moment they were hurrying nearer to a fate that seemed inevitable. Stoutly and manfully, however, they battled with the stream, but all their efforts to resist the current were useless; and at length, overcome by their exertions, their arms dropped powerless to their sides, and, with straining eyes and forlorn gestures, they surveyed the scene before them. It was, in truth, a spectacle that would have quailed the boldest heart that was ever animated with the breath of life. The moon shone in undimmed loveliness, and displayed, at a short distance, the mass of heaving waters, with the white clouds of spray cast up by the violence of the fall. The noise of the gushing torrent pealed through the air like the reverberation of thunder, and sounded, to the unfortunate hunters, as the knell of every mortal hope.

“We are lost!” exclaimed, in a despairing tone, the eldest of the party, John Henderson, a fine, athletic American, about forty years of age; “no human aid can now reach us.”

As he spoke, the boat dashed wildly through the waters; a few minutes more, and the yawning abyss would receive them. At this supreme instant Providence came to their aid. On one side of the river, owing to the rocks being less precipitous, and shelving towards the shore, the waterfall was greatly diminished. From this point, midway to the river, extended an enormous mass of floating timber, part of which had become entangled in the rocks, and thus withstood for an interval the force of the current which was impelling them towards the falls. The timber was covered with luxuriant vegetation, accumulated during its long sojourn in the river. Towards this object, which presented a last chance of safety, the earnest glances of the hunters were now directed, but the distance appeared too great; with the energy of despair, however, Henderson and his companions, as the boat neared the falls, threw themselves on the floating garden, and

succeeded in clinging to some of the vegetation, and gaining a firm hold; but the weight of their bodies caused the wood to sink several feet, and thus, half immersed in the water, and in constant dread that the timber would be carried over the fall, the hunters passed eight weary hours in the greatest agony of mind. At length, as the morning appeared, they were observed from the shore, and rescued after great difficulty from their perilous condition.

VOLCANOES.

VOLCANOES are the most interesting of the phenomena of the earth, as being most impressive in their appearance, extraordinary in their effects, and mysterious in their origin. The term is derived from the name of Vulcan, the god of fire, who was supposed by the ancients to forge the thunderbolts of Jupiter in Etna's furnace. Volcanic eruptions are intimately connected with physical geography, and the science of geology.

Such eruptions are usually preceded by earthquakes of different intensity and duration, with loud sounds resembling the noise of musketry, and bellowings, prolonged for days, in the sides of the mountain. The atmosphere produces a sense of oppression. Springs, throughout a large extent of country, frequently disappear, and the wells become dry. The ocean sometimes retires from the shore. The surface of the ground becomes heated, and swells upwards like a plastic mass, or heaves like the waves of the sea, till a rent is formed in the ground, extending the whole length, perhaps, of the agitated land. Through this chasm, masses of rock, with flame, and smoke, and lava, are thrown up, which often fall back and choke the fissures, so as to confine their passage to one or more apertures.

During the great earthquakes which destroyed Lisbon in 1755 and 1761, Europe, Asia, and America were all affected

with subterranean agitations, muddy boiling of warm springs, and drying up of wells. Etna, which had not been active for eighty years, broke out; Mexico was filled with earthquakes and volcanic eruptions.

In September, 1759, the volcano of Jorullo, near the town of Mexico, broke forth on a plain surrounded by mountains, and 120 miles from any volcano, preceded as usual by subterranean noises; there were tremendous earthquakes, and a "tract of ground, from three to four miles square, rose up like a bladder," and, after heaving and swelling like the waves of the sea, settled, leaving six mountains, from 300 to 1,700 feet high. On the night of its first eruption, two rivers near the spot disappeared; but at 6,500 feet distant two new ones burst out, leaving their fountains as warm springs.

The greatest eruptions of Etna and Vesuvius are always from the sides of the mountains; and some of the volcanoes of South America, from 18,000 to 22,000 feet high, very seldom send forth anything but mud. Near Naples there can be seen sixty extinct volcanoes.

Cumea, a city founded 1,260 B.C., is built in the crater of a previous volcano. In Auvergne, in France, the vestiges of extinct volcanoes cover a tract of country several thousand leagues in extent. The period at which they occurred is so far distant, that no record of history contains any information concerning them. Their lava appears as fresh as those of modern volcanoes, and their craters are in a measure perfect. The craters of Vesuvius, of Etna, and of Teneriffe, are within the bosom of previous larger craters. The whole of the mountainous parts of Quito are considered by Humboldt as one immense volcano. Stromboli is constantly burning; one reason of which may be its low situation. The crater is inclined towards the sea, whither its products, continually rising, are always thrown. The pumice-stone used in the arts is mostly obtained here. Nicaragua is another, continually burning volcano. Kirauea, in the island of Hawaii, is now

admitted to be the most wonderful volcano in the world. A description of a visit there contains the following:—"Standing at an elevation of 1,500 feet, we looked into a black and horrid gulf, from the highest part from fifteen to twenty miles in circumference, so directly beneath us, that in appearance we might have plunged into its lowest depth."

Many volcanic eruptions are supposed to occur, of which the knowledge cannot reach us, either because the craters are so deep in the sea that the materials of the eruption do not appear upon the surface, or else because, when the eruptions occur, no navigator is near to notice them. The same causes which operate to produce volcanoes on land throw up matter also at sea. All insular volcanoes have originally been formed by matter thrown out from submarine vents. Many of the islands that have thus been thrown up have soon disappeared.

An island emerged from the ocean near the Azores, nine miles square, which remained a few months, and then sunk, leaving eighty fathoms of water above it. An eruption of flames from the sea commenced near Iceland, in January, 1783, which continued for several months, shaking the island with earthquakes. When these flames ceased, the Shapta Yokul, 200 miles inland, broke out with the most tremendous eruptions ever recorded: the inhabitants did not see the sun during the remainder of the summer, and all Europe was covered with haze. Near the island of Sautorini, in the Mediterranean, there was a subterraneous volcano that sent up such vast quantities of pumice-stone (which is so light, that it floats on the water), as to cover the sea, and choke the entrance to the harbour, so that neither ships nor boats could pass through.

Naturalists are agreed in ascribing these tremendous exhibitions to the united agency of fire and water. But the subject is very little understood. It is not known what is the origin or seat of the fire, or by what it is supported. The substance of the earth is known to consist to some extent of various combustible materials, such as bitumen, fossil wood, turf,

and coal. There exists also considerable quantities of iron and sulphur. In a state of combination, the latter substances become strongly heated when excluded from the air, if they contain any moisture.

An instance of this effect is afforded by a common experiment. It was originally performed in the following manner:—A chemist mixed several pounds of iron filings and powdered sulphur into a paste, by means of water, and buried it in an iron pot in the earth. In about an hour the earth swelled and cracked, and sulphurous vapours were exhaled; a subterraneous fire was produced by the chemical actions of the sulphur, iron, and water.

These causes are, however, allowed to be inadequate of themselves to supply such vast fires. The most extensive beds of coal we know of are but a few rods in thickness; and sulphur, compared with the immensity of the other volcanic products, is but a rare mineral in the earth. Where, then, shall we obtain a supply of materials for the yawning lakes of Vesuvius, Etna, and Kirauea? We at once see they could not have come from the mountain itself, for then there would have been nothing to support the superficial strata; and besides, they have some of them thrown up—Etna, for instance—twenty times as much matter as the original size of the mountain. We are driven to believe that they come from an immense depth, and from one common point, the centre of the earth.

If we cannot unravel the design of the Author of Nature in permitting such a vast central fire, we are able certainly to scan the wise provision of allowing the angry, raging elements within to escape so peacefully from their confinement, and spend themselves by throwing their superfluous matter into the sea, or over a few leagues of territory. Volcanoes are immense safety-valves to the globe, chimneys to the subterranean furnace beneath our feet, and are the obvious means of preventing the overthrow of cities and countries by earthquakes. When the inflamed materials, generating in incalculable

quantities elastic vapour, are seeking some vent, and rolling throughout the great cavity of earth, the orifice of a volcano permits the whole to be discharged, without disturbing the superficial strata.

The volcanic system is supposed to be common to the whole universe of planets and suns revolving in the heavens. The celebrated Dr. Herschel discovered, beyond doubt, volcanoes in operation in the moon. The crater of one of the four or five discovered, all luminous with the action of fire, is supposed to be about three miles in diameter.

Volcanoes are conjectured to be alluded to in the sacred volume, in Job xxii. 15:—

“Hast thou observed the ancient tract
That was trodden by wicked mortals?
Who were arrested on a sudden,
Whose foundation is a *molten flood*?

* * * * *

Surely their substance was carried away,
And their riches devoured by fire.”

The prophet Nahum says: “The mountains *quake* at him, and the hills *melt*, and the earth is *burned* at his presence: his fury is poured out *like fire*, and the rocks are *thrown down* by him.”

No phenomena of Nature awake such overwhelming sensations of the power and majesty of Him who formed the universe, who laid the foundations of the earth, and who is by his Almighty power preserving and governing it, as the sight of the smoke, the flames, and the torrents of volcanoes. The awful revelations of His word are brought to our mind with fearful force: “Great and marvellous are thy works, Lord God Almighty. Greatly art thou to be feared, God terrible in majesty.”

WHIRLWINDS, HURRICANES, SIMOOMS, &c.

A CONVERSATION BETWEEN UNCLE SIDNEY, MARY, JANE,
HENRY, AND GEORGE.

Sidney. Good evening, children; I am happy to see you. I suppose you have come to hear something about whirlwinds and simooms.

Mary. Yes, uncle; you know you said you would tell us about them to-day.

Sidney. So I did, and I am pleased to see you like to be instructed. But what shall I talk about first?

Henry. Tell us of whirlwinds; I want to know what makes them.

George. Yes, do, uncle; I saw a whirlwind last week. It came over me, and took my cap off, and lifted it straight up in the air. I did not know before that wind could lift anything up like that.

Sidney. That is not so strange as an account of a whirlwind which occurred in France, in June, 1839. Some needle-work and a pillow-case were taken up a chimney, and the next day they were found in a field many rods from the house. Such winds are sometimes so powerful, that they lift heavy objects into the air. It is said that a whirlwind occurred at Maysville, Ohio, in 1842, which lifted a barn from its foundation, containing four horses and three tons of hay.

Mary. What a strong wind that was! It would blow away a man if he should happen to be in its way.

Sidney. Such a thing has happened. Two persons were walking together in Germany, when suddenly a whirlwind came upon them, drove one against the wall, and threw the other into the adjoining field.

George. Are whirlwinds caused by heat, too?

Sidney. Yes, George, all winds are caused by the influence of heat on the air. A whirlwind is formed by the meeting of opposite currents of air, which heat has set in motion.

George. But what makes the whirlwind lift things from the ground?

Sidney. When these currents of air meet, the air, being expanded by heat, rises up very rapidly.

George. Do whirlwinds last long?

Sidney. No, not usually more than a few seconds in the same place, for they move along rapidly. Violent whirlwinds are called *tornadoes*. These sometimes travel ten or twenty miles, and they often move at the rate of a mile a minute. Whirlwinds are not usually more than a few rods in width.

Mary. What are hurricanes?

Sidney. Hurricanes are great whirlwinds. They vary from fifty to five hundred miles in diameter, and move forward at the rate of from seventeen to thirty miles an hour.

Henry. Where are hurricanes seen?

Sidney. They usually occur in warm climates, and are by far the most frequent and powerful in the torrid zone.

Jane. I read something about a wind called the simoom, a few days since; I wish you would tell us something about that.

Sidney. Can you tell me where those occur, Jane?

Jane. I think it is on the dry, sandy plains of Asia, and the great deserts of Africa.

Sidney. That is right. Now I will try to explain the cause of the simoom. Those great deserts and plains of Africa and Asia are covered with dry quartz sand. This sand becomes so heated by the rays of the sun, that it is burning to the touch. This intense heat of the sand is imparted to the air, which causes it to expand, and rise very rapidly. The cool air from the adjoining country rushes in to take its place, and in so doing raises the fine dry sand in dense clouds. Remarkable stories have been told of the simoom. Some, that it was a

poisonous fiery blast, which instantly destroyed life; others, that it has been known to overwhelm and bury whole caravans. Such stories are considered as untrue by modern travellers. The blast of the simoom does not inflict instant death, but it is a dreadful visitant to the traveller on the desert. The wind is so dry and hot, that his skin becomes parched, his throat inflamed, and a raging thirst created. What adds still more to this calamity, the burning blast often dries up the traveller's supply of water, and thus deprives him of his only means of relief from suffering. Hence the principal danger which the traveller has to fear from the simoom, is the loss of water, and, in consequence, death from thirst.

Mary. That must be dreadful!

George. I should not like to travel on those deserts.

Jane. What do the people do, when they see the simoom coming?

Sidney. They take the skins, in which they carry their water, from the backs of their camels, and cover them up as well as they can with blankets, cloaks, &c., to keep the heat from the water. Then they lie flat on the ground, until the simoom has passed. The camels lie down also, and sometimes they plunge their heads into the sand. This storm of sand does not usually last more than ten or fifteen minutes, and when it has passed, the people reload their camels, and proceed on their journey.

Henry. Are there any other winds like the simoom?

Sidney. Yes, there is a south-east wind that blows over the islands of the Mediterranean Sea, and along the shores of Italy. This wind blows during the summer and autumn. The people that live where this wind comes lie on sofas, carpets, and on the bare ground, while it lasts. This wind is hot and moist, and causes such a profuse perspiration, that the body soon becomes weak and languid.

George. Where does this hot air come from?

Sidney. It is generally supposed that it blows over the

Mediterranean from the burning sands of Africa. It is heated on the sandy deserts, and derives its moisture from the sea. The late Mr. Buckingham described a sand-storm as commencing with a dull red mist, not unlike the sunrise skies of northern climates ; and soon afterwards forming large columns of sand and dust, which were whirled up into the air, and carried along in a body over the plain with a slow and stately motion. One of these, apparently from eighty to one hundred feet in diameter, was certainly of sufficient force, by its constant whirling motion, to throw both men and animals off their legs, so that if crossing a crowded caravan, and broken by the interruption of its course, the danger of suffocation to those buried beneath its fall would be very great.

And now, having explained thus far, I must wish you good-night.

THE GREAT GEYSER IN ICELAND.

“AFTER waiting,” says Madame Pfeiffer, “till the second day of my sojourn at the Geyser, the long desired explosion took place on the 27th of June, at half-past nine in the morning. The peasant, who came twice a day to inquire if I had yet seen an eruption, was with me when the first dull sounds, which announced the event, were heard. We hurried to the spot, and as the waters boiled over as usual, and the noise died away, I thought I was doomed to disappointment again ; but the last tones were just expiring, when the explosion suddenly took place. I have really no words to do justice to this magnificent spectacle, which to behold once in a lifetime is enough.

“It infinitely surpassed all my expectations. The waters were spouted with great power and volume, column rising above column, as if each were bent on outstripping the others. After I had recovered in some degree from my first astonishment, I looked round at the tent ; how small, how diminutive it

seemed compared to those pillars of water! and yet it was nearly twenty feet high. It was lying rather lower, it is true, than the basin of the Geyser; but tent might have been piled on tent; yes, by my reckoning—which may not have been perfectly accurate, however—five or six, one above the other, would not have reached the elevation of those jets; the largest of which I think I can affirm, without any exaggeration, to have risen at least to the height of a hundred feet, and to have been three or four feet in diameter.

“Fortunately I had looked at my watch when the first rumbling was heard,—for I should certainly have forgotten to do so during the explosion; and by the calculation I made when it was over, I found that it lasted nearly four minutes, the actual outbreak occupying more than half that time.

“When this wonderful scene was ended, the peasant went with me to examine the basin and cauldron. We could approach very near them without the least danger, but there was nothing farther to be seen. The waters had entirely disappeared from the basin, into which we entered, and walked close up to the cauldron, where they had also sunk to the depth of seven or eight feet, though they were still boiling and bubbling with great violence.

“I broke off a few pieces of crust from the interior of the basin and cauldron with a hammer: those from the first were white, and the others brown. I tasted the water, which had no unpleasant flavour, and can contain but little sulphur; the steam is also free from any sulphurous smell.

“In order to ascertain how long it would be before the basin and cauldron were full again, I returned to the spot every thirty minutes, and found that for the first hour I could still stand within the basin; but at my next visit the cauldron was completely filled, and on the point of running over. As long as the water remained in the cauldron, it boiled furiously, but the ebullition subsided as it flowed into the basin; and when the latter was full, there was only an occasional bubble to be seen.

“After the expiration of two hours, it was precisely twelve o'clock: the basin was full to the brim, and I was standing near it, when the waters became violently agitated again, and the rumblings were once more heard. I had barely time to spring back, when the jets burst forth: they continued to play as long as the sounds lasted, and were fuller than those of the former explosion, which was perhaps in consequence of their height being rather less,—it was hardly more than forty or fifty feet. After the eruption the basin and cauldron were about as full as they were before.

“I had now witnessed two explosions of the Geyser, and felt amply compensated for all my watchfulness; but I was so fortunate as to see two other outbreaks, which varied a little from the former ones. At seven in the evening, the jets rose again to a greater height than at noon, throwing up some stones, which looked like black specks in the frothy waters; and on the third night the basin was filled with waves, which tossed wildly over each other, but did not spout up any streams into the air. The waters overflowed the margin, and an immense mass of steam arose, which was driven by the wind towards the spot where I stood, and wrapped me in a thick cloud, which prevented my seeing more than a few feet before me. I could perceive no odour, and felt no other inconvenience than a slight degree of heat from the steam.”

THE AURORA BOREALIS.

OF all atmospherical phenomena, the Aurora Borealis, or the northern day-break, is one of the most striking, especially in the regions where its full glory is revealed. The sight of the appearance in the north part of the heavens, and its close resemblance to the aspect of the sky before sunrise, have originated the name. A native Russian, Lomonosov, thus refers to the spectacle:—

“ Where are thy secret laws, O Nature, where?
 Thy torch-lights dazzle in the wintry zone:
 How dost thou light from ice thy torches there?
 There has thy sun some sacred, secret throne?
 See in yon frozen sea what glories have their birth;
 Thence night leads forth the day t’illuminate the earth.

“ Come then, philosopher, whose privileged eye
 Reads Nature’s hidden pages and decrees;
 Come now, and tell us whence, and where, and why,
 Earth’s icy regions glow with lights like these,
 That fill our souls with awe?—profound inquirer! say,
 For thou dost count the stars, and trace the planet’s way.

“ What fills with dazzling beams the illumin’d air?
 What wakes the flames that light the firmament?
 The lightning’s flash? there is no thunder there,
 And earth and heaven with fiery sheets are blent:
 The winter’s night now gleams with brighter, lovelier ray
 Than ever yet adorn’d the golden summer’s day.

“ Is there some vast, some hidden magazine,
 Where the gross darkness flames of fire supplies?
 Some phosphorous fabric, which the mountains screen,
 Whose clouds of light above those mountains rise?
 Where the winds rattle loud around the foaming sea,
 And lift the waves to Heaven in thund’ring revelry?”

The appearances exhibited by the Aurora are so various, as to render it impossible to comprehend every particular in a description that must be necessarily brief and general. A cloud, or haze, is commonly seen in the northern region of the heavens, but often bearing toward the east or west, assuming the form of an arc, seldom attaining a greater altitude than 40° , but varying in extent from 5° to 100° . The upper edge of the cloud is luminous, sometimes brilliant and irregular. The lower part is frequently dark and thick, with the clear sky appearing between it and the horizon. Streams of light shoot up in columnar forms from the upper part of the cloud,

now extending but a few degrees, then as far as the zenith, and even beyond it.

Instances occur in which the whole hemisphere is covered with these coruscations; but the brilliancy is the greatest, and the light the strongest, in the north, near the main body of the meteor. The streamers have, in general, a tremulous motion, and, when close together, present the appearance of waves, or sheets of light, following each other in rapid succession. But no rule obtains with reference to these streaks, which have acquired the name of "the merry dancers," from their volatility, becoming more quick in their motions in stormy weather, as if sympathizing with the wildness of the blast. Such is the extraordinary aspect they present, that it is not surprising the rude Indians should gaze upon them as the spirits of their fathers roaming through the land of souls. They are variously white, pale red, or of a deep blood colour, and sometimes the prismatic colours of the rainbow are presented. When several streamers, emerging from different points, unite at their zenith, a small and dense meteor is formed, which seems to burn with greater violence than the separate parts, and glows with a green, blue, or purple light. The display is sometimes over in a few minutes, at others it continues for hours, or during the whole night, and appears for several nights in succession.

Captain Beechey remarked a sudden illumination to occur at one extremity of the auroral arch, the light passing along the belt with a tremulous, hesitating movement towards the opposite end, exhibiting the colours of the rainbow; and as an illustration of this appearance, he refers to that presented by the rays of some molluscous animals in motion. Captain Parry noticed the same effect as a common one with the aurora, and compared it, as far as its motion is concerned, to a person holding a long ribbon by one end, and giving it an undulatory movement through its whole length, though its general position remained the same. Captain Sabine likewise spoke of the

arch being bent into convolutions, resembling those of a snake in motion. Both Parry, Franklin, and Beechey agreed in the observation that no streamers were ever observed shooting downward from the arch.

The preceding statement refers to the aurora in high northern latitudes, where the full magnificence of the phenomenon is displayed. It forms a fine compensation for the long and dreary night to which these regions are subject, the gay and varying aspect of the heavens contrasting refreshingly with the repelling and monotonous appearance of the earth. We have already stated that the direction in which the aurora generally makes its first appearance, or the quarter in which the arch formed by this meteor is usually seen, is to the northward. But this does not hold good of very high latitudes, for by the expeditions which have wintered in the ice, it was almost always seen to the southward; while by Captain Beechey, in the *Blossom*, in Zotterne Sound, 250 miles to the southward of the ice, it was always observed in a northern direction. It would appear, therefore, from this fact, that the margin of packed ice is most favourable to the production of the aurora.

The reports of the Greenland ships confirm this idea; for, according to their concurrent testimony, the meteoric display has a more brilliant aspect to vessels passing near the situation of the compact ice, than to others entered far within it. Instances, however, are not wanting of the aurora appearing to the south of the zenith in comparatively low latitudes. Lieutenant Chappell, in his voyage to Hudson's Bay, speaks of its forming in the zenith, in a shape resembling that of an umbrella, pouring down streams of light from all parts of its periphery, which fell vertically over the hemisphere in every direction.

As we retire from the Pole, the phenomenon becomes a rarer occurrence, and is less perfectly and distinctly developed. In September, 1828, it was observed in England as a vast arch of silvery light extending over nearly the whole of the heavens, transient gleams of light separating from the main body of the

luminosity; but in September, 1827, its hues were red and brilliant.

Dr. Dalton has furnished the following account of an aurora, as observed by him on the 15th of October, 1792. "Attention," he remarks, "was first excited by a remarkably red appearance of the clouds to the south, which afforded sufficient light to read by at eight o'clock in the evening, though there was no moon nor light in the north. From half-past nine to ten there was a large, luminous, horizontal arch to the southward, and several faint concentric arches northward. It was particularly noticed that all the arches seemed exactly bisected by the plain of the magnetic meridian. At half-past ten o'clock streamers appeared, very low in the south-east, running to and fro from west to east. They increased in number, and began to approach the zenith, apparently with an accelerated velocity, when, all on a sudden, the whole hemisphere was covered with them, and exhibited such an appearance as surpasses all description. The intensity of the light, the prodigious number and volatility of the beams, the grand intermixture of all the prismatic colours in their utmost splendour, variegating the glowing canopy with the most luxuriant and enchanting scenery, afforded an awful, but at the same time the most pleasing and sublime spectacle in Nature. Every one gazed with astonishment; but the uncommon grandeur of the scene only lasted one minute. The variety of colours disappeared, and the beams lost their lateral motion, and were converted into the flashing radiations. The aurora continued for several hours."

A copious deposition of dew—hard gales in the English Channel—and a sudden thaw, after great cold, in northern regions, are circumstances which have been frequently noticed in connection with auroral displays.

The sky of the southern hemisphere occasionally exhibits this strange and mysterious light, contrary to an old opinion upon the subject: and here it must be called *Aurora Australis*, the southern day-break. Its appearance, however, is far from

being so common as in the northern zone, and is much less imposing. Don Antonio Ulloa, off Cape Horn, in the year 1745, witnessed the first appearance of the kind upon record in this region. Upon the clearing off of a thick mist, a light was observed in the southern horizon, extending to an elevation of about thirty degrees, sometimes of a reddish colour, and sometimes like the light which precedes the rise of the moon, but occasionally more brilliant. Captain Cook, in the same latitudes, had more distinct views of the luminous streamers adorning the night sky of the south. In the course of his second voyage he remarks, that on February the 17th, 1773, "a beautiful phenomenon was observed in the heavens. It consisted of long colours of a clear, white light, shooting up from the horizon, to the eastward, almost to the zenith, and spreading gradually over the whole southern part of the sky. These columns sometimes bent sideways at their upper extremity; and though in most respects similar to the northern lights, yet differed from them in being always of a whitish colour, whereas ours assume various tints, especially those of a purple and fiery hue. The stars were sometimes hid, and sometimes faintly seen through the substance of these southern lights, *Aurora Australis*. The sky was generally clear when they appeared, and the air sharp and cold, the thermometer standing at the freezing point, the ship being in latitude 58° south."

EXPERIENCE IN ANIMALS. — Old birds are not so easily approached within gun-shot as young ones; old foxes are less easily caught in traps; and old stags show more cunning. On newly discovered islands, the birds and animals have no fear of man, and the seals and other animals do not move at his approach; but a very short experience teaches them in what their safety consists. In tracts where the art of trapping has never been practised, the animals are at first caught in numbers, but by degrees they become more wary, and the hunter is compelled to use greater stratagems.

THE HISTORY OF REYNARD THE FOX;

IN WHICH, AFTER THE MANNER OF FABLE, THE EVIL DOINGS AND INTRIGUES OF MEN, AND THEIR CONSEQUENCES, ARE ILLUSTRATED.

IN the days of opening summer, when the sweet-scented flowers were expanding in the warm sunshine, and the birds were carolling their cheerful songs from every bough, the Lion, king of beasts, a magnanimous and gracious monarch, published a royal proclamation, dated at his palace, in the forest of Numidia, that every beast in his dominions should attend at Court, to celebrate the nuptials of the prince, his eldest son, with a princess of the forest of Bareith. All his vassals, excepting Reynard the Fox (who, as we shall see, had good reasons for keeping away), obeyed the summons; and there was great feasting and revelry for seven days, during which the marriage was performed with a pomp befitting the occasion, and the distinguished rank of the parties interested. At the conclusion of these gaities, a council was held, at which the Lion presided in state, to hear sundry charges against Reynard the Fox, whose audacity and violence had created a host of enemies, who now eagerly pressed forward to state their grievances.

Foremost among them was Isgrim, the Wolf, who began by informing his Majesty that Reynard had cruelly treated several members of his family without the least provocation, and that he had even boasted of his wickedness.

“Sire,” said Curtise the Hound, “I have also been a victim to the deceit of Reynard the Fox. It happened in a trying season, when food was difficult to be obtained. By dint of hard labour, I had scraped together a substantial dinner, and was about to appease my hunger, when this treacherous enemy

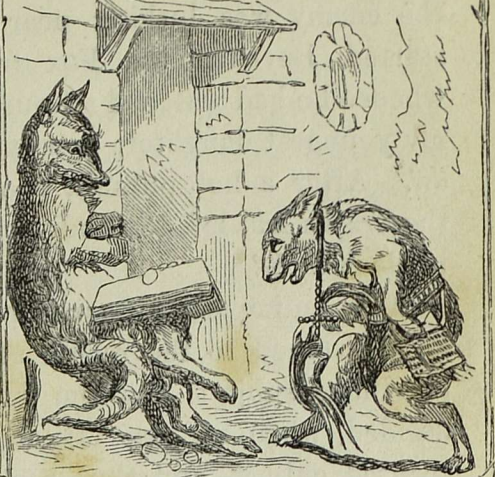
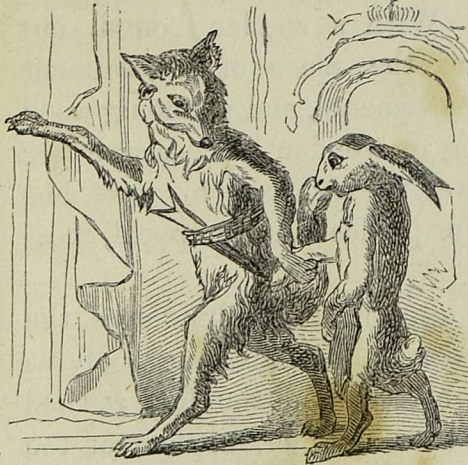
came by, and feigning to see a goodly prey in the distance, persuaded me to seek it. When I returned from my fruitless errand, the greedy rascal had purloined my food, and I was nearly starved in consequence.

Sir Tibert the Cat, on hearing this complaint, with fire in his eyes, and an angry countenance, sprang nimbly forward, and kneeling before the King, accused the Hound of having stolen from him the good things he had mentioned as having earned by honest industry; though, in truth, Sir Tibert himself had taken them on the sly from a neighbouring mill.

When the confusion incident to this recrimination had subsided, Sir Chanticleer the Cock, with his wife and sister, the good hens, Motley and Clackwell, advanced slowly in funeral procession, cackling and crying most sorrowfully, while four young hens carried a bier, supporting the body of their dead sister.

Sir Chanticleer, kneeling before the King, exclaimed:—

“Justice, most gracious Sovereign, against the craven Reynard the Fox, who has, in the most treacherous manner, assailed my happiness. I had eight valiant sons, and seven fair daughters, who were the comfort and pride of my existence; but, alas! neither bravery nor beauty could secure them against the artful depravity of their enemy, who succeeded in enticing away and destroying ten of my family. Yesterday, as I was alone, brooding over my sorrows, I espied this cruel persecutor coming towards me, but no longer with the roguish, confident look he was accustomed to wear. His eyes were bent on the ground, with an expression of humility and contrition. He was constantly turning a rosary in his hand, and muttering prayers of penitence at the same time. With a slow and constrained step he approached, and presented me with a paper, to which your Majesty’s signature was attached, and which set forth that, in consequence of the deep remorse exhibited by Reynard the Fox for his past misdeeds, and the self-penance inflicted on himself, together with his promises of



future amendment, your Majesty had deigned to grant a free pardon to him.

“ ‘Fear no more, friend Chanticleer,’ said Reynard; ‘go forth in safety with your children, for I have neither the will nor the ability to harm you. My wickedness presses hard upon me, and I must endeavour now to atone for the past.’ With these words, the artful traitor sighed deeply, as though his heart would break, and appeared so afflicted that I was moved with compassion.

“Secure, as I thought, from all danger, I called my family around me, and we proceeded for a lengthened stroll in the neighbourhood of the farmyard where we dwelt; but, alas! the enemy was lurking near. With a sudden bound, out started Reynard the Fox from the place of concealment whence he had watched all our movements, and pouncing upon my youngest daughter, now lying on yonder bier, carried her off. After a hot pursuit, she was rescued from his jaws, but the breath had left the body. For justice I again appeal, most noble king!”

With an impatient flourish of his tail, and flashing eyes, the Lion listened to the recital of these audacious pranks of his rebellious subject, and the fate of Reynard the Fox seemed decided, when up rose Grimbard the Badger, nephew of the accused culprit, and thus spoke:—

“My Sovereign liege, it is proverbially known that malice never speaks well of any person. My uncle, a stranger at the Court, and no favourite, stands maligned before your Majesty. I wish his accusers had the integrity to state the provocations he has received. Do they forget the fish he risked his life in stealing, while they kept back for fear, and then defrauded him of it, devouring it among themselves, and scarcely leaving him the bones? Did they not also get from him, with specious promises and show of friendship, the fitch of bacon that Reynard had also taken, and for which he was near paying dearly, being caught by the owner in a sack, and escaping with great

difficulty? The many injuries that Isgrim the Wolf has inflicted on my uncle are too tedious to mention; and as to Curtise the Hound, whoever can discern between right and wrong, must confess it is not criminal to take stolen goods from a thief. Sir Chanticleer should also remember how often he has alarmed the village with his crowing, and endangered the life of my uncle, when he was quietly passing, without injuring him. My uncle may have faults; but I assure your Majesty that, unless he is provoked, he is quite harmless."

The King, who had listened to this debate with great attention, now stood rampant on his throne, shaking his mane, and lashing the air with his tail. With a loud roar and powerful voice, at length he exclaimed:—

"What! shall even vice find an advocate in my presence? Shall any vassal beast of mine thrive by hypocrisy, grow daring in oppression, prey on his fellows, or increase his means by fraud? Your uncle is, I fear, deeply guilty; his artful stratagems and mischievous intentions betray it; and I blush to think that even you, his nephew, can plead in his defence; since to excuse bad actions is, in some measure, to share the wickedness. Shame and dishonour will ever redound to those who varnish crimes, hold the guilty free. Your daughter being dead, Sir Chanticleer, is past recall, and shall have funeral honours. All your complaints shall have redress, and receive due attention from our Privy Council: meanwhile we will summon Reynard the Fox to answer for his conduct."

The King, by the advice of his Privy Council, despatched Sir Bruin the Bear, to summon Reynard the Fox to appear at Court, and take his trial; with a strict caution, however, to guard against any trick the audacious rebel might be disposed to play upon him. This advice was wasted upon Sir Bruin, who was exceedingly conceited, and fancied that he had no equal in sagacity and cunning. With these feelings, he disguised himself, and set forward on his journey, and soon found Reynard the Fox at home, seated on a sofa, in a comfortable apartment of Bramble-

brier Castle, his principal residence. At the moment Sir Bruin entered the room, Reynard was deeply engaged in thought, one paw supporting his head, and his tail curling gracefully over another, while the expression of his eyes seemed to denote that some shrewd plot was busily working in his brain. He rose, however, with great courtesy to welcome Sir Bruin.

“What news from Court, my friend?” he exclaimed.

“The King is surprised at your absence; but this letter,” said Sir Bruin, presenting his credentials at the same time, “will secure to us, no doubt, the pleasure of soon seeing you there.”

“Why, to tell you the truth,” replied Reynard, confidentially, “my retirement from public life has not been occasioned by any want of condescension on the part of his Majesty the Lion, or from any actual dislike to the world in general, but simply from diffident motives, and a consciousness that I do not possess the dissimulation, flattery, and pliable disposition so essential to a courtier. Sorry, indeed, I should be if, thus obeying the dictates of my conscience, I forfeited the favour of our gracious Sovereign, for I am as innocent as any beast alive of deception, and incapable of doing an unworthy action. However, I will accompany you to the royal presence; and there, though slow of speech, I will defend myself——”

“Nobly resolved,” cried Sir Bruin, secretly delighted with the success of his mission.

“—— and no doubt,” continued Reynard, without noticing the interruption, “I shall be honourably acquitted from every charge; at least, my mind tells me so.”

“Shall we start at once?” inquired Sir Bruin, impatiently.

“Why, no. Tarry, I pray you, good Sir Bruin, under my roof to-night, when you shall be honourably entertained, and to-morrow morning we will set forward together. I have more need of this rest, as I have been indulging somewhat freely of late in the delights of a honeycomb, a dish of which I am particularly fond.”

At the mention of the honeycomb, the eyes of Sir Bruin shone eagerly, and the desire for immediate departure quickly vanished.

“ You argue wisely,” he said, addressing his host; “ let us not neglect an opportunity of recruiting our strength. That honeycomb you mentioned is a feast for an emperor. I ask no other food; supply me with that, and consider me your best friend for ever.”

“ I am right well pleased to find that you like honey, Sir Bruin,” replied Reynard, “ and that it is in my power to give you a treat. Let us go, then, to a neighbouring house, inhabited by a friend of mine, a carpenter by trade, who has a large stock of it; indeed, as much as you could devour in seven years.”

“ Friend Reynard,” returned the Bear, giving him his paw, “ my heart warms with love for you. I shall endeavour to deserve your kindness. You may boldly present yourself before the King, and leave me to manage your adversaries. I will still their clamours, and satisfy their complaints. We courtiers have a certain manner of dealing with these matters, unknown to others, and we acquit or condemn according to our interest.”

Thus conversing pleasantly, and with apparent friendship, Reynard the Fox and his companion proceeded towards the house of Landford, for so the carpenter was named; and, entering the work-yard, they saw a large oak, lately felled, which he had begun to cleave, and in which the wedges were still sticking.

“ Friend,” whispered Reynard, mysteriously, in the ear of Sir Bruin, “ within this oak-tree before us lies such a store of honey, that a thousand persons might regale themselves with it, and be satisfied; but be careful, my dear and honoured friend, and attend to my instructions. You will find a passage at this open end. Enter, and enjoy yourself; but I pray you bear in mind that moderation is wholesome, while a surfeit is dangerous.”

"Fear not for me, Reynard; I have not lived thus long in the world without learning experience. Few there are who can equal me in wisdom and shrewdness. Now for the honey."

With these words Sir Bruin thrust in his head and feet as far as he was able, when Reynard the Fox, slyly watching his opportunity, ran forwards, pulled out the wedges, and the tree closing, locked fast the unlucky honey-seeker.

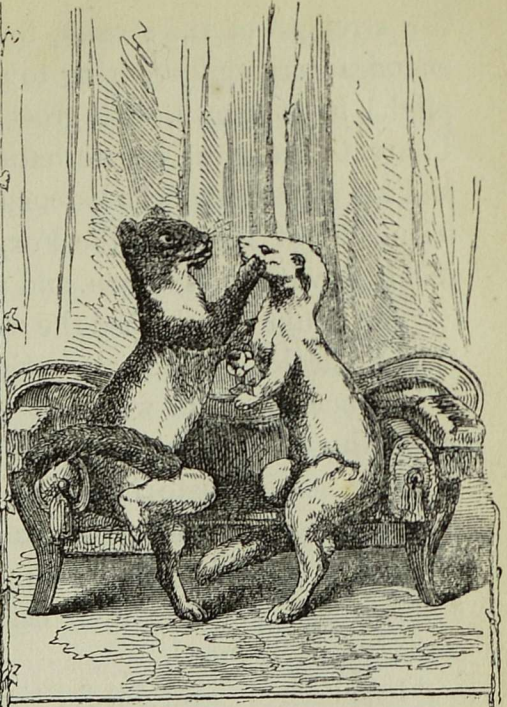
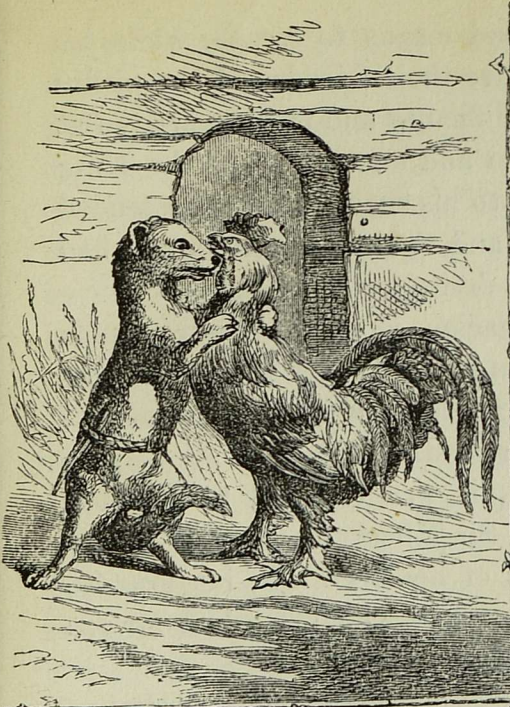
Loud and merrily laughed Reynard the Fox at this clever trick played upon his greedy enemy, and many were the jeers with which he greeted him.

"Is the honeycomb sweet to the taste, Sir Bruin? Are you making a good dinner? Take your time, I earnestly intreat you, that your digestion may not suffer from over haste. Where is now your wonderful sagacity, friend Bruin, and the experience natural to your years? You look for all the world like a thief in the pillory! Will no bail be taken?"

With these and sundry other remarks of the like nature did Reynard the Fox treat his discomfited victim, when suddenly he espied Landford, whom the roaring of Sir Bruin had aroused, approaching hastily the spot, when he retreated to a short distance to watch the end of this adventure.

Great was the surprise of the carpenter on seeing who was held fast in the cleft of the tree; and raising his voice, the villagers came running towards him, armed with all kinds of domestic weapons, with which they belaboured poor Sir Bruin so lustily, that he lay for a time insensible; but, summoning all his strength, with a sudden spring he extricated himself from his persecutors, not, however, without leaving his ears and a portion of his skin in their possession as trophies. The terror depicted on his countenance served him in this need more than his strength; and raising a hideous yell, he leaped, as well as he was able, among a crowd of female spectators, and plunged into a deep river which ran adjacent, and into which numbers of the women, in their endeavours to avoid him, also fell.

This was a lucky incident for Sir Bruin, who, swimming in



the strength of the stream, found means to escape, while his enemies were endeavouring to save their friends. In a pitiful plight, he at length, with great difficulty and fatigue, arrived at Court, to the great consternation and amazement of the King and his attendants, who listened to his account of the pretended friendship of Reynard the Fox, and the consequences that had resulted, with indignation, and a desire for vengeance.

“Sir Bruin,” exclaimed the sagacious monarch, “your wounds shall be healed by the retribution we will exact from your perfidious enemy. But we must exercise caution; for what can strength avail against treachery and stratagem?”

After some debate in council, it was resolved to summon Reynard the Fox once more, and Sir Tibert the Cat was chosen for this commission, on account of his keen wit, his gravity, and wisdom, and the high esteem in which he had always stood with Reynard.

“I feel deeply grateful for the high opinion your Majesty has been pleased to express of me; but I intreat you to appoint some other creature to execute this task, as I am in profound grief at the death of my intended son-in-law.”

“Ah!” said the King; “how did that happen?”

“If your Majesty will deign to listen to the sad story, I shall narrate it briefly.”

The King assented, and Sir Tibert thus proceeded:—“Your Majesty has seen my daughter Paulina, who had many admirers, and one in particular, Mr. Longtail, a schoolmaster, who had heard her sing at a tea-party, given by some cats, her relations, and from that moment had lost his peace of mind.

“At his request, his uncle, Mr. Sharp Weasel, called upon me, and entered at once upon the subject of marriage. The settlements of course occupied our first attention; and after these were completed, arrangements were made, and invitations sent for the wedding. The messenger first called upon Jack Hare, an old acquaintance of our family, and he was so delighted at

the news that he gave an entertainment, and led off the ball with great spirit; but unfortunately slipping, he sprained his foot severely, and was obliged to send word he could not attend the wedding.

“The messenger next met Ensign Squeaker and Miss Rose, and delivered his message; but they replied coolly, ‘that having themselves to pass through the same interesting ceremony shortly, they had no time to attend to other people’s weddings.’ This ungracious speech, however, met its reward; for a few days afterwards the Ensign was imprisoned for some offence, and kept there on bread and water for a few months. The Dormice were next applied to; but it appeared that the graces of Paulina had produced a disastrous effect among them; for, on some trifling difference of opinion with respect to her, two of the principal Dormice had fought a duel, and were killed. This sad event of course prevented the attendance of the others. About this time, also, an accident happened to Mr. Longtail himself; for whilst teaching by cane a rule of arithmetic to one of his pupils, an obstinate Rabbit, he struck his own foot so severely that he could no longer walk. The marriage was therefore postponed, which vexed him greatly.

“On hearing this news I felt much affected, but was somewhat consoled by a visit from Mr. Bantum, who came to propose the settlement of a long-contested law-suit between us, that had been very expensive to him, and he was very glad to come to terms, and so get out of the difficulty.

“Of course Mr. Bantum was invited to the wedding; but not wishing to renew acquaintance with Mr. Polecat and Mr. Stoat, whom he considered would be present as relations, he declined the pleasure. Two Frogs from a neighbouring pond were next asked to the bridal feast; but the messenger found them on the point of ‘going a wooing themselves,’ one being already equipped with his parasol and walking-stick, while the other was under the barber’s hands. These Frogs were, however, conceited fops, and replied saucily, ‘they would

come when they had nothing better to do.' Unfortunately for them, their wooing trip was soon changed into a woful one; for, while crossing a brook, a duck, that was too near, swallowed them up.

"To all these sad accidents was now added the serious illness of Longtail, whose foot had gradually become worse. Mr. Ferret, the physician, who had successfully attended a daughter of Mr. Sharp Weasel, was now sent for; but it was in vain, for poor Longtail died under his care.

"This has been a serious blow to Paulina; and she has in consequence given up all intention of marrying. I am therefore desirous of remaining at home, to console and protect her."

"Be satisfied and obedient," replied the King, after Sir Tibert had finished his story; "I shall take especial care of Paulina in your absence. I require prudence in this case;—craft against craft. I have full confidence in your wisdom and integrity, and that you will not, like Sir Bruin the Bear, neglect your public duty for the gratification of your own desires. Proceed, therefore, on your mission!"

Sir Tibert the Cat accordingly set out for Bramblebrier Castle, proceeding cheerfully on his road, until he happened to see a magpie flying on his left side, which, as he was somewhat superstitious, he took as an omen of ill success, and his spirits were slightly depressed in consequence. Arming himself with better hope, however, he soon arrived at his destination, and was rejoiced to find Reynard the Fox at home. He found that worthy seated at the gate of his castle, busily occupied in making up his accounts, with an open ledger before him, and several pieces of money, which he was regarding with a look of great sagacity and satisfaction, having probably obtained them by some clever exercise of his wit and ingenuity.

Reynard received Sir Tibert with great politeness and complacency of manners; and after the ceremony of greeting was over, the latter warned his host of the imminent danger he was

likely to incur if he did not speedily make his appearance at Court, which point he greatly urged and recommended to him, adding that his Majesty the Lion was in great wrath at his treatment of Sir Bruin the Bear, and his rebellious defiance of the last summons sent to him. Reynard, being a clever reasoner, argued very learnedly for his own case, and expressed himself extremely proud of the honour conferred upon him by the King, in sending his cousin Sir Tibert, without at once proceeding to violence; he further admitted that it was his bounden duty to wait upon his Sovereign, and that he would accompany Sir Tibert as early in the morning as he might think proper; excusing himself for not setting out instantly, from having a weakly stomach, in consequence of partaking rather too freely of mice the preceding evening,—a delicate food, Reynard added, but new to him, although it abounded in a neighbouring farm.

Sir Tibert raised his ears at this information, and owned that this was a dish to which he was exceedingly partial. He was therefore soon prevailed upon to remain at Bramblebrier Castle until the morning; and it was agreed, as he suddenly felt himself hungry, that they should at once proceed to the barn, where he could indulge his appetite at leisure.

With an impatient step Sir Tibert trotted gaily forward, conversing very sociably with Reynard, although his thoughts were intent on the delicacies in prospect. They soon reached the spot, and approaching a hole, Reynard politely invited his companion to enter. Sir Tibert, not to be outdone in ceremony, requested the other to take the lead, to which Reynard would by no means consent, urging that he could not treat a Cat of his dignity with such ill manners.

After some good-natured scruples about precedency, Sir Tibert yielded, and boldly entered the passage—but, alas! to his cost; for he was caught by the neck in a noose placed there by the farm-people to entrap Reynard himself, for having stolen a fat hen the preceding night. The sly Fox, however, had

watched their movements, and determined to profit by it in ensnaring the Cat.

With a chuckle of satisfaction at the success of his plans, Reynard returned to Bramblebrier Castle, to recount the story to his wife and children, who were exceedingly diverted. Meanwhile, the loud cries of the Cat roused the inmates of the farm, who, rushing upon the defenceless Sir Tibert, struck him until they broke the cord in which he hung, and he fell to the ground insensible. Happily for the Cat, however, a heavy blow, intended for him as he lay sprawling, alighted upon the shoulders of one of his antagonists, which turned the fury of the battle from his quarter, and allowed him an opportunity of retreating, which he did in the best manner he was able, halting and tumbling on the way, until he reached the Court (having lost an eye in the battle), where he laid his complaint of the treacherous Reynard.

The indignation of the kingly Lion and his Privy Council, on hearing of this additional outrage committed by the Fox, was beyond all bounds. A detachment of troops was on the point of being despatched to besiege Bramblebrier Castle, and bring its rebellious ruler, alive or dead, to the royal presence, when Grimbard the Badger, Reynard's nephew, craved an audience of his Majesty, and engaged to overcome his uncle's obstinacy, and lead him to Court. After some difficulty, permission was granted, and Grimbard took his departure.

On arriving at the Castle he found his uncle and aunt sporting with their cubs; and after an affectionate greeting, he strongly entreated Reynard to obey this, the third summons of his Sovereign, assuring him that, in case of refusal, there would only be one day between him and ruin; and he doubted not, through his uncle's wisdom and discretion, and the interest of his friends, he would triumph over all his enemies. After some further observations, Grimbard the Badger gained his point, and Reynard was induced to comply. "Remember, however, nephew," he said, "it is only a feeling of patriotism

and loyalty that urges me to this decision. I will go, not so much to answer for my offences, as to convince the Court how greatly they stand in need of me in the council-chamber; for the country is going to ruin with mismanagement, and I am the only one who can save it."

With these words, taking leave of his wife and cubs, Reynard the Fox set forward with Grimbard his nephew; and having arrived at Court, he was immediately arrested by orders from his Majesty the Lion, and a Council was summoned to try his case. Numberless complaints were brought against him by almost every beast and fowl of the forests and lakes; and foremost among his accusers were the Wolf, the Bear, the Cat, the Ass, the Camel, the Goose, the Cormorant, the Rook, the Coney, the Weasel, the Sheep, and others. A mass of overwhelming evidence was offered in support of their charges; and Reynard, after being cautioned against saying anything that might criminate himself, was called upon for his defence. Rising with an air of injured innocence, the Fox thus commenced his discourse:—

"Most gracious Sovereign, although I stand as a criminal in your royal presence, I can safely say that a more loyal bosom than mine does not exist, nor is there a heart in which innocence is more firmly seated. It is true, I have not the graces of speech, nor the arts of exaggeration, displayed by those immediately attendant upon your Majesty; but where there is no guilt, reason must follow the plainest words, and upon this I rely. I once was gay and happy, too, at Court; I dwelt in the sunshine of your royal favour, and stood fair to obtain the highest preferment, until Envy, jealous of my good fortune, drove me from thence, and made me trust to my own resources for a livelihood. That these were sometimes doubtfully employed, I must confess; but Isgrim the Wolf, who was then your treasurer, first taught me how to steal. My thefts were trifling when compared with his: mine he would share, however; but always kept his own."

"Your Majesty," exclaimed the Wolf, darting forward with fiery eyes, "surely will not believe this monster of deception?"

"Peace, good Isgrim," returned the Lion, addressing the Wolf; "leave me to manage this affair. As for you, Reynard, I know you well; you are a dissembling traitor."

"My liege," replied the Fox, "had I been a traitor I should not have been accused as I am at the present time. The crimes of which I am charged are but the outpourings of their revenge who seek my ruin. If I have at any time done wrong, it is not in my natural disposition; for in my youth I was noted for my tenderness, having sported with the lambs whole days together without injuring them, until at length—oh, dire disaster!—unhappily I bit one. The tempting morsel had so sweet a relish that I have never since been able to resist a liking for the same flesh. The sad remembrance of this circumstance draws tears from my eyes. Your Majesty will forgive me for betraying such weakness."

"Our time is not to be wasted in this manner," exclaimed the Lion, angrily; "keep to the point, and answer the accusations brought against you."

"Your Mightiness shall be obeyed," replied Reynard, bowing low; "and first, I would ask the Wolf whether he has not, in conjunction with Sir Bruin the Bear, concerted measures to remove your Majesty from sovereign authority, and raise the Tiger to the throne?"

"My Lord!" exclaimed Sir Isgrim the Wolf, bitterly, "is it possible that your Majesty could for one moment believe the falsehoods of this ever-deceiving Reynard? He is a wretch of the deepest dye, covered with crime, who has scoffed at your Majesty continually. For my part, I am glad he is here in your presence, where I shall ring him such a peal, that all the untruths he can invent shall not bear him out with safety. It was only last winter that he played a trick upon my wife which shows his evil nature. It chanced that they met near a lake, and after some civil discourse, he persuaded Lupina that he

could teach her a very singular manner of catching fish with her tail, by letting it hang like an angle in the water for some time. 'In this way,' said the arch deceiver, 'so many fish will collect together, that a basket might be filled with them.' The silly fool, my wife (supposing that what he said was true), went to the water-side, and putting her tail in the stream, she kept it there patiently, expecting that the fish' would come; but the weather being sharp and frosty, the tail became frozen in the ice, and she could not pull it out. While the villanous Fox stood grinning beside her, and asking Lupina whether she felt cold, I passed by accidentally, at which the rascal scampered away, laughing heartily at his joke. My first impulse was to follow and chastise him; but the cries of my wife withdrew my attention from him, and he escaped. With a world of labour, heaviness, and sorrow, I broke the ice about her; and, despite of all my efforts, she was obliged to leave a portion of her tail behind her; and, indeed, we both barely escaped with our lives, for the people of the neighbourhood, being alarmed, came upon us, armed with thick sticks, and so fiercely assaulted us, crying, 'Slay them! slay them!' that I never was in greater danger. One among the rest, stronger and swifter of foot than the others, hurt us sorely; and had not the night befriended us, we had never escaped with life."

"So ho, culprit!" exclaimed the Lion; "this is another of your pranks, of which we were not before acquainted. What answer can you make to this additional crime in your black calendar?"

"Your Majesty has been again deceived," replied the Fox, with assurance: "the story is altogether different from what really occurred. It was I who found the Wolf's wife with her tail in the frozen water; and while endeavouring to extricate her, Sir Isgrim arrived. I appeal to the lady herself for the truth of this."

At these words, Lupina, the wife of Sir Isgrim, came forward; and glancing with indignation at the Fox, she cried,—

“False Reynard! you well know my husband has spoken truly. But this was not the only time I have experienced trouble at your hands. No doubt you forget how you treated me at the Well, which has two buckets hanging on one cord, and running through one pulley, so that as one descended the other went up. I remember your getting into one of these, and falling to the bottom of the well, to the danger of your life. Hearing your cries, I ran to the well in great haste, and heard you, as I thought, sighing and moaning below. I inquired what you were doing, and you replied that you were fishing, and invited me to leap into the bucket at the top, and see what was going on. Little dreaming of the trick, I did so; and being heavier than you, I fell quickly to the bottom, while you mounted as quickly in the other bucket to the top. And when I was angry at this trick, you said, ‘Never mind, Lupina; this is but the way of the world,—so fast as one comes up, another must go down;’ and with these words you leaped out of the bucket, and ran away, leaving me at the bottom of the well, where I remained a whole day, pining with hunger, and shivering with cold; and before I could extricate myself, receiving so many blows that my life was in great danger.”

“You must be aware,” returned Reynard, addressing Lupina, “that although the blows were painful, yet I preferred that you should undergo them instead of myself, as you were stronger and better able to bear them than me. Besides, you were more than repaid by the wisdom and experience this affair taught you, which was—that you should not trust either friend or foe, when he persuades you to do that which he himself avoids; for Nature teaches us to love our own welfare, and he who does otherwise deserves a cap and bells for his folly.”

“Your Majesty,” said Dame Lupina, addressing the Lion, “will see how artfully this rascal Reynard jumps over all his bad actions, and blows with every wind to serve his own purpose. Many other such perfidious tricks he has played on

us, and my husband may ascribe to him the loss of one of his ears."

"Nay, Lupina," interrupted Reynard; "do not abuse his Majesty's condescension with misstatements. It is *I* who should mention that circumstance, as I was nearly falling a victim to the ingratitude of your faithless husband. If I am indulged with the permission of your Mightiness, I will relate how it happened."

The Lion happened to nod at this moment, during one of the drowsy moods to which he was subject, and which will account for his surprising tranquillity during this trial; the action was construed into a sign of assent to proceed, and the Fox, after clearing his throat, continued:—

"Upon a certain time, the Wolf came to me into the wood, and complained that he was exceedingly hungry, although I never saw him looking better fed in my life—but he always was a dissembler, and will ever remain so; at which I, taking pity upon him, said that my appetite likewise required appeasing. So away we went together, until we came to the foot of a hawthorn tree, where there was a hole covered over with brambles. Hearing a noise within, I told the Wolf to enter, and try if he could get anything for our mutual profit (for I felt persuaded something was therein); but he refused to do so upon any consideration, until he knew for certainty what was inside; and he entreated me, who, he said, had art and wit enough to save myself from any danger, to do so, promising to await my coming out, and beseeching me to make haste, as he was impatient to know the result.

"Thus he persuaded me, poor silly beast that I was, to be foremost in this hazard, while he remained without in safety,—a no small act of friendship on my part, for I would not, at any cost, undergo the like danger again. But to proceed: I went into the hole, and found the passage dark and intricate, until at length I observed a light, which shone from the other side of the hole, and by which I discovered a great Ape, with eyes

sparkling like fire, her mouth furnished with long teeth, and her finger-nails as sharp as thorns. I at first took her for a baboon, for a more dreadful beast I never saw. By her side lay several of her children,—stern of countenance, and cruel, like herself,—who, seeing me advance, gaped with open mouths, as though they would devour me. I was struck with amazement, and wished myself far away; but nothing now remained but to extricate myself in the best manner I was able; and thinking a few gentle words would serve me best in this need, I accosted her, saying, ‘Good aunt, bless you and my fair cousins, your charming offspring. They are truly the fairest children that eyes ever beheld; they surpass in beauty, and look indeed like royal infants. Truly, aunt, I am greatly pleased with this increase of glory to our family. I could not forbear coming to pay you a visit.’

“She replied: ‘Cousin Reynard, thank you for this friendly call; you are exceedingly welcome. It gives me great pleasure to hear of the high esteem in which you are held throughout the forest for your wit and judgment, integrity and rare principle. I shall be happy, cousin, if I can prevail on you to superintend the education of my children, that they may learn from you how to thrive hereafter in the world.’

“I was, indeed, pleased to hear such language from her, which no doubt was occasioned by my having called her aunt at first, although she was of no kindred to me. By this means I flattered the voracious monster. I added, also, that my life and fortune were at her command, although I heartily wished myself far enough from her at that very instant. I pitied Sir Isgrim the Wolf, who was waiting without all this time, pinched with hunger; and offering to take my leave, under pretence that my wife was impatiently expecting my return, the Ape said, ‘Dear cousin, you must not depart until you have eaten something; I shall take it most unkind if you attempt it.’

“Then she took me into an inner room, where there was such

a great store of venison, and a quantity of all kinds of birds, that I wondered whence they could all be brought. When I had satisfied my hunger, she courteously presented me with a haunch of venison for my wife, insisting that I should carry it home, and which, though much ashamed, I was compelled to do. I then took my leave, after many entreaties to call often, rejoicing greatly that I had fared so well.

“Coming to Sir Isgrim, who lay on the ground without, groaning piteously, I inquired how he fared. ‘Extremely ill,’ he replied: ‘so ill, indeed, that without some meat I shall presently expire.’ In compassion, I bestowed upon him the portion intended for my wife, by which his life was preserved; but how he thanks me for it, you are all witnesses. He had no sooner devoured my venison, than he inquired what I had seen in the hole. ‘I am,’ said he, ‘more hungry now than ever, for this small morsel has but whetted my appetite.’ I desired him to enter, where he might find plenty, for my aunt and her children lived there, and if he would say a few flattering words to them, they would assuredly treat him well.

“I thought, your Majesty, that this warning was sufficient; but wisdom will never harbour in the mind of a barbarian, who despises the advice given to him. Thus it was with Sir Isgrim, who entered the hole, and finding the Ape not disposed to be ceremonious, began to abuse and revile her, until she rushed upon him, with her children, and scratched and bit him so severely, that the blood ran down in streams; so that he quickly made the best retreat in his power. He came out, indeed much bitten and bruised, leaving one ear behind as the penalty of his want of manners.

“Thus, my liege, I have told your Majesty how Sir Isgrim came by his red nightcap, which he cannot deny.”

This story raised a hearty laugh at the Wolf’s expense, in which the King joined; for he had opened his eyes and understanding in time to hear the disaster at its close. The case against Reynard the Fox was, however, too grave to be set

aside, and the Lion accordingly prepared to pass sentence upon him, when the criminal came forward before the throne, and begged to say a few words.

"Mighty monarch!" he exclaimed, "you are deceived. Your crown is in jeopardy."

"How so, rascal?" replied the King gruffly. "Remember, we are not to be frightened by false reports."

"It is precisely for that reason I would warn your Majesty against the wicked arts of Sir Isgrim the Wolf, and Sir Bruin the Bear, who are plotting with the Tiger to dispossess you of your sovereignty."

"How know you this, varlet?" inquired the Lion, with an angry wave of his mane.

"I will bring a witness, who shall unfold to your Majesty all the inventions of your traitorous favourites;" and with these words Reynard the Fox went among the audience, and returned, bringing Sir Keyward the Hare as his witness, and apparently admonishing him to be firm and decided in his behaviour.

"Sir Keyward," said his Majesty, "are you one of the Hares of Shotley Cover, that escaped the cruel massacre by their landlords, the Foxes of Hurstdale, some years ago?"

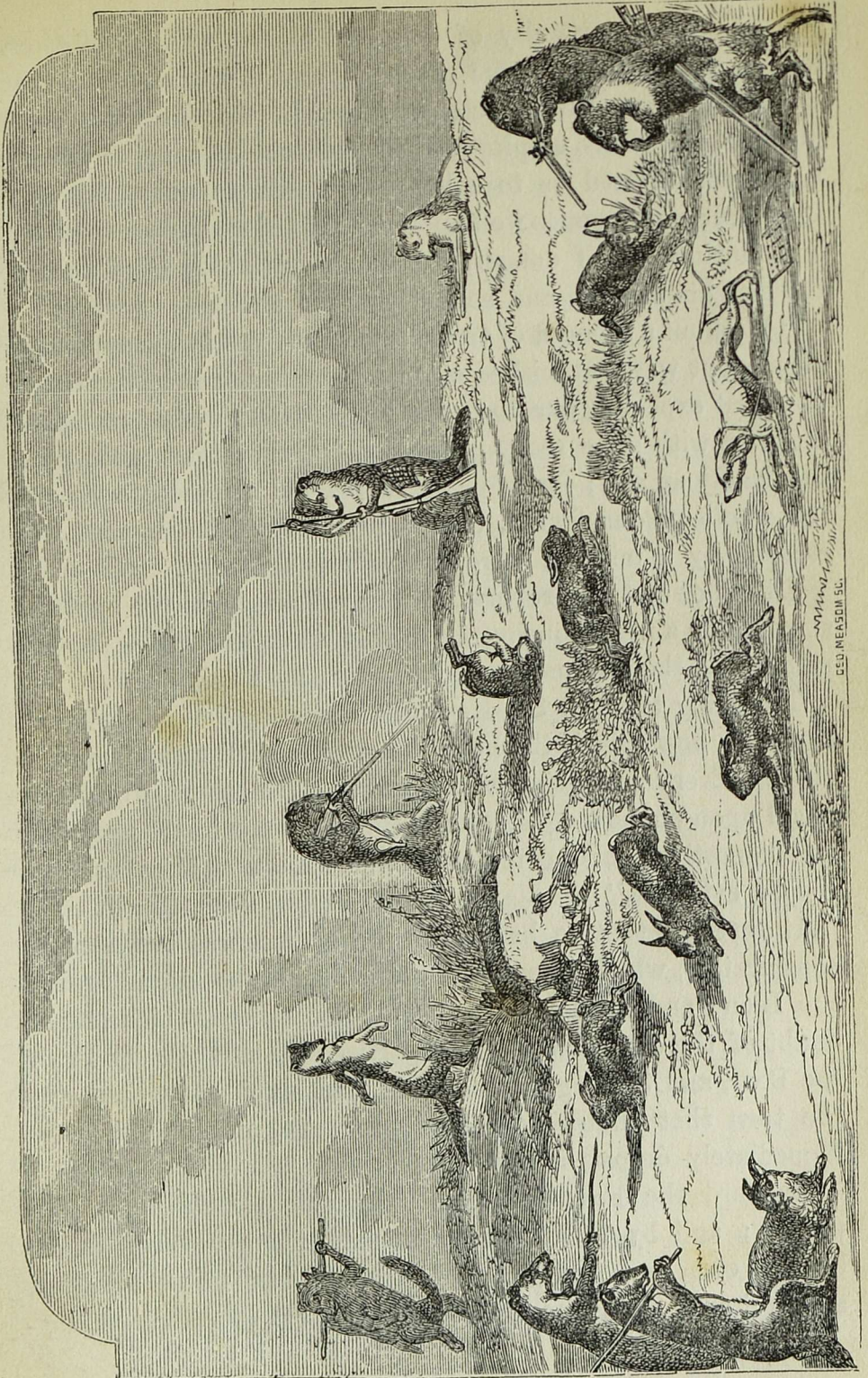
"I am," replied Sir Keyward; "the flower of our family perished on that occasion."

"I forget the particulars," responded the King; "pray narrate them."

Sir Keyward, without further preface, said:—

"Shortly after your Majesty's accession to the throne, the Foxes of Hurstdale held a council to consider the various complaints alleged against the Hares of Shotley Cover, their tenants, who, it was asserted, had extended their foraging excursions beyond the limits assigned to them, and had intruded on the private preserves of the Foxes themselves.

"These accusations were chiefly made by a jealous old Fox, who, for some trifling slight, had vowed vengeance against us,



W. H. WOODS
D. MERRISON & CO.

and lost no opportunity of doing us injury. Unhappily, on this occasion, his influence prevailed, and it was resolved that the whole colony should be exterminated. To effect this cruel purpose, the Foxes employed their habitual cunning, and, with fair words, invited us to a banquet, which we unsuspectingly accepted; our enemies well knowing, that if we had received the least intimation of danger, we should instantly have quitted the neighbourhood, and so escaped the snare.

“Without a thought of treachery, we arrived at the appointed place; but were astonished on perceiving, instead of the entertainment expected, our hosts the Foxes, drawn up in a menacing attitude, with guns ready primed, which they fired with, alas! too deadly an aim; for after an ineffectual attempt to escape, the whole of our family, except my brother and myself, who escaped by a miracle, were barbarously killed.

“The noise of the reports, however, brought to the spot the servants of a neighbouring farm, who made the Foxes pay the penalty of their injustice and cruelty, by slaying them.”

The King thanked Sir Keyward, and said, “We may learn from this how vain is the hope that wrong shall escape punishment. Every bad action we are guilty of to others, will surely recoil upon ourselves. Let us, then, endeavour to act uprightly and honestly in all we undertake. I shall now hear Sir Keyward’s evidence.”

It appeared that he had overheard a discourse between the conspirators, which clearly showed a dangerous league against the Lion; and he detailed other circumstances, which left no doubt of the criminality of the parties. Meanwhile Sir Bruin the Bear, and Sir Isgrim the Wolf, had slunk away on seeing the turn that affairs were likely to take, and officers were immediately despatched to arrest them.

Reynard the Fox was again triumphant, receiving a full pardon; and by this masterly defeat of his adversaries, he became even powerful. The King made him prime minister, and bestowed upon him several of the most lucrative employ-

ments in the forest, exhorting him, now that he was advanced in authority, to make a right use of the powers delegated to him, and to be faithful in his administration of justice. Reynard expressed his zeal and loyalty in the warmest terms, and promised his best services. By his orders the Bear was stripped of part of his skin, and the Wolf of his shoes, after which they were both set at liberty.

The Fox, now Lord Reynard, was in sufficient power to advance his friends and oppress his enemies. His apartments were crowded with submissive courtiers, and the King confided to him alone the most important state secrets. No measure was taken, nor conference held, without the sanction of the new favourite. His policy was to gain the good opinion of all parties, that he might carry on his designs of private speculation undisturbed; and he found means to become reconciled to the Wolf, the Bear, and the Cat, together with others who had withdrawn in disgust from the Court; so that at length, by promises and bribery, he had a numerous party devoted to his interests; for however he might be exalted above them for the present, he thought himself not altogether beyond the reach of adversity. His *levées* were more brilliant than those of the Sovereign, being attended by crowds of beasts of all ranks and denominations, pressing for employment, and whom he had the art to manage without giving offence to any,—smiling on one, whispering to another, giving his paw to a third; and happy were they upon whom these distinguished honours were conferred; while, inwardly laughing at their credulity, he kept them in suspense and expectation, by large promises and small performances.

But while thus sunning himself in the warmth of popular favour, the Fox was by no means indifferent to his own interests. Every occasion for filling his coffers was eagerly seized, without any regard to the means employed: and among others, it so happened that a Beaver and an Otter, who had been at variance about some fish they had taken, laid their several complaints

before Lord Reynard. The Otter began by setting forth the wrongs he had sustained from the Beaver, who, he stated, had been his partner in a fishery for many years. "All the fish we caught," said the Otter, "was stored up in common for the support of our families during hard frosts and severe seasons. It so happened that this excessive pinching winter, according to my usual custom, I came for some fish; but the Beaver, who was entrusted with the custody of it, denied my privilege or right to any, giving me not so much as one small fish. Therefore, I humbly entreat your Lordship to consider my present necessity, and to grant me justice."

The Beaver, on the other hand, accused the Otter of falsehood and detraction, affirming they had never been partners, although he confessed they had sometimes fished together, and afterwards made merry over their booty. He further complained, that the Otter knew not the true art of fishing, always making such a noise in the water, that he frightened the fish away: "but *I*, my Lord," continued the Beaver, "never leap into the water until I see my prey secure within my reach; so that, in this discreet manner, I catch at least double the number that he can; and is it, therefore, reasonable to suppose, my Lord, that I should join in company with one whose labours in our art are not equal to mine?"

"Have you any store of fish by you at present?" demanded Lord Reynard.

"No, my Lord," replied the Beaver.

"Believe him not, my Lord, he has a great quantity," interposed the Otter.

Seeing this conflicting evidence, Lord Reynard despatched two officers to the house of the Beaver, in search of fish, who finding, as the Otter had stated, a large mass stored away in a corner, seized it in the name of King Lion; and while one kept guard over the prize, the other informed Lord Reynard, who at once delivered a sentence of condemnation; and, bestowing one half upon the Otter, as his right in the quality of an

informer, sent the other half quietly home for his own consumption.

Soon afterwards, a great dissension arising between some Daws and Rooks, the cause was brought before Lord Reynard. It appeared that the Daws had fixed their residence in a high tower, built, and formerly inhabited, by men; and in process of time becoming very numerous, they almost tenanted every hole in the tower, right against which grew a stately row of elm-trees, and in the upper branches, at first a few, and afterwards many Rooks, built their habitations. These neighbours at length grew into acquaintance, and frequently visited one another with great familiarity, feasting together, and amusing themselves in every possible joyous manner.

This continued for some time, until at length one day, during a very severe and hard season, when all the old Daws were fled abroad, the Rooks, taking advantage of the occasion, agreed together to rob the Daws, being greatly tormented by hunger. Fearing, however, that the young Daws might betray them, it was resolved to kill them all, which was no sooner determined than executed; but while carrying away their dead bodies too hastily, they dropped a few. The Rooks having thus not only faithlessly massacred all the young Daws, but also robbed their habitations of every valuable effect, hastened home, and then flew about as unconcerned as if nothing had happened.

The poor old Daws, on returning laden with provisions for their young, were horror-struck on beholding the devastation committed in their homes, and suspecting the criminals, the stoutest of them flew over to their neighbours; and, coming unawares, beheld the torn limbs of their young strewed about. Others, flying downwards, saw their offspring lying dead on the ground. The Daws, greatly exasperated, were with difficulty restrained from taking instant vengeance on their perfidious neighbours; but the wisest among them recommended an application for redress to Lord Reynard.

To him, therefore, they croaked aloud their complaint, and

demanded justice. Lord Reynard summoned the guilty Rooks, who attended, and set forth by their counsel how basely the Daws had belied them:—that most of them had also gone abroad for provision for their families, and that, in their absence, the ambitious young Daws, trying to fly before they were able, had crawled out of their nests, and were killed by the fall—some of them, they said, were still to be seen dashed to pieces against the stones.

Lord Reynard remarked, how strange it was that all the young ones should be alike animated by the same desire of crawling out of their nests at once; and said he should suspect the veracity of the Rooks, unless they brought sufficient evidence of the truth of their assertion.

Some of the elder Rooks affirmed, that they could bring eye-witnesses of the accident that had happened to the young Daws;—and, on being requested to do so, they all came in a body to give evidence to that effect, after which they added, “Seeing they were killed with the fall, each of us took up a dead body and carried it home; and upon the return of these our kindred, who stand there arraigned, we told them the story. We also confess, that the old Daws, flying over, beheld many of us eating the dead bodies, and thereupon falsely declared to your lordship, that we had barbarously massacred them.”

Lord Reynard, who displayed the utmost attention and penetration on this trial, observing how the Rooks denied the fact, and yet confessed they had devoured the young Daws, pronounced them guilty upon their own evidence, and condemned them all to be strangled, as an atonement to the surviving Daws for the fatal massacre of their relations; which sentence was no sooner pronounced than executed. Their dead bodies were delivered over to the chief cook of Lord Reynard’s kitchen, to be made into pies for his Lordship’s especial consumption; while the houses and effects of the miscreants were given to Lord Reynard, who gracefully waived his claim to them in favour of the Daws. This piece

of generosity, however, was not the effect of pity, but because he did not know what use to make of them for himself.

Lord Reynard, as appears from the foregoing passage of his life, so contrived matters, that whichever way the scale turned, some profit should come to him; partly by bribery on both sides, by forfeitures of the condemned, by a kind of tax or gratuity out of places of emolument, and by the sole command of all the King's treasures. By these means he became exceedingly wealthy; and this was increased by large sums he received from the Tiger, with whom he carried on a treasonable correspondence. He had by degrees so insinuated himself into the good graces of the Lion, that all authority was delegated to him. Not a word of truth was suffered to reach the King's ears, so that he was quite ignorant of the real state and danger of his forests, upon which the Tiger was continually encroaching, although there were not wanting a few, more hardy than the others, who endeavoured secretly to enlighten the Lion on the subject; but such complaints, even if they were whispered about the Court, were always attributed to jealousy, and consequently treated with neglect.

Meanwhile the Tiger became more daring than ever, thinking of nothing else than becoming sole monarch of the woods, and making Lord Reynard the instrument of his ambition; but the cunning Fox kept a wary eye on his movements,—still, however, secretly encouraging him to rebellion, with the view of profiting by the confusion that might attend the deposition of the Lion, and raising himself to the throne.

Affairs were in this condition, when one day a messenger came to Lord Reynard from the Tiger, requesting a private interview, having matters of importance to communicate, and indicating a place of meeting in the neighbouring forest. Punctual to the appointed hour, Lord Reynard sallied forth, and soon reached the spot. The Tiger was already there, impatiently waiting his arrival.

“Good morrow, Lord Reynard!” exclaimed the Tiger

coaxingly. "This is, indeed, kind of you, and deserves my deepest gratitude. I have always remarked, that among the many virtues which distinguish your character, a readiness to oblige your friends is pre-eminent."

"Noble Tiger!" replied Lord Reynard, "I am afraid you overrate my poor services; but tell me in what manner I can be useful to you."

"You know full well," returned the other, "our causes of grievance against the Lion. Too long has he swayed with a tyrant spirit the destinies of the forest, and it is now time that he should relinquish the power he has abused, and leave it in worthier hands."

"What you say is true, friend Tiger," said Reynard; "but how do you propose to accomplish this desirable end?"

"By stratagem; in which your surpassing wit and ingenuity, Lord Reynard, will ensure success."

"Humph!" thought the Fox, "you are too polite to be sincere."

"We will invite the King," continued the Tiger, "to a grand feast in the wood, for which I have prepared a delicate young kid,—a food of which he is immoderately fond; and afterwards, to lull his suspicions, you shall propose an excursion in the neighbourhood. You can easily contrive to separate yourselves from the attendants, and then give me a signal, when I will come with Sir Bruin the Bear, Sir Isgrim the Wolf, the Baboons and Jackalls, and leave his Majesty no chance of escape."

"And how will all this benefit your humble servant?" inquired Lord Reynard.

"You shall have half the kingdom," replied the Tiger, in a soft voice, "besides keeping the other portion in good humour by your frolicsome pranks."

Some further conversation ensued between the two conspirators, who then separated, each one taking a different route, to avoid suspicion. This precaution, however, was needless;

for no sooner had they left the place, than up started Laprell the Rabbit, who, in his lurking-place near a thicket, had overheard all that passed.

“ Here is a pretty state of things ! ” he exclaimed, shaking his ears ; “ that cunning traitor, Lord Reynard, plotting treason with the grumbling old Tiger ! The prime minister endeavouring to overthrow his Sovereign, and then step into his shoes ; for as to giving place to the Tiger, I know Lord Reynard too well even to *suppose* such an act of good nature on his part. My duty is very clear. I will hence to the King, and let him know what mischief is hatching. A kid, indeed ! Who ever heard of a Tiger preparing such a dish for others, without expecting a daintier morsel in return ? ”

With a quick step and a thoughtful glance, as if he felt the immense importance of the secret he was carrying in his breast, Laprell the Rabbit proceeded to the royal residence, and craved an audience of the King. The result of this interview was the immediate arrest of the Tiger, who was sent to prison, and loaded with chains. Lord Reynard escaped with his usual good fortune ; but articles of impeachment were immediately drawn up against him, and, from the hostility evinced by the King and his Court, it appeared evident that the days of the rebel Fox were numbered.

It happened about this time that the Lion, whose sloth and indifference to public affairs had alienated the good will of a large portion of his subjects, perceiving, from the conspiracies formed against him, the necessity of vigilance and a more impartial dealing of public justice, roused himself from his torpor, and devoted himself with energy to remodelling the State. With praiseworthy patience, he would now daily sit in Council, and hear every case, however trivial, that was brought before him ; and it was his constant boast, that not one of these appeals had been left unsettled, and that so far his judgment had been unquestioned.

A trial, however, took place in his presence that sorely

perplexed him. The plaintiff and defendant in this case were a Monkey and a Serpent. It transpired that the latter, in attempting to get through a hedge, was caught by the neck in a snare which had been laid for the Hare. The Serpent, thus entrapped, gave himself up for lost, seeing no chance of escape. The Monkey, passing by at this moment, was earnestly entreated by the Serpent to help him out of this difficulty.

The Monkey, moved by his piteous complaints, agreed to release him, but upon the express condition, confirmed by promises and oaths, that the Serpent should never, at any time, do him injury by tooth or tail, or by any poison about him. The terms being agreed to, with many protestations of good faith, the Monkey released the Serpent from his critical situation. They proceeded together afterwards into the forest, and were for some time close companions. Food, however, becoming scarce, and the Serpent feeling acutely the cravings of hunger, he suddenly forgot all his promises, and rushing upon the Monkey, would have devoured him; but the other started aside, saying indignantly, "How is this, after what I have done for you? Have you so speedily lost all shame, that you show such black ingratitude?"

"Hunger cancels all obligations," returned the Serpent; "and therefore prepare yourself to die, for I must satisfy my raging appetite."

"This is, indeed, a hard case," said the other; "and the least you can do, in justice, is to let me live until we meet the next traveller, who shall judge between us, and decide the controversy."

The Serpent, after making many objections, at length agreed to this proposition; and they proceeded onwards until they met Tisselin the Raven, accompanied by Slimpere, his son. The matter was at once laid before them; and the Raven, without hesitation, decided that the Serpent should eat the Monkey, hoping that he might, with his son, get a share of the prey.

The Monkey, however, with that instinctive love of life

natural to animals as well as to man, objected to this hasty verdict. "How," he exclaimed, "can one who is a robber, and who lives by blood, be an impartial judge in such a cause?"

The Serpent, with great reluctance, yielded again to his entreaties, and agreed to refer the matter to the next comers. These happened to be the Bear and the Wolf, who were out together on a marauding expedition, and who, on hearing the case, and feeling little sympathy for the Monkey, also declared against him.

Upon this, the Serpent at once prepared to put his design into execution, and made a start at the Monkey, who, however, leaped aside, and again remonstrated loudly with him on his conduct.

"I am guilty of no injustice," returned the Serpent; "for twice has judgment gone against you in my favour."

"Yes," retorted the Monkey, "by such as are murderers, and whose profession of guilt allows them no sympathy for the unfortunate. To such animals, what are oaths and promises? How can they distinguish between justice and oppression?"

"A truce to these observations," exclaimed the Serpent, petulantly; "I can wait no longer."

"Then I appeal to the Court, said the Monkey; "let me be tried by the King, and I will submit to whatever his Majesty may decide."

The Bear and the Wolf, glad of an occasion to return to the Court, from which they had been dismissed for greedily devouring a choice stew which had been prepared expressly for the Lion's palate, concurred in opinion that the demand of the Monkey was just; and accordingly the Serpent, being obliged to yield, laid the affair before the Court.

Long did the royal Lion and his Council debate over this weighty matter; and the lawyers, employed on both sides, argued the case with great learning and logic; but the result was unsatisfactory. Opinions differed in such an equal degree,

that the King could not arrive at any decision, and was greatly perplexed in consequence.

Seeing how matters stood, the Ape, who had a secret liking for Reynard the Fox, judged the opportunity favourable for serving his cause, and accordingly presented himself before the Lion, and thus addressed him:—"Your Majesty, as I am given to understand, is in some doubt relative to a cause between the Serpent and the Monkey. I think I can point out a way to remove the difficulty."

"Friend Ape," replied the Lion, condescendingly, "you will confer a lasting obligation on me and the forest at large by so doing; for our honour, which is deeply concerned in the issue of this trial, is at stake."

"I will merely ask your Majesty, in case of success, to allow me one favour, which shall not in any way compromise your royal dignity."

"Your request shall be granted, whatever it may be; so let us at once hear your proposition."

"I would suggest, great Sovereign, that since no one in your Court is able to solve this question, that Reynard the Fox be sent for. Nay, start not, my liege," continued the Ape, observing the impression that the mention of the name had on the Lion; "I admit that he has committed great errors, and perhaps some few crimes; but who could rival him in intelligence?"

"I will never again listen to that arrant traitor, Reynard," replied the Lion, angrily; "he has betrayed me several times with his fine phrases and smooth tongue. If you cannot give me other advice than to trust to his deceitful lips, you had better be silent."

"Dread Sovereign!" returned the Ape, humbly; "I bow with all submission to your will; but I would nevertheless respectfully suggest——"

"Enough of this," exclaimed the Lion, angrily; "am I to be thwarted in my just resolves by an ill-timed friendship for

the recreant, Reynard? Never! Mercy were lost upon the traitor! Away!" and, with an imperious gesture, the monarch of the woods waved the Ape aside.

Fortune, however, which seemed particularly to favour the cunning Fox, came to his aid, at this moment, in the form of a diversion, which caused some commotion in the assembly. How this was occasioned we must now inform the reader.

The Tiger, as we have already stated, was a competitor with the Lion for the empire of the woods; and not being able, by his own prowess, to overcome the powerful monarch, he had insidiously used every effort to corrupt the immediate friends of the Lion; but to the honour of the four-footed race generally be it said, that none were found willing to become the instrument of perfidy, with one exception, and this was the Wolf, whose ruthless propensities were always active and insatiable.

By the promise of a large share of plunder, and an eminent position at Court, he had been gained over to kill the Lion; and he had seized the present occasion to effect his purpose, trusting to escape in the confusion that would arise. Accordingly, he had stolen with a wily step behind the tree, against which the Lion was leaning, and had raised his paw to give a fatal blow, when the Ape, who had been watching his movements with suspicion, rushed forward, and hurled him with great force to the ground. The Wolf, however, though stunned by the fall, was uninjured; and, in a moment regaining his feet, he retreated quickly into the woods. Here, being well acquainted with every recess and covert spot, he set pursuit at defiance.

We will return to the assembly of beasts, who were greatly scandalized at the turbulent conduct of the Wolf, and congratulated the Ape on the vigilance and courage he had shown in the defence of their King. The Lion, who, throughout this trying scene, had not evinced the slightest feeling of fear, was loud in his expressions of gratitude to the Ape, who modestly attributed his timely interference to the dictates of duty.

“If, gracious monarch, you deem this simple action worthy of your condescending regard, I would fain draw from thence an inference in favour of Reynard the Fox.”

A gloom settled upon the countenance of the Lion at the mention of this name, hateful to his ears; and a struggle between dislike for the Fox, and a sense of obligation to the Ape, produced some indecision.

The Ape, however, by dint of expostulations and entreaties, prevailed upon the King to send for Reynard, who was accordingly brought into the royal presence in custody of two sturdy Hounds, who, knowing his sly habits, kept a watchful guard over him. The prisoner gazed quietly around him, with a look of contempt for the sycophant courtiers who crowded near the throne; he also met the menacing glance of the Lion with eyes flashing bold defiance, and appeared utterly indifferent to any ill opinions formed against him by the beholders.

“Culprit!” exclaimed the King, addressing Reynard with a stern countenance, “had we acted in strict justice, you had been long before this swinging from a tree; for such punishment your perfidy merits. We have, however, delayed your fate, in order to give you time to repent of your wickedness; and for this act of clemency we require from you certain explanations, the subject of which will be read to you by the Clerk of the Court. By returning a faithful answer, it will be a trifling compensation for past misdeeds before you die.”

A smile of satisfaction crossed the features of Reynard the Fox at this address, which he thought left some chance of escape. Concealing his joy, however, he listened with becoming gravity to the reading of the case between the Serpent and the Monkey, and after considering a few moments, replied thus:—

“I do not wonder that your Majesty and this Worshipful Court have been uncertain what judgment to render on this occasion, for it is one of extreme importance; and before I come to any conclusion, I should like to see exactly the

manner in which the Serpent was ensnared, and what extent of danger he incurred thereby."

The Lion, approving this suggestion, proceeded, accompanied by a party of inspection, with Reynard the Fox, the Monkey, and the Serpent; and the latter was placed in the same situation in which the Monkey first discovered him. The Fox, then turning to the King, observed:—

"It is now clearly evident, your Majesty, that both parties being in the same state as they were at their first meeting—the Serpent in a dilemma, and the Monkey a spectator of his pain—there is no obligation as yet on either side. Therefore, if it be your royal pleasure, I would suggest, that if the Monkey will again unbind the Serpent upon the same oaths and promises as were formerly made by the latter, he may do so but if he thinks that hunger, or any other inducement, may incite him to break his faith, then let the Monkey go on his way, leaving the Serpent as he found him at first, for that is the best punishment for ingratitude."

"Bravo!" cried the Ape, approvingly, shaking Reynard by the paw, and flourishing his tail with enthusiasm. The cry was caught up by several other members of the Court, who could not forbear admiring the singular penetration and dexterity of the Fox.

"Peace, my friends," exclaimed the Lion, rising with dignity, "and disturb not the course of justice with these unseemly clamours. You have," he said, addressing the Fox, "untied this knotty point with great wisdom, and, as some return, we will mitigate a part of your punishment. In consequence of your treasonable acts, it was intended that you should be hanged; we will now commute that sentence into imprisonment for life."

"If your Majesty will deign to consider the services I have rendered to the State——" commenced the Fox.

"And the crimes you have committed," returned the Lion, impatiently; "no! treason must be punished. Away to prison!"

“My liege,” interposed the Ape, “I have a plan, by which the safety of the country may be secured, and Reynard the Fox may, by repentance, have an opportunity hereafter of again employing his matchless talents for the good of the forest. I would suggest that your Majesty send him on a pilgrimage, the hardships of which will, no doubt, prove an equivalent punishment for his transgressions.”

A murmur of applause rose amongst the audience at this proposition; for although most of the attendants at Court had a great dislike to the Fox, and were jealous of his surpassing abilities, still there were none who wished his death. Accordingly, the amendment of the Ape was strongly supported, and the Lion, after some opposition, yielded his consent.

With a look of profound mock humility, Reynard took his leave, after receiving orders for the journey he was to perform, and the various penances he was to undergo. A guard was despatched with him a short distance, to see that he did not evade the execution of this decree; and Reynard set forth on his pilgrimage to Rome, first taking an affecting farewell of his wife and little ones, who had found a shelter in the house of a friendly Ape; Bramblebrier Castle having been razed to the ground by order of his Majesty.

With a stick in his hand, shaped into a cross, to signify his errand, Reynard proceeded onwards, and, as he passed through the various villages on his way, the inhabitants were much edified by observing his repentant and humble behaviour. But all this apparent humility was assumed, to disguise the real sentiments that were passing through his mind; for he was plotting, as usual, various plans of annoyance to his enemies, more particularly Laprell the Rabbit and Sir Chanticleer the Cock, for whom he had an especial dislike.

Unhappily for the former, an occasion soon presented itself for exercising the revenge harboured in the breast of Reynard; for it chanced that Laprell, who was fond of taking long

excursions, had been to pay a visit to the Hare, at his country house, where he had feasted with such enjoyment that he was compelled to return slowly, and was quite unable to support a long chase, even if self-preservation required it. In this condition, therefore, it was with a feeling of agony that he beheld Reynard the Fox approaching, and pretended not to observe him. Suddenly, however, trotting up to his side, the latter inquired affectionately after his health, and shaking his paw, appeared to be on the best terms with him.

“I know not how it is, friend Laprell,” said the Fox confidentially, “but I have always felt for you the sentiments of a father; indeed, I was observing to my wife but yesterday, that you were the only one about the Court for whom I had esteem, and I hoped I should soon be able to prove it to you.”

“Many thanks, Reynard,” replied the Rabbit, reassured by the friendly manner of the Fox, “for your kindness. Indeed, I have always been disposed to favour your interests, except in one unlucky instance——”

“Say no more, good Laprell,—say no more,” interrupted Reynard; “let the past be forgotten, and we shall be firmer companions in future.”

While thus conversing they had passed a small settlement of Bears, relations of Sir Bruin, whose former altercations with Reynard would have induced them to treat the latter severely; but, seeing him on such terms of intimacy with their friend, Laprell the Rabbit, they allowed him to pass on his way unmolested.

The cunning Fox had been prepared for this, and in consequence had treated his companion with great politeness; but no sooner was the danger passed, and the Bears away from all hearing, than he determined to gratify his revenge. Turning, therefore, to Laprell, he requested him, as he was troubled with a hoarseness, to turn up the earth, and see if there was not a bone, as he scented something thereabouts, and was exceedingly hungry, and at the same moment Reynard attacked

Laprell, and dealt him a fearful blow over the head with his cross, which had the effect of killing him, and he died without a groan. Having done this treacherous deed, the Fox dragged the body to a stream, and covered it with rushes.

But wickedness always meets its punishment, however artfully and secretly it is committed: and thus it was with the Fox; for the Hare, having heard that his friend had been missing from home, suspecting some accident, had searched far and wide, and at length discovered his remains, with a portion of the wooden staff broken and left behind by the Fox, who had forgotten to remove the pieces. This latter proof at once convicted Reynard, who was quickly pursued and taken prisoner. He was conducted, loaded with chains, and followed by a multitude of beasts hooting and mocking him, to the presence of the Lion, who, on hearing of this fresh outrage, was with difficulty prevented from tearing him to pieces on the spot with his own royal jaws. He, however, showered his indignation upon him in these words:—"False miscreant that you are! how dare you lift up your head, after thus abusing my generous forbearance towards you? What can you say in answer to the crimes laid to your charge?"

The Fox, not being able to reply, hung down his head, until, upon the King again demanding if he would speak before sentence was executed upon him, he arose and said:—"My liege, I have so many enemies, that it will be in vain to say anything contrary to what they affirm; and since I know I am to die, I here, before your Majesty, declare myself guilty of what is laid to my charge, and of other crimes also, for which I am sincerely repentant, and most humbly beg your royal pardon."

"Enough!" exclaimed the King: "Reynard, you shall die."

In the evening of the same day the Lion summoned a council, and it was resolved that Reynard should be hanged upon a tree that stood on the top of a hill, near which his Majesty had a cave, which served as a depository for several

valuable effects. In the morning the Fox was led out to punishment, the Lion and a large concourse of beasts being present. The Monkeys, who were charged with the office of tying Reynard, having nimbly climbed up the tree, were about to perform their duty, when the criminal begged leave to say a few words, and permission being granted, he made a full confession of his crimes; after which the Lion, who, with all the assembly, had attentively listened to every word, thus addressed him:—"Reynard, I have given a patient hearing to all you have unfolded, and I now perceive that, if you had been punished, as I intended, for your first faults, you would not have perpetrated such enormous outrages as those for which you are about to suffer. Therefore, for the future, in all other cases, no interest nor entreaty shall prevail with me to pardon those who deserve chastisement, for it is an abuse of mercy."

The King then ordered the Monkeys to perform their office; and in a few moments Reynard the Fox had paid the penalty of his manifold transgressions against the laws and repose of society. His effects became forfeited to the Lion, who magnanimously divided them amongst those persons who had been most injured by that notorious criminal.

For many years afterwards the spot where this tragical event took place was commemorated by the following inscription, cut in quaint characters upon the bark of an old tree, which stood upon an eminence commanding the forest; and these lines, of which the following is an authentic copy, will serve as a Moral for the whole of this wonderful and instructive history:—

HERE REYNEHARDE YE FOXE, A TRAYTOR SLYE,
 FOR CRUEL ACTES WAS SWUNG FULLE HIGHE;
 TAKE HEEDE ALLE YE THATTE PASSE THIS WAYE,
 FOR GUILTE WILLE HAVE AS SHORTE A DAYE.

ELECTRICAL PHENOMENA IN LIVING ANIMALS.

NOT only the metals and other solid bodies, but even very many liquids, when they come in contact with one another, or with solid bodies, show electric action. This is apparent, however, much more strikingly in the case of certain fishes, that possess the power of communicating at will electric shocks, more or less strong, to men and animals, and other bodies. This electricity, proceeding from a living animal body, like common electricity, can be used to charge a Leyden jar, to give forth a spark, presenting all the appearances produced by our artificial electrical machines.

One of the most widely known electrical fishes is the *torpedo*, or *cramp-fish*, which is found in the Mediterranean, in the North Sea, the British Channel, in the Atlantic and Indian Ocean, a singular animal, whose body has nearly the shape of a fiddle, and the soft flesh of which is no very agreeable dish. The ancients were acquainted with the power of this animal, by which it so benumbs fishes and other sea animals, that they become incapable of moving for some time,—a power employed partly in self-defence, and partly to secure prey.

When this animal is touched by the hand, an electric discharge is felt through the whole arm, producing a tremor and throbbing, and sometimes also a sudden shock like that of the Leyden jar. This effect, however, is not always felt upon contact; it evidently depends on the will of the animal whether it will use this weapon or not, and only when it is excited does it manifest its power. The electric action, of which this fish is capable, is evidently a compensation for a defect under which its body suffers in comparison with other fishes of the same species. Its soft body is not protected by a strong skin, or by those hard projections and spears with which the surface of

most fishes of the same kind is protected. Its movement in the water is rendered difficult by the weakness and shortness of its breast-fins. The cramp-fish is no active swimmer; it commonly lies in the sand or mud at the bottom. But its deficiencies in these respects are supplied by its peculiar physical power, by which it palsies, in the midst of their rapid course, the swiftest of its fellow-inhabitants of the sea, when they do not excel it too much in size.

This faculty depends upon a peculiar arrangement in the interior of its body. Just in the fore part of the body, near the neck, there lies on both sides, under the skinny exterior, a quantity of four to six cornered cells, about 1,200 in number filled with a mixture of gelatine and albumen. Strong branches of nerves are spread among these cells, which resemble honeycomb; and these nerves are the means by which the animal sends forth from the brain an electric influence into the solid and fluid parts of the cells.

The most powerful among the electrical fishes, thus far known, is the electric eel (*gymnotus electricus*), found abundantly in the streams and standing waters of South America. This powerful animal sometimes reaches the length of a man, and the thickness of a man's arm. Much as it resembles the common eel in other respects, it differs, apparently to some great disadvantage, in being very obviously marked with one defect: the long dorsal fin is wanting, and at the same time all those little muscles, by which, in other fishes, that fin is moved, are wanting also. This curious animal is deficient also in a body, the tail being the chief part of the length. Yet these defects are supplied by a faculty which it possesses, and which is more powerful than fins or muscles. Down the back, and on both sides, are found a countless multitude of little, irregular cells, which are formed by the sinewy skin running horizontally, and cutting them perpendicularly. These cells are filled with a thick gelatinous substance. Considerable branches of nerves are spread among these cells. It is this peculiar structure,

with which the great swimming bladders of the animal are happily adjusted, that imparts that strong electric power which makes it a terror to man and other animals.

The inhabitants of those countries, the swamps and pools of which abound with the electrical eel, dread the mysterious power of this fish so much, that they will scarcely venture, even for a large reward, to attempt to catch it, and when they undertake the enterprise, they go to work with the greatest caution. Their fear is not groundless. Powerful horses fall paralyzed, when they pass through water which the electric eel inhabits. This formidable animal places itself with its back under the body of the beast of burden as it swims or wades through the water, and gives out so powerful an electric shock, that the beast either sinks motionless in the water, and is drowned, or, if it reaches the land, stretches itself benumbed on the ground, and recovers its strength only slowly. Men swimming have also been destroyed in this way.

It often happens, therefore, that in those countries where the electrical eel is found, and where there are no artificial roads, and only here and there a bridge, the traveller is compelled to make a circuit, to avoid guiding his mules and horses through the water; for on such occasions these animals, with their burdens, and oftentimes with their riders, have been thrown down, as the electric eel, even when undisturbed, assaults all animals that enter its waters. As a venomous snake, however, by repeated biting, exhausts its venom so much that it becomes almost harmless, the electric eel likewise, by several discharges of its battery, becomes so weak, that one may take him without any fear of its strokes.

On this account, therefore, when persons wish to amuse themselves with catching these animals, they drive a number of wild horses, which may be obtained at a very cheap rate, into the water, that the eels may exhaust their power upon them; but even when the fish has become so weak that he swims with his body half out of the water, avoiding contact with the horses,

and seeking the vicinity of the shore, it is not wholly deprived of its electric influence. Persons unskilled in the hunt, by seizing the little harpoons which have been hurled at the eels, and which remain sticking in the prey, have experienced a shock exceeding that of the most powerful Leyden jar.

The effect of the shock of the eel is, as observers report, very different in different cases. It depends much upon the size and condition of the fish. When the animal is exhausted in a great degree, then its contact excites only a tremor in the nerves of the arm to the elbow, and a similar vibratory sensation has been frequently remarked as an effect produced by the cramp-fish. When, on the other hand, the animal is large and fresh, then the stroke which it communicates to the feet or hands that touch it is so severe through all the limbs and parts of the body, that the individual thus affected can hardly hold himself up, and for days afterwards he suffers from weakness and pain in his limbs, numbness in the head, and a feeling of general discomfort. When a net is used in catching the electric eel, and only one is caught of full size, and there happens to be caught at the same time a young alligator, perhaps half the length of a man, the alligator, and any other fishes that may accidentally be caught with the eel, are, when taken out, found to be dead, and only the eel, the destroyer of the rest, remains, though somewhat weakened, still alive.

All those experiments have been tried with these fishes, which go to show the essential agreement of their polaric action with common electricity. The electric spark has been seen, although in size and brightness less in proportion to the violence of the shock than the spark of a large voltaic pile. When the fish is touched with a rod of glass, or with the hand wrapped in silk, the glass and silk prove to be as good protectors as in the case of common electricity. On the other hand, the shock of the eel is communicated by metals in all its strength. The eel can give a shock from any part of its slimy exterior, but not from the interior of its mouth. The galvanic fluid, when acting

continuously rather than by a sudden shock, is more nearly related to the vital activity of the animal nerves than common electricity.

The same is much more strikingly true of the electric strokes of the fishes we have named, of the *tetraodon electricus* of the Indian Ocean, and the *silurus electricus*, which inhabits the Nile and certain streams of middle Africa. The excitement and manifestation of the electricity of these animals is communicated from the brain to the nerves, and depends entirely on the will. The electric eel, the most powerful creature of this sort, whose electric influence extends a considerable distance in the water, when kept in a vessel of water, and, in a manner, tamed, is able to give a certain direction to the shock, or to retain it altogether, making use of his power not every time he is touched, but only when he is excited. It often seems as if the electric fish, before it discharges a shock, first paused to ascertain whether the way was clear, for it sometimes places itself for a while in contact with the hostile animal, before the latter is made to feel the stroke. The weaker cramp-fish show still greater care and deliberation. It is the natural instinct of self-preservation that moves the animal to proceed with caution in the use of its electric power. When it is stimulated to a frequent discharge of electricity within a brief space, not only its electric force, but the very vitality of the creature is so exhausted, that death ensues. Of two electric fishes, it has been observed that by cutting in two the nerves of the electrical organ of one, and thereby destroying the connection with the brain, the animal thus treated could give out no more electric shocks, but it lived longer than the other, which was subjected to no such experiment, but only irritated to frequent discharges of electricity.

Another species of electricity, more nearly related, perhaps, to common electricity, is that which has been observed as peculiar to certain persons. In many individuals the hair, upon being combed or rubbed, gives out electric sparks; the

same is the case with the hair of the lion, the lynx, and other animals of the cat kind. In other persons, sparks are observed when the skin is rubbed, or upon the taking off of the garments. Theodoric the Great, and Charles Gonzola, duke of Mantua, are stated to have exhibited this peculiarity. Possibly the strange and rare cases of a sudden self-combustion that have been known, are to be accounted for in this way.

In regard to those pitiable diseases which flesh is heir to, happily not always incurable, as epilepsy, convulsions, &c., which resemble the effects of the Voltaic pile, or of common electricity, we are led to conjecture that the electric influence, connected with the nerves, ordinarily imperceptible and always equalizing itself, is in these particular cases obstructed in its healthy course, until, suddenly overcoming all obstruction, it pours itself with accumulated force over all the nerves of the body.

THE FIRST PREDICTION OF AN ECLIPSE.

To those who have given but little attention to the subject, even in our own day, with all the aid of modern science, the prediction of an eclipse seems sufficiently mysterious and unintelligible. How, then, it was possible, thousands of years ago, to accomplish this same great object, without any just views of the structure of the system, seems utterly incredible. Follow us, then, while we attempt to reveal the train of reasoning which led to the prediction of the first eclipse of the sun—the most daring prophecy ever made by human genius.

Man had already remarked that the moon's track in the heavens crossed the sun's, and that this point of crossing was in some way immediately connected with the coming of the dread eclipse. He determined to watch, and learn whether the point of crossing was fixed, or whether the moon, in each successive revolution, crossed the sun's path at a different point. If the sun, in his annual revolution, could leave behind him a track

of fire, marking his journey among the stars, it would be found that this same track is followed from year to year, and from century to century, with undeviating precision. But it was soon discovered that it was far different with the moon. In case she, too, could leave behind her a silver thread of light, sweeping round the heavens, in completing one revolution, this thread would not join, but would wind around among the stars in each revolution, crossing the sun's fiery track at a point west of the previous crossing. These points of crossing were called the *moon's nodes*. At each revolution the node occurred further west, until, after a cycle of about nineteen years, it had circulated in the same direction entirely around the ecliptic.

Long and patiently did the astronomer watch and wait; each eclipse was duly observed, and its attendant circumstances recorded, when, at last, the darkness gave way, and a ray of light broke upon his mind. He found that no eclipse of the sun ever occurs, unless *the new moon is in the act of crossing the sun's track*. Here was a grand discovery; he held the key which he believed would unlock the dread mystery, and now, with redoubled energy, he resolved to thrust it into the wards, and drive back the bolts.

To predict an eclipse of the sun, he must sweep forward until he finds some new moon which should occur while she is in the act of crossing from one side to the other of the sun's track. This certainly was invisible. He knew the exact period from new moon to new moon, and from one crossing of the ecliptic to another. With eager eyes he seized the moon's places in the heavens, and her age, and rapidly computed where she would cross at her next change. He found the new moon occurring far from the sun's track; he looked around another revolution; the place of the new moon fell closer to the sun's path, and the next year closer, until, reaching forward with piercing intellectual vigour, he at last found a new moon, which would

occur precisely at the computed time of the passage across the sun's track.

Here he made his stand, and he announced to the startled inhabitants of the world that, on the day of the occurrence of that new moon, the sun would expire in dark eclipse. Bold prediction! Mysterious prophet! With what scorn must the unthinking world have received this solemn declaration! How slowly do the moons roll away, and with what intense anxiety does the stern philosopher await the coming of that day which should crown him with victory, or dash him to the ground in ruin or disgrace! Time to him moves on leaden wings; day after day, and, at last, hour after hour, roll heavily. The last night has gone—the moon has disappeared from his eagle gaze, in her approach to the sun, and the dawn of the eventful day breaks in beauty on the slumbering world.

This daring man, stern in his faith, climbs alone to his rocky home, and greets the sun, as he rises and mounts the heavens, scattering brightness and glory in his path. Beneath him is spread out the populous city, already teeming with life and activity. The busy morning hum rises on the still air, and reaches the watching place of the solitary astronomer. The thousands below him, unconscious of his intense anxiety, joyously pursue their rounds of business, their circles of amusement. The sun slowly climbs the heavens, round, and bright, and full-orbed. The lone tenant of the mountain-top almost begins to waver in the sternness of his faith as the morning hours roll away. But the time of his triumph, long delayed, at length begins to dawn—a pale and sickly hue creeps over the face of nature. The sun has reached his highest point, but his splendour is dimmed—his light is feeble.

At last it comes! Blackness is eating away his round disc; onward, with slow but steady pace, the dark veil moves, blacker than a thousand nights; the gloom deepens, the ghastly hue of death covers the universe—the last ray is gone, and horror reigns. A wail of terror fills the murky air—the clangour of

brazen trumpets resounds—an agony of despair dashes the stricken millions to the ground, while that lone man, erect on his rocky summit, with arms outstretched to heaven, pours forth the grateful gushings of his heart to God, who had crowned his efforts with triumphant victory.

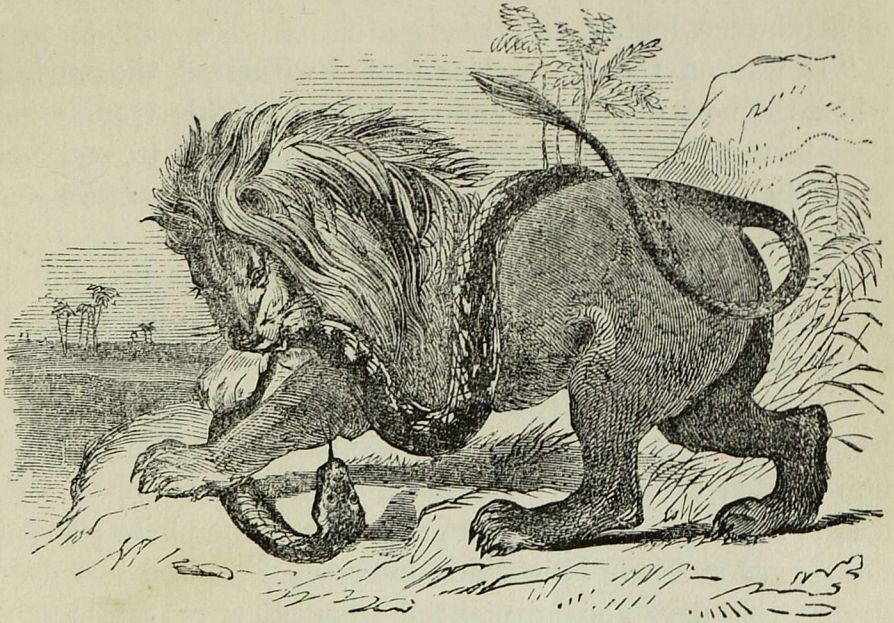
A thousand years roll by; the astronomer stands on the watch-tower of Babylon, and writes for posterity the records of an eclipse; this record escapes destruction, and is safely wafted down the stream of time. A thousand years roll away; the old astronomer, surrounded by the fierce but wondering Arabs, again writes and marks the day which witnesses the sun's decay. A thousand years roll heavily away; once more the astronomer writes, from amidst the gay throng that crowds the capital of Europe. Record is compared with record, date with date, revolution with revolution, the past and present together,—another struggle commences—another triumph is won. Little did the Babylonian dream that he was observing for one who, after a lapse of three thousand years, should rest upon this very record the successful re-resolution of one of Nature's mysteries.

THE LION.

OUR young friends are no doubt familiar with the habits and peculiarities of this noble animal, usually termed, from his strength and majestic appearance, the king of beasts. We shall not, therefore, tire them with needless particulars, but detail a few stories, in which his remarkable instincts and courage are conspicuous.

“Some years ago it was my fortune,” says an officer in the army, “to be attached to a party of the Cape Cavalry, encamped on the banks of the Orange River, in South Africa, for the protection of the boors on that extreme boundary against a tribe of savages who were then supposed to threaten an invasion of the colony. The occupation, I believe, was not recognized at

that time by Government. The character of the scenery was somewhat peculiar; vast plains or flats extended in all directions, bare and sandy, rarely presenting a green blade of verdure to the weary eye. These plains were enriched or intersected by ranges of low table mountains, whose sides and summits were equally divested of all vegetation; and in passing over the country, as you crossed the low ridge of some of those hills, a prospect of the same unvaried and barren extent was presented to the view.



“It was seldom we met with a human habitation, and nought enlivened the dreary scene, save the various species of antelope and quagga abounding in these plains, which, frightened at the appearance of man, ran off in every direction. At a distance they might have been sometimes taken for vast herds of sheep and droves of cattle. If a boor’s dwelling happened to be in the neighbourhood, it was always erected on the banks of some rivulet or spring, where there might be sufficient water for his flocks, and to water a few roods of land, that he might grow vegetables and

tobacco. In the drier seasons, however, these almost pastoral farmers were obliged to forsake their more permanent abodes, and betake themselves to tents, and, with their flocks, wander over the sandy waste in search of pasturage for their sheep and cattle. While encamped in these open plains, their folds were frequently disturbed by the midnight visit of the lion; and their only escape from his attacks was in the discovery of his retreat, and his destruction. His usual prey was the antelope; but the fleetness of these animals, or their instinctive precautions perhaps, gave them more security than the feeble defences of a crowded fold.

“It was on these occasions that I witnessed the mode in which the boor discovered and rid himself of his troublesome neighbour, as the officer commanding was applied to, and most willingly granted the assistance of a few men, whom we were delighted to accompany.

“The method by which the boors pursue the lion will be shown by describing the last hunt at which I was present. In every instance it was the same, and in three, successful, without injury to any individual of the parties. The north-east bank of Orange River, opposite our encampment, was totally uninhabited save by a few wandering bushmen. Vast numbers of antelopes and quaggas grazed upon the plains; and, in the rugged and bare hills which intersect them, the lion dwelt during the day, and at night descended, after considerable intervals, in search of food. I have seldom seen him in the plain during the day, save when, in the extreme heat of the summer, he might be found on the wooded banks of the river; but often during the night, when we bivouacked in the open plain, and the terror of the cattle and horses bore evidence of his approach, at dawn he would be seen winding slowly his way to the loftier summit of some neighbouring mountain. One might hear the thunder of his voice at the distance of many miles, while every animal shook with fear. A lion of huge dimensions passed the river, which at that season was low,

and carried off a horse, the property of a neighbouring boor. For some nights previous he had been heard in a hill close to the banks of the river, to which it was supposed he had again retreated on destroying his prey.

“The boors assert that the flesh of the horse is highly prized by the palate of the lion, but perhaps it is because that animal is their own most valuable property.

“It was proposed to cross the river the following morning, and trace him to his den, with the few boors we could collect, and a party of our men. We mounted immediately after sunrise, and with a large number of dogs proceeded to the mountain, every crevice and ravine of which we examined without finding him. Gorged with his late meal, he had perhaps, we thought, remained in the thick cover on the steep banks of the river, to which we then returned, and in passing over a narrow plain, a spot of ground was pointed out to us by an eyewitness where he had been seen to seize and devour a quagga some days before. The hard and dry soil was actually hollowed by the violence of the mortal struggle. The dogs had scarcely entered the thick bushy banks of the river, ere they gave tongue, and they appeared to advance in the pursuit as if the lion was slowly retreating. At times it would seem that he turned and rushed upon the dogs. We, however, could not dare to enter farther than the skirts of the jungle, with a finger on the trigger and the carbine half at the present. One single clutch of his tremendous paw unquestionably would have been fatal. For a considerable time the dogs remained silent, and we fancied we had irrecoverably lost him. With more and more confidence we examined the thicket, but without success, and were about giving up the pursuit in despair, when a Hottentot and boor observed his footsteps in the sand.

“The word was again to horse. The lion’s course appeared to be towards the mountain we had left. A friend, with a party of boors and soldiers, galloped straight up the nearest declivity, while I, with a smaller number, rode round a projecting

edge of the hill, into a deep ravine, to which he might have retreated. With my party I had been too late: he had been just brought to bay, as he was commencing his descent on the opposite side of the hill, but my friend delayed the attack until we should arrive to witness it; meanwhile the dogs amused him. The ascent by which we could reach the summit was steep and rugged, but our horses were accustomed to it, and with whip and spur we urged them on.

“Whoever has seen the African lion at bay will assuredly say sportsmen can never behold a more stirring scene in the chase. There he was, seated on his hind quarters, his eye glaring on a swarm of curs yelping around him; his dark shaggy mane he shook around his gigantic shoulders, or with his paw tossed in the air the nearest dog, apparently more in sport than in anger.

“The mode of attack was now arranged. The horses were tied together in a line, taking care to turn their heads from the direction where the lion was at bay, and likewise that they were to the windward of him, lest his very scent should scare them into flight. The retreat behind this *living* wall is the boors' last resource, if the lion should advance upon them, that his fury may fall upon the horses. Some of the boors are excellent marksmen, and the Hottentot soldiers are far from being despicable, yet many a bullet was sent, ere he was slain. Tired by the wounds he received, his claw was no longer harmless; one dog he almost tore to pieces, and two more were destroyed ere he fell. At each shot he rushed forward, as if with the intent of singling out the man who fired; but his rage was always vented on the dogs, and he again retired to the station he had left. The ground appeared to be bathed with his blood. Every succeeding attempt to rush forward displayed less vigour and fury, and at last, totally exhausted, he fell; but still the approach was dangerous. In the last struggle of his expiring agony he might have inflicted a mortal wound: cautiously approaching, he was shot through the heart; twelve wounds were counted in his head, body, and limbs. He was

of the largest size, and of the species called the black lion. We claimed the skin and skull—the bushmen the carcase, which to them is a delicious morsel; and the boors were satisfied with knowing that he would commit no further depredations on them.

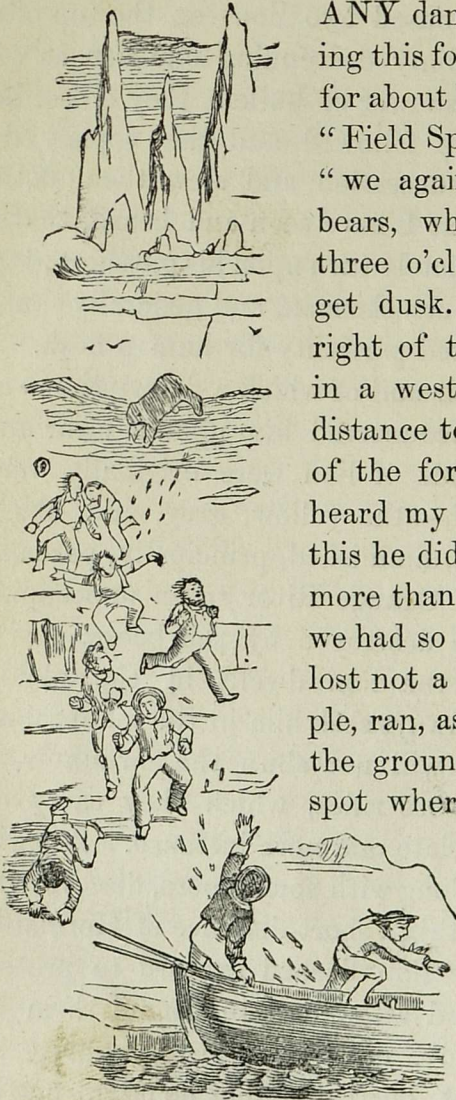
“On another occasion we roused two lions on the top of a low, stony hill. They were calmly descending one side as we reached the top, and, amid a shower of bullets, they crossed a plain to ascend another. We followed, and they separated; we brought them to bay in succession, and slew them both.

“It appears to me, from what I have seen and heard, that a lion, once wounded, will immediately turn upon his pursuers; but I am of opinion that he seldom attacks man, and generally shuns him, having none of the reported partiality for human flesh.

“In the district I described, and of which a description was necessary to show that we encountered him upon a clear and open ground, the various kinds of lion were originally very numerous, and of three kinds—the yellow, grey, and black. Their numbers are now much diminished, principally, perhaps, from their retreating beyond Orange River to an unoccupied country, although many were destroyed by the boors.

“It has been said that the lion dwells in the plains. The African hunters almost always seek him in the mountains; and occasionally one or two will not shun the encounter, if armed with their long and sure rifles, which they carry on almost all occasions. I will relate one more instance. A party of officers, a few years since, along with some boors, discovered a lion, lioness, and two cubs, within a short distance of Hernianus Kraal, on the frontier. The lion dashed forward to protect his mate and young ones, and attempted to defend them by shielding them with his body, until the officers, moved by the nobleness of his conduct, entreated that he might not be destroyed; but the Dutchmen were inexorable, and they killed him; the cubs fled, and the lioness followed; but all were found dead of their wounds the succeeding day.”

THE BEAR.



ANY dangers are encountered in attacking this formidable animal. "After resting for about half-an-hour," says Lloyd, in his "Field Sports of the North of Europe," "we again resumed the search for the bears, which we continued until near three o'clock, when it was beginning to get dusk. At this time I was to the right of the line, which was proceeding in a westerly direction: when, in the distance to the northward, and in a part of the forest we had not yet beaten, I heard my old dog Paijas giving tongue; this he did in such a manner, that I had more than a suspicion he had found what we had so long been in search of. I now lost not a moment, but, leaving the people, ran, as fast as the broken nature of the ground would permit, towards the spot where the dog was challenging, which might be at one hundred and fifty or two hundred paces distance.

"This was in a rather thick part of the forest, and in a clump of pines, around the foot of which,

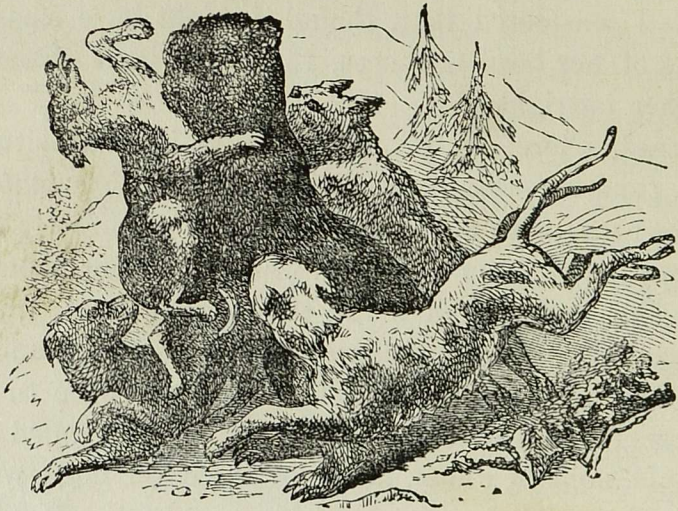
though at some paces distant—for he probably remembered the rough treatment he had received upon a former occasion—Paijas still kept furiously barking. Though the dog had found

the bears, I did not at the first moment observe the entrance to their den, which was an excavation in the face of a little rising, situated between and partly formed by the roots of the surrounding trees. But on discovering it, I at once sprang on to the top of the hillock ; and though at that time immediately over the den, the bears still remained quiet. On my hallooing, they felt so little inclination to leave their quarters, that the old bear simply contented herself with partially projecting her snout. At this, from its being the only point exposed to my view, I levelled my rifle, which was then pointed in a perpendicular direction. On reflection, however, I refrained from firing, as I considered that, though I might have smashed the fore part of her head to pieces, there was little chance of my killing her outright.

“ Instead, therefore, of firing whilst in that situation, I stepped (and it certainly was not ‘the most prudent step’ a man ever took) with my left foot in advance, directly over her, to the opposite side of the hole, when, wheeling about on the instant, and having then a full view of her head, from which the muzzle of my gun was hardly two feet distant, and my left foot still less, for it was partially in the entrance to the den itself, I sent a bullet through her skull. I now called loudly to the people, none of whom, nor even the other dogs, which had been running after birds in another part of the forest, had as yet come up ; for I was rather fearful the cubs might attempt to make their escape.

“ To prevent this, I stood for a while over the den, in readiness to give them a warm reception with the butt-end of my rifle. But three or four minutes passed before Jan Finne, who was to the left of our line, and the peasants, made their appearance ; for, strange to say, though Pajjas had been in Jan Finne’s possession for several years, he either did not recognize his challenge, or he had not a suspicion that it was to the bears ; and in consequence, neither he nor the people moved from where I had left them, until they heard my shot. My appre-

hensions as to the cubs attempting to escape were, however groundless, for they still continued quiet ; at first, indeed, we could see nothing of them, for the old bear, as is usual with these animals when they have young, was lying in the front of the den, and we, therefore, almost began to think we had hit upon a bear distinct from those of which we were in search. But on the people introducing a stake, and moving the old bear a little to the side, one of the cubs, and afterwards a second and a third, showed themselves, all of which I despatched either with my own or with Jan Finne's rifle.



“ The work of death being at length completed, we drew the bears out of their den. This was, however, of such small dimensions, that it was the admiration of us all how they could have stowed themselves away in it. Bears usually prepare their winter quarters during the autumnal months, and some time before taking possession of them ; but the animals of which I am now speaking having been disturbed from their original den at a time when the ground was hard frozen, and when it was of course much more difficult for them to dig into the earth, probably accounted for the small size of the den in which we found them. The old bear had attained her full

growth ; the cubs were nearly a year old, and of about the size of large dogs. The whole of them were in tolerably good condition.”

Barras, a celebrated hunter, relates the following among many of his adventures. It seems that he had discovered a cavern, in which a bear had taken up his winter quarters, and from which he immediately determined to dislodge him. Singly he did not dare to attempt this, and accordingly he chose one of his most hardy companions to join him in the attack. The place which the bear had chosen for his retreat was an almost inaccessible cave, on the sides of the Pyrenees, and among its darkest forests. When the two hunters arrived at the entrance of the cave, they consulted as to the best mode of rousing the animal, and getting him to leave it. Barras proposed that he should enter the cave and wake him, while his companion stood guard without. This extraordinary mode of disturbing the bear's slumbers was adopted, and the sentry having promised to stand by his friend, the other prepared to enter the cave.

For a considerable distance the cavity was large enough to permit of the daring hunter walking upright, but as it decreased in height, he had to grope his way on all fours. While proceeding in this manner, the bear, roused by the slight noise which the hunters had made at the entrance of his chamber, was heard approaching. To turn and run away was hopeless ; the bear was too near to permit of this being attempted ; so that to throw himself on his face, and take the chance of the animal's passing over him, was the only hope of escape. Barras did so, and the bear walked over him, without even saluting him with a growl. His companion at the mouth of the cave did not get off so easily ; for expecting that he would certainly have some warning of the approach of the animal, he was not altogether prepared for the encounter when he appeared, and before he had time to lift his gun to his shoulder, he was folded in the deadly embrace of the giant brute. Within a few yards

of the cave the precipice was several hundred feet in depth, and in the struggle both bear and man rolled over together.

Barras, eager to aid his friend, followed the bear after it had passed over him, but reached the mouth of the cave just as the bear and his comrade were disappearing over the edge of the precipice. Horror-struck at the dreadful fate of his friend, and without the slightest hope of saving him, he rushed forward to descend the mountain side, and rescue, if possible, the mangled body; when the first glance into the gorge below revealed to him his friend, dangling by his clothes among the branches of a thick shrub, which, growing out of a fissure in the precipice, had caught him in his fall, while the bear, less fortunate, had descended to the bottom. To release his friend from his perilous situation was no easy task; but by the aid of the long sashes which the mountaineers almost always wear, he at last effected it, and drew him to the platform from which he had been so rudely hurled. The bear had lacerated him severely, but he was no sooner on his legs than, expressing his confidence that the bear had been killed by the fall, he proposed descending to the foot of the precipice to ascertain the result. They effected this with much difficulty, and to their great satisfaction as well as profit, found among the rocks below the object of their search, in the last agonies of death. They returned to their homes, the wounded man greatly exhausted by loss of blood; and Barras next morning, accompanied by a band of villagers, carried off the spoil.

THE TIGER.

ONE of the most dangerous animals that the traveller in Asia and the East Indies can encounter, is the tiger, a most ferocious and powerful enemy, belonging to the feline species, of which, as you know, the cat is a member. So serious are

the depredations of this animal, that in India he is hunted and killed whenever his traces are found. These are usually in the jungles, as thick bushes and trees are called, and here the tiger resorts, until hunger draws him forth in search of food. Many are the stories we could relate of the perils which often attend the daring hunter when he finds himself in the presence of his formidable foe. One or two instances must, however, suffice.



A gentleman in the civil service of the East India Company relates the following :—“ When a tiger springs on an elephant, the latter is generally able to shake him off under his feet, and then woe be to him. The elephant either kneels on him and crushes him at once, or gives him a kick, which breaks half his ribs, and sends him flying perhaps twenty paces. The elephants, however, are often dreadfully torn, and a large old tiger clings too fast to be thus dealt with. In this case it often happens that the elephant himself falls, from pain, or from the hope of rolling on his enemy, and the people on his back are in very considerable danger both from friend and

foe. The scratch of a tiger is sometimes venomous, as that of a cat is said to be. But this does not often happen; and in general persons wounded by his teeth or claws, if not killed outright, recover easily enough.

“ I was at Jaffna, at the northern extremity of the island of Ceylon, in the beginning of the year 1819; when, one morning, my servant called me an hour or two before my usual time, with ‘Master, master! people sent for master’s dogs—tiger in the town!’ Now, my dogs chanced to be some very degenerate specimens of a fine species, called the *poligar* dog, which I should describe as a sort of wiry-haired greyhound, without scent. I kept them to hunt jackals; but tigers are very different things. My gun happened not to be put together; and while my servant was doing it, the collector, and two medical men, who had recently arrived, came to my door, the former armed with a fowling-piece, and the latter with remarkably blunt hog-spears. They insisted upon setting off without waiting for my gun, a proceeding not much to my taste. The tiger had taken refuge in a hut, the roof of which, as those of Ceylon huts in general, spread to the ground like an umbrella; the only opening in it was a small door, about four feet high.

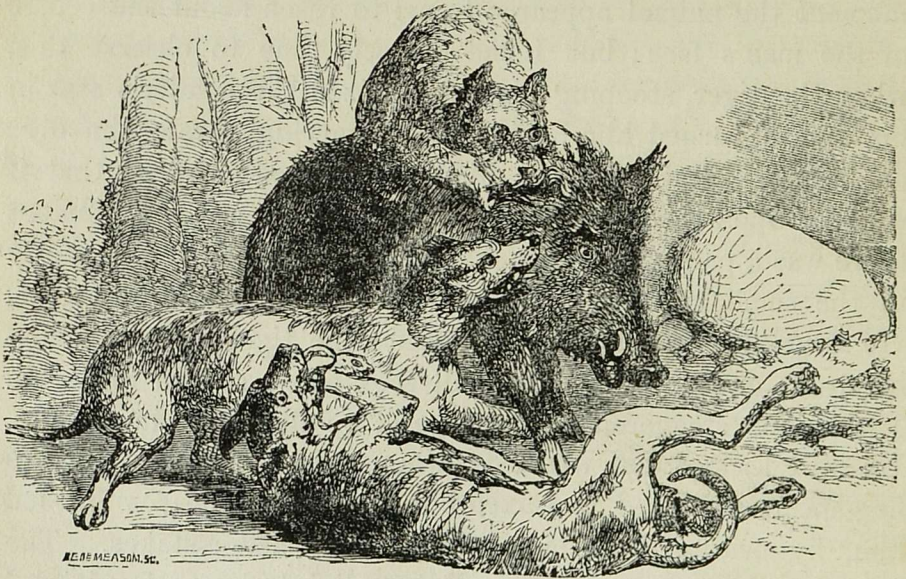
“ The collector wanted to get the tiger out at once. I begged to wait for my gun; but no—the fowling-piece (loaded with ball, of course) and the two hog-spears were quite enough. I got a hedge-stake, and awaited my fate, from very shame. At this moment, to my great delight, there arrived from the fort an English officer, two artillerymen, and a Malay captain; and a pretty figure we should have cut without them, as the event will show. I was now quite ready to attack, and my gun was brought a minute afterwards. The whole scene which follows took place within an enclosure, about twenty feet square, formed on three sides by a strong fence of palmyra leaves, and on the fourth by the hut. At the door of this the two artillerymen planted themselves, and the Malay captain

got on the top, to frighten the tiger out, by worrying it—an easy operation, as the huts there are covered with cocoa-nut leaves. One of the artillerymen wanted to go in to the tiger, but he would not suffer it.

“ At last the beast sprang : this man received him on his bayonet, which he thrust apparently down his throat, firing his piece at the same moment. The bayonet broke off short, leaving less than three inches on the musket ; the rest remained in the animal, but was invisible to us : the shot probably went through his cheek, for it certainly did not seriously injure him, as he instantly rose upon his legs, with a loud roar, and placed his paws upon the soldier’s breast. At this moment the animal appeared to me to reach about the centre of the man’s face ; but I had scarcely time to observe this, when the tiger, stooping his head, seized the soldier’s arm in his mouth, turned him half round staggering, threw him over on his back, and fell upon him. Our dread now was, that if we fired upon the tiger, we might kill the man : for a moment there was a pause, when his comrade attacked the beast exactly in the same manner as the gallant fellow himself had done. He struck his bayonet into his head ; the tiger rose at him—he fired ; and this time the ball took effect, and in the head. The animal staggered backward, and we all poured in our fire. He still kicked and writhed ; when the gentlemen with the hog-spears advanced, and fixed him, while the natives finished him, by beating him on the head with hedge-stakes. The brave artilleryman was, after all, but slightly hurt : he claimed the skin, which was very cheerfully given to him. There was, however, a cry among the natives that the head should be cut off : it was ; and in so doing, the knife came directly across the bayonet. There was no tradition of a tiger having been in Jaffna before ; indeed, this one must have either come a distance of almost twenty miles, or have swum across an arm of the sea nearly two miles in breadth ; for Jaffna stands on a peninsula, on which there is no jungle of any magnitude.”

THE WILD BOAR.

THIS animal, from which our domestic pigs are descended, was formerly a native of Britain, but is now an inhabitant of the dense forests of France, Germany, and other European states, besides being found in various parts of the world, where he roams in savage independence. His ferocity makes him a formidable enemy when attacked, and nature has provided him with a weapon of defence in his tusk, which is sometimes a foot in length. But dogs, trained for the purpose, often



succeed in bringing him to the ground in spite of his efforts, and this dangerous sport is followed with great ardour on the continent. When the boar is driven from his covert, he goes forward with a slow pace and sullen air, and frequently turns back to his pursuers, grinding his teeth, and showing every indication of hostility. The dogs, aware of the danger of a close encounter, keep back, and bay him at a distance. After they have for awhile gazed upon each other with mutual

animosity, the boar again pursues his way, still followed at a cautious distance by the dogs. In this manner the pursued and the pursuers continue, until the boar, exhausted with fatigue, stops to rest. This is the moment chosen by the dogs for an attack. The boar defends himself with the greatest courage, and frequently overcomes his tormentors; but a fresh enemy awaits him in the hunter, who, with his long and pointed spear, generally succeeds in killing him.

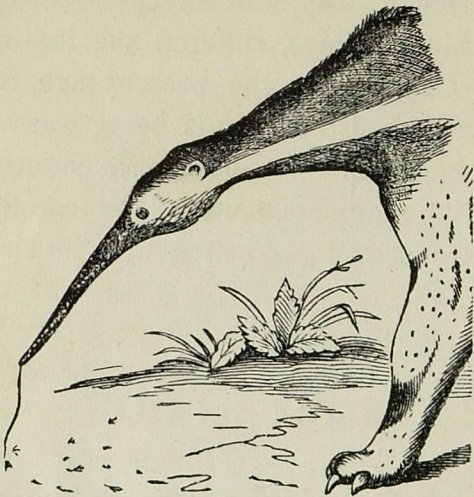
In former days, the boar hunt was a favourite sport in our own country, when the soil was covered with forests, which afforded a convenient lurking-place for these animals. It was considered the best pastime for royalty, and any person who was found infringing upon this privilege, suffered the loss of his eyes as a punishment. Happily for the present age, no such oppression can exist; and instead of lands being wasted to afford amusement to fickle princes, we have a country fertile and useful, yielding its abundance under the careful hand of the husbandman, and cheering our hearts with its rich beauty.

THE ANT BEAR AND THE SLOTH.

AMONG animals, there are two found in Brazil whose history is little known,—as the Ant-bear, or Ant-eater; so called from the circumstance of its having been generally supposed, by all the earlier naturalists, that the animal subsisted wholly upon the ant species; although it is now a well-known fact, that it feeds indiscriminately upon all small insects, worms, eggs of birds, &c.; the other is the Sloth.

The Ant-eater is so very different from all other creatures, that it is a difficult matter to give a description of it. The animal, when full-grown, is nearly or quite seven feet in length, of which the head and snout is something more than one-third of the whole, and the tail, taking off another third, leaves the

body about two feet long, and very nearly that in height. The back and sides are covered with long, coarse hair, or more properly bristles, black next the skin, but gradually changing to a pale dirty brown on the outside. That of the head, belly, and legs, is of a finer texture, and nearly jet black. The legs are short; the feet have three toes, exactly like those of the land tortoise, each one of which is armed with a tremendous strong claw, full four inches in length. The tail is equal in length to the body, and so far as appearances go, it is equal in size too, being covered with bristles even coarser than those on the body, and nearly a foot in length, with a thick undergrowth of



fine hair. All this mass of hair and bristles grows out vertically, that is, from the upper and lower side of the tail,—it is not more than four inches thick, and two feet wide, except where it joins the body, and there it is small and round; so that at a little distance, when the animal's legs are hid, it looks almost exactly like two creatures, or rather a

double one joined together by a short stem. The body is but a trifle thicker than the tail; but the most singular feature about the animal is its head and snout. The head is disproportionately small, with eyes scarcely larger than those of a rat, but exceedingly bright. The snout is about fourteen inches long, and diminishes until the end is no bigger than a man's thumb, the mouth being so small, that the animal cannot take in any hard substance larger than a moderate-sized raisin. The tongue seems to be constructed upon the same mechanical principle as that of the toad; and is used by the animal much in the same way in procuring its food.

The Ant-bear, during the day, will lie perfectly motionless for hours at a time, in some warm spot frequented by ants, which swarm all over the country in incredible numbers; here if an unwary ant passes within a distance of three feet, he is certain to be seized by the tongue, which is darted out as quick as a flash of lightning. During the night, the animal prowls about in quest of birds'-nests; eggs appearing to be his favourite food. He is easily domesticated, and soon becomes strongly attached to his master, or the person who tends him.

Another animal, less remarkable in appearance than the Ant-eater, but in its habits one of the most singular creatures in the world, is the Brazilian Sloth. He, like the other, has been classed and paired off by naturalists with other animals, and yet he is as totally different in his habits from all other creatures, as the Ant-eater is in appearance.

The Sloth inhabits the densest forests, and is very rarely seen in the neighbourhood of any settlement. Its colour is a very dark gray on the sides, deepening into black along the back, and fading into a reddish white on the belly and inside of the legs. It feeds exclusively upon the leaves of trees, and in its wild state never drinks nor ventures near any lake or stream, although, when domesticated, it drinks almost everything that man does, including all kinds of spirits, and it will take the water as readily as a spaniel.

Sometimes, in the dark recesses of some old Brazilian forests, five or six at a time of these strange creatures may be seen in the branches of a giant old tree which they are industriously stripping of its foliage. For a whole week, perhaps, they will remain on a single tree, each one creeping at a snail's pace from branch to branch, cropping every green thing within its reach, till all is gone, when he draws himself up into a ball, and there he sits for three or four days, it may be, without a single motion that indicates life. Hunger finally arouses him, and he makes the first move towards seeking a new pasture, by

swinging under the limb, and clinging to it with his strong claws. Here he will hang sometimes for hours, and then he will let go with one foot, then another, till at last he hangs there by one. At last he lets go with that, and down he comes full sixty feet, perhaps, like a sack of wool. The fall appears to astonish the animal, and for several hours more he lies there as if dead. At length he gathers himself up, and then commences to move. Every time he puts forth his foot he sends forth a peculiar scream, and thus goes on in his journey up the trunk of another tree: at intervals of a minute comes one of those peculiar cries. And thus passes his life of forty years. Eating till he gets fat, and then falling, and remaining inactive till he gets poor. The name given to the animal is, therefore, appropriate.

THE RHINOCEROS AND HIPPOPOTAMUS.

BOTH varieties of the black rhinoceros are extremely fierce and dangerous, and rush headlong and unprovoked at any object which attracts their attention. They never attain much fat, and their flesh is tough, and not much esteemed. Their food consists almost entirely of the thorny branches of the wait-a-bit thorns. Their horns are much shorter than those of the other varieties, seldom exceeding eighteen inches in length. They are finely polished with constant rubbing against the trees. The skull is remarkably formed, its most striking feature being the tremendous thick ossification in which it ends above the nostrils. It is on this mass that the horn is supported. The horns are not connected with the skull, being attached merely by the skin, and they may thus be separated from the head by means of a sharp knife. They are hard and perfectly solid, and well adapted to make various articles, such as drinking-cups, mallets for rifles, handles for turners' tools, &c. The horn is capable of a very high polish.

The eyes of the rhinoceros are small and sparkling, and do not readily observe the hunter, provided he keeps to leeward of them. The skin is extremely thick, and only to be penetrated by bullets hardened with solder. During the day the rhinoceroses are found lying asleep, or standing indolently in some retired part of the forest, or under the base of the mountains, sheltered from the power of the sun by some friendly grove of umbrella-topped mimosas. In the evening they commence their nightly ramble, and wander over a great extent of country. They usually visit the fountains between the hours of nine and twelve o'clock at night, and it is on these occasions that they may be most successfully hunted, and with the least danger.



The black rhinoceros is subject to paroxysms of unprovoked fury, often ploughing up the ground for several yards with its horn, and assaulting large bushes in the most violent manner. On these bushes they work for hours with their horns, at the same time snorting and blowing loudly; nor do they leave them in general until they have broken them into pieces. The rhinoceros is supposed by many to be the animal alluded to by Job, chap. xxxix., verses 10 and 11, where it is written, "Canst thou bind the unicorn with his band in the furrow? or will he harrow the valleys after thee? Wilt thou trust him because his strength is great? or wilt thou leave thy labour to him?" evidently alluding to an animal possessed of great strength and of untameable disposition, for both of which the rhinoceros is remarkable. There are four varieties, two black and two

white, and they all delight to roll and wallow in mud, with which their rugged hides are generally incrustated. Both varieties of the black rhinoceros are much smaller and more active than the white, and are so swift that a horse, with a rider on his back, can rarely overtake them.

The two varieties of the white rhinoceros are so similar in habits, that the description of one will serve for both, the principal difference consisting in the length and set of the anterior horn; that of the muchocho averaging from two to three feet in length, and pointing backwards, while the horn of the kobaoba often exceeds four feet in length, and inclines forward from the nose at an angle of forty-five degrees. The posterior horn of either species seldom exceeds six or seven inches in length. The kobaoba is the rarer of the two, and it is found very far in the interior, chiefly to the eastward of the Limpopo. Its horns are very valuable for loading rods, supplying a substance at once suitable for a sporting implement and excellent for the purpose.

Both these varieties of rhinoceros attain an enormous size, being the animals next in magnitude to the elephant. They feed solely on grass, carry much fat, and their flesh is excellent, being preferable to beef. They are of a much milder and more inoffensive disposition than the black rhinoceros, rarely charging their pursuer. Their speed is very inferior to that of the others, and a person well mounted can overtake and shoot them. They generally carry their heads low, whereas the black rhinoceros, when disturbed, carries his very high, which imparts to him a saucy and independent air. Unlike the elephants, they never associate in herds, but are met with singly or in pairs. In districts where they are abundant, from three to six, and in some instances even a dozen, may be seen congregated together on some young grass, but such an occurrence is rare.

Here is Cumming's introduction to the rhinoceros.

"I found myself on the banks of the stream beside which

my waggons were outspanned. Following along its margin, I presently beheld a black rhinoceros bull, standing within a hundred yards of me. Dismounting from my horse, I secured him to a tree, and then stalked within twenty yards of the huge beast, under cover of a large, strong bush. Hearing me advance, he came on to see what it was, and suddenly protruded his horny nose within twenty yards of me. Knowing well that a front shot would not prove deadly, I sprang to my feet, and ran behind the bush. Upon this he charged, blowing loudly, and chased me round the bush. Had his activity been equal to his ugliness, my wanderings would have terminated here, but, by my superior agility, I had the advantage in the turn. After standing a short time, eyeing me through the bush, he got a whiff of my wind, which at once alarmed him. Uttering a blowing noise, and erecting his insignificant yet saucy-looking tail, he wheeled about, leaving me master of the field, when I sent a bullet through his ribs to teach him manners."

But the most extraordinary fact connected with the history of the rhinoceros comes under the observation of Cumming immediately after this incident. It is thus introduced:—

"On the forenoon of the 23rd a native came and informed me that he had discovered a white rhinoceros lying asleep in a thick cover to the south. I accordingly accompanied him to the spot, and commenced stalking in upon the vast muchocho. He was lying asleep beneath a shady tree, and his appearance reminded me of an enormous hog, which in shape he slightly resembles. He kept constantly flapping his ears, which they invariably do when sleeping. Before I could reach the proper distance to fire, several 'rhinoceros birds,' by which he was attended, warned him of his impending danger by sticking their bills into his ear, and uttering their harsh, grating cry. Thus aroused, he suddenly sprang to his feet and crashed away through the jungle at a rapid trot, and I saw no more of him.

"These rhinoceros birds are constant attendants upon the

four varieties of rhinoceros, and also upon the hippopotamus, their object being to feed upon the ticks and other parasitic insects that swarm upon these animals. They are of a greyish colour, and are nearly as large as a common thrush; their voice is very similar to that of the mistletoe thrush. Many a time have these ever-watchful birds disappointed me in my stalk, and tempted me to invoke an anathema upon their devoted heads. They are the best friends the rhinoceros has, and rarely fail to awaken him even in his soundest nap. 'Chukuroo' perfectly understands their warning, and, springing to his feet, he generally first looks about him in every direction, after which he invariably makes off. I have often hunted a rhinoceros on horseback, which led me a chase of many miles, and required a number of shots before he fell, during which chase several of these birds remained by the rhinoceros to the last. They reminded me of mariners on the deck of some bark sailing on the ocean, for they perched along his back and sides; and as each of my bullets told on the shoulder of the rhinoceros, they ascended about six feet into the air, uttering their harsh cry of alarm, and then resumed their position. It sometimes happened that the lower branches of trees, under which the rhinoceros passed, swept them from their living deck, but they always recovered their former station; they also adhere to the rhinoceros during the night. I have often shot these animals at midnight, when drinking at the fountains, and the birds, imagining they were asleep, remained with them till morning, and on my approaching, before taking flight, they exerted themselves to their utmost to awaken Chukuroo from his deep sleep."

Of the abundance of the rhinoceros in the upper part of the valley of the Limpopo, Harris gives us the following graphic sketch:—

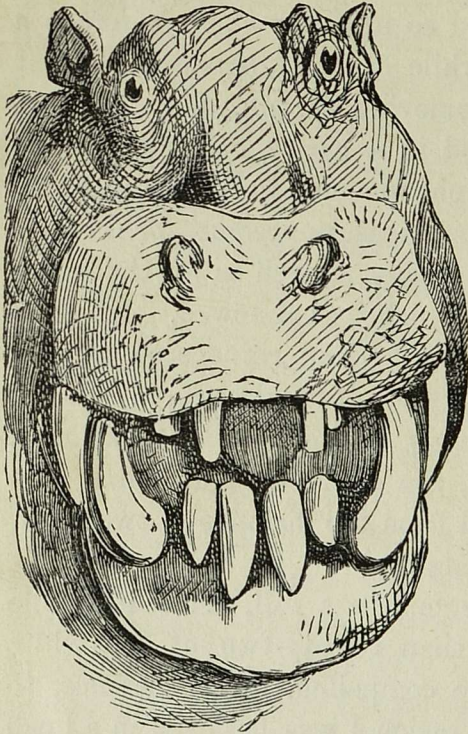
"The country now literally presented the appearance of a menagerie; the host of rhinoceroses in particular that daily exhibited themselves, almost exceeding belief. Whilst the camp was being formed, an ugly head might be seen protruding

from every bush, and the possession of the ground was often stoutly disputed. In the field, these animals lost no opportunity of making themselves obnoxious—frequently charging at my elbow, when in the act of drawing the trigger at some object—and pursuing our horses with indefatigable and ludicrous industry, carrying their noses close to the ground, moving with mincing gait, which ill-beseemed so ungainly and ponderous a quadruped, and uttering the while a sound between a grunt and a smothered whistle. In removing the horn with the axe, the brain was discovered seated in a cavity below it, at the very extremity of the snout—a phenomenon in the idiosyncrasy of this animal, which may in some measure account for its want of intelligence and piggish obstinacy, as well as for the extraordinary acuteness of smell with which it is endowed. Irascible beyond all other quadrupeds, the African rhinoceros appears subject even to unprovoked paroxysms of reckless fury; but the sphere of vision is so exceedingly limited, that its attacks, though sudden and impetuous, are easily eluded, and a shot behind the shoulder, discharged from the distance of twenty or thirty yards, generally proves fatal.

“On our way from the waggons to a hill, not half a mile distant, we counted no less than twenty-two of the white species of rhinoceros, and were compelled, in self-defence, to slaughter four. On another occasion I was besieged in a bush by three at once, and had no little difficulty in beating off the assailants.

“Our next movement brought us to the source of the Oori. Led by many fine streams from the Cashan range, this enchanting river springs into existence as if by magic; and rolling its deep and tranquil waters between tiers of weeping willows, through a passage in the mountain barrier, takes its course to the northward. Here we enjoyed the novel diversion of hippopotamus shooting, that animal abounding in the Limpopo; and dividing the empire with its amphibious neighbour, the crocodile. Throughout the night, the unwieldy monsters might

be heard snorting and blowing during their aquatic gambols, and we not unfrequently detected them in the act of sallying from their reed-grown coverts to graze by light of the moon; never, however, venturing to any distance from the river, the stronghold to which they betake themselves on the slightest



alarm. Occasionally, during the day, they were to be seen basking on the shore amid ooze and mud, but shots were most constantly to be had at their uncouth heads when protruded from the water to draw breath, and if killed, the body rose to the surface. Vulnerable only behind the ear, however, or in the eye, which is placed in a prominence so as to resemble the garret window in a Dutch house, they require the perfection of rifle practice, and after a few shots become exceedingly shy, exhibiting the

snout only, and as instantly withdrawing it.

“The flesh is delicious, resembling pork in flavour, and abounding in fat, which, in the colony, is deservedly esteemed the greatest of delicacies. The hide is upward of an inch and a half in thickness, and, being scarcely flexible, may be drawn from the ribs in strips, like the planks from a ship’s side. Of these are manufactured a superior description of *jambok*, or elastic whip, an indispensable piece of furniture to every boor proceeding on a journey. Our followers encumbered the wagons with a large investment of them, and of the canine teeth, the ivory of which is extremely profitable.”

THE SERPENT.

SERPENTS are sometimes found of a monstrous size. Among the largest are the different species of a genus called Boa. The Boa Cenchris is a formidable serpent, though not so large as the boa constrictor. There are a number of anecdotes of different serpents of the larger kind, gleaned from several sources, which we shall present to our readers.

Some years ago the following appeared in the *Bombay Courier*:—“A Malay prow was making for the port of Amboyna; but the pilot, finding she could not enter it before dark, brought her to anchor for the night close under the island of Celebes. One of the crew went on shore in quest of betel nuts in the woods, and on his return lay down, as it is supposed, to sleep on the beach. In the course of the night he was heard by his comrades to scream out for assistance. They immediately went on shore; but it was too late, for an immense boa had crushed him to death. The attention of the monster being entirely occupied by his prey, the people went boldly up to it, cut off its head, and took both it and the body of the man on board their boat. The snake had seized the poor fellow by the right wrist, where the marks of the fangs were very distinct; and the mangled body bore evident signs of being crushed by the monster’s twisting itself round the neck, head, breast, and thigh. The length of the snake was about thirty feet; its thickness equal to that of a moderate sized man; and on extending its jaws, they were found wide enough to admit at once a body the size of a man’s head.”

In the *Oriental Annual* we find that the captain of a country ship, while passing the Sunderbunds, sent a boat into one of the creeks to obtain some fresh fruits, which are cultivated by the few miserable inhabitants of that inhospitable region. Having reached the shore, the crew moored the boat under a

bank, and left one of their party to take care of her. During their absence the Lascar, who remained in charge of it, overcome by heat, lay down under the seats, and fell asleep. While he was in this state, an enormous boa constrictor emerged out of the jungle, reached the boat, had already coiled its huge body round the sleeper, and was in the act of crushing him to death, when his companions fortunately returned, and attacking the monster, severed a portion of its tail, which so disabled it, that it no longer retained the power of doing mischief. The snake was then easily despatched, and was found to measure forty-two feet and some inches in length.

Even when in a state of bondage, and enfeebled by confinement and the cold of our climate, the boa has been known to exhibit considerable address and power in seizing its prey. The following anecdote, related of one that was kept in the Tower of London, shows that a man is scarcely a match for a very ordinary boa constrictor:—"Some years ago, when the keeper was offering a fowl to one of these serpents, the animal, being almost blind from the approaching change of its skin, missing the fowl, seized upon the keeper's thumb instead, around which and its own head it instantaneously threw two coils, and then, as if surprised at the unexpected resistance, cast an additional fold round his neck, and fixed itself by its tail to one of the posts of its cage in such a manner as nearly to throttle him. His own exertions, however, aided by those of under-keepers, at length disengaged him from his perilous situation; but so determined was the attack of the snake, that it could not be compelled to relinquish its hold until two of its teeth had been broken off and left in the thumb."

The following adventure is narrated by Mr. Waterton, in his "Wanderings" in Demerara and the adjacent parts of South America:—"I was sitting," says he, "with a Horace in my hand, when a negro and his little dog came down the hill in haste, and I was soon informed that a large snake had been

discovered. I instantly rose up, and laying hold of the eight-foot lance, which was close by me, 'Well, then,' said I, 'we'll go and have a look at the snake.' I was barefoot, with an old hat, check shirt, and trousers on, and a pair of braces to keep them up. The negro had his cutlass, and we ascended the hill; another negro, armed with a cutlass, joined us, judging from our pace that there was something to do. The little dog came along with us; and when we had got about half a mile in the forest, the negro stopped, and pointed to a fallen tree. All was still and silent. I told the negroes not to stir from the spot where they were, and keep the little dog in, and I would go and reconnoitre. I advanced up to the place slowly and cautiously. The snake was well concealed, but at last I made him out. It was not poisonous, but large enough to have crushed any of us to death. On measuring him afterwards, he was something more than fourteen feet long. This species of snake is very rare, and much thicker, in proportion to its length, than any other snake in the forest. After skinning this animal, I could easily get my head into his mouth, as the singular formation of the jaws admits of wonderful extension.

"On ascertaining the size of the game we had to encounter, I retired slowly the way I came, and promised four dollars to the negro who had shown it to me, and one to the other who had joined us. Aware that the day was on the decline, and that the approach of night would be inconvenient for the dissection, a thought struck me that I could take him alive. I imagined, if I could strike him with the lance behind the head, and pin him to the ground, I might succeed in capturing him. When I told this to the negroes, they begged and entreated me to let them go for a gun, and bring more force, as they were sure the snake would kill some of us; but I had been in search of a large serpent for years, and now having come up with one, it did not become me to turn soft. So taking a cutlass from one of the negroes, and then ranging both the sable slaves

behind me, I told them to follow me. I smiled as I said this; but they shook their heads in silence, and seemed to have but a bad heart of it. When we came to the place, the serpent had not stirred; but I could see nothing of his head, and I judged by the folds of his body that it must be at the farthest side of his den. A species of woodbine had formed a complete mantle over the branches of the fallen tree, almost impervious to the rain or the rays of the sun. Probably he had resorted to this sequestered place for a length of time, as it bore the marks of an ancient settlement. I now took my knife, determining to cut away the woodbine, and break the twigs in the gentlest manner possible, till I could get a view of his head. One negro stood guard close behind me with the lance, and near him the other with a cutlass. The cutlass which I had taken from the first negro was on the ground close by me, in case of need. After working in dead silence for a quarter of an hour, with one knee all the time on the ground, I had cleared away enough to see his head. It appeared coming out between the first and second coils of his body, and was flat on the ground. This was the very position I wished it to be in. I rose in silence, and retreated very slowly, making a sign to the negroes to do the same. We were at this time about twenty yards from the snake's den. I now ranged them behind me, and told him who stood next me to lay hold of the lance the moment I struck the snake, and that the other must attend my movements. It now only remained to take their cutlasses from them; for I was sure if I did not do this they would be tempted to strike the snake in time of danger, and thus forever spoil his skin. My heart, in spite of all I could do, beat quicker than usual; and I felt those sensations which one has on board a merchant vessel in war time, when the captain orders all hands on deck to prepare for action, while a strange vessel is approaching under suspicious colours.

“We went slowly on in silence, without moving our arms or heads, in order to prevent alarm as much as possible, lest the

snake should glide off, or attack us in self-defence. I carried the lance perpendicularly before me, with the point about a foot from the ground. The snake had not moved; and, on getting up to him, I struck him with the lance on the near side, just behind the neck, and pinned him to the ground. That moment the negro next to me seized the weapon, and held it firm in its place, while I dashed head foremost into the den to grapple with the snake, and to get hold of his tail before he could do any mischief. On pinning him to the ground, he gave a tremendous loud hiss, and the little dog ran away, howling as he went. We had a sharp fray in the den, the rotten sticks flying on all sides, and each party struggling for superiority. I called out to the second negro to throw himself upon me, as I found I was not heavy enough. He did so, and the additional weight was of great service. I had now got firm hold of his tail; and after a violent struggle or two he gave in, finding himself overpowered. This was the moment to secure him. So, while the first negro continued to hold the lance firm to the ground, and the other was helping me, I contrived to unloose my braces, and with them tied up the snake's mouth. The snake, now finding himself in an unpleasant situation, tried to better himself, and set resolutely to work; but we overpowered him. We contrived to make him twist himself round the shaft of the lance, and then prepared to convey him out of the forest. I stood at his head, and held it firm under my arm, one negro supporting the belly, and the other the tail. In this order we began to move slowly towards home, and reached it after resting ten times; for the snake was too heavy for us to support him, without stopping to recruit our strength. As we proceeded onward, he fought hard for freedom, but it was all in vain. The day was now too far spent to think of dissecting him; so, after securing his mouth, so that he could not open it, he was left to his fate till morning."

THE CROCODILE.

A FABLE FOR LITTLE FOLKS, AND GREAT ONES TOO.

ON the banks of the fertile and many-mouthed Nile,
A long time ago, lived a fierce Crocodile,
Who round him was spreading a vast desolation,
For bloodshed and death seemed his chief occupation.

'Twas easy to see,

No pity had he ;

His tears were but water—there all could agree.

The sheep he devour'd, and the shepherd I ween ;
The herd fear'd to graze in the pastures so green ;
And the farmer himself, should he happen to meet him,
The monster ne'er scrupled a moment to eat him.

There never before

Was panic so sore,

On the banks of the Nile, as this creature spread o'er.

Wherever he went, all were flying before him,
Though some, in their blindness, thought fit to adore him :
But as they came near, each his suit to prefer,
This god made a meal of his base worshipper.

By day and by night,

It was his delight,

His votaries to eat—it was serving them right.

Grown vain of his prowess, puffed up with success,
The reptile must travel—how could he do less ?
So, one fine summer morning, he set out by water
On a pleasure excursion—his pleasure was slaughter !—

To Tentyra's isle,

To visit awhile,

The careless inhabitants there to beguile.

The men of Tentyra were able before
To conquer each monster that came to their shore ;
But now they with horror were fain to confess,
That the Crocodile gave them no little distress :

So in great consternation,

A grand consultation

Was called to convene, of the heads of the nation.

It met ; but alas ! such the terror and fright,
 They failed to distinguish the wrong from the right !
 When, just at this crisis, an Ichneumon small *
 Stept forth on the platform, in front of them all,
 With modesty winning,
 To give his opinion,
 Of measures and means to secure the dominion.

“ Grave sirs,” said he, bowing, “ I see your distress ;
 And your griefs are, I fear me, past present redress ;
 Yet still, if to listen should be your good pleasure,
 I think I can help you, at least in a measure ;
 For ’tis my impression,
 A little discretion
 Than valour itself is a far greater blessing.

“ No doubt, ’tis a noble and great undertaking,
 Great war on a powerful foe to be making ;
 But still, I assure you, ’tis better by far,
 Not to let this great foe become mighty for war.
 While the Crocodile lies
 In an egg of small size,
 To crush him at once you should never despise.

“ You see me before you, a poor, feeble creature ;
 Yet I cope with this monster, for such is my nature ;
 And while you have met here in grand consultation,
 This one Crocodile to expel from the nation,
 I thought it a treat,
 For breakfast to eat
 A dozen or more, which I happen’d to meet.

And now that my fable is pretty nigh ended,
 I think there should be a brief moral appended.
 Beware how you let evil habits grow up—
 While feeble and young, you to crush them may hope :
 But let them remain
 Till strength they attain,
 You may find your best efforts to conquer them vain.

* The Ichneumon eats Crocodile’s eggs.

THE EAGLE.

The tawny eagle seats his callow brood
 High on the cliff, and feasts his young with blood.
 On Snowdon's rocks, or Orkney's wide domain,
 Whose beetling cliffs o'erhang the western main,
 The royal bird his lonely kingdom forms
 Amid the gathering clouds and sullen storms ;
 Through the wide waste of air he darts his sight,
 And holds his sounding pinions ready poised for flight ;
 With cruel eye premeditates the war,
 And marks his destin'd victim from afar ;
 Descending in a whirlwind to the ground,
 His pinions like the rush of waters sound ;
 The fairest of the fold he bears away,
 And to his nest compels the struggling prey.—*Barbauld.*

THE Eagle has been considered to bear the same dominion over birds which has been almost universally attributed to the lion over quadrupeds. As the lion is not the largest of the four-footed tribe, so the eagle is not the largest of birds ; but courage is equally conspicuous in both ; they despise the small animals, and disregard their insults. It is only after a series of provocations, after being teased with the noisy or harsh notes of the raven or magpie, that the eagle determines to punish their insolence with death. Both disdain the possession of that property which is not the fruit of their own industry ; rejecting with contempt the prey which is not procured by their own exertions. Both are remarkable for their temperance. The eagle seldom devours the whole of his game, but, like the lion, leaves the fragments to the other animals ; and, though starving for want of prey, he disdains to feed upon carrion.

Formed by nature for a life of rapine and hostility, these birds are solitary and unsociable. They are also fierce, but not implacable ; and though not easily tamed, are certainly capable

of great docility, and in some cases, evince an attachment to those by whom they are kindly treated. This, however, happens but rarely; as the keeper is too often savage and unrelenting, and sometimes brings on himself a severe revenge. A gentleman who resided in the south of Scotland had some years ago a tame eagle, which the keeper one day injudiciously lashed with a horsewhip. About a week afterwards, the man chanced to stoop within reach of its chain, when the enraged animal, recollecting the late insult, flew in



his face with so much violence, that he was terribly wounded, but was fortunately driven so far back by the blow as to be out of all further danger. The screams of the eagle alarmed the family, who found the poor man lying at some distance, equally stunned with the fright and the fall. The animal was still pacing and screaming in the most terrible rage; and just as the party withdrew, he broke his chain, by the violence of his exertions, and escaped for ever.

The Golden Eagle builds his nest in elevated rocks, in

dilapidated castles and towers, and other solitary places. Its form resembles that of a floor: its basis consisting of sticks about five or six feet in length, which are supported at each end, and covered with several layers of rushes and heath. It is generally placed in a dry and inaccessible situation; and the same nest is said to serve during the life of the architect.

An eagle's nest found in the Peak of Derbyshire, has been thus described: "It was made of great sticks, resting one end on the edge of a rock, the other on a birch tree. Upon these was a layer of heath, and on the heath rushes again; upon which lay one young one, and an addle egg; and by them a lamb, a hare, and three heath poults. The nest was about two yards square, and had no hollow in it."

The females generally lay two or three eggs, which are hatched in thirty days. They feed their young with the slain carcasses of such small animals as come in their way; and though they are at all times formidable and ferocious, they are particularly so while nurturing their progeny.

It is said that an Irish peasant in the county of Kerry once got a comfortable subsistence for his family, during a summer of great scarcity, out of an eagle's nest, by robbing the eaglets of their food, which was plentifully furnished by the parents. He stopped their progress beyond the usual time, by clipping the wings, and thus retarding the flight of the young; and tying them so as to increase their cries, which is always found to increase the despatch of the parents in supplying their wants. It was a fortunate circumstance, however, that the old ones did not detect the plunderer, as their resentment might, in all probability, have proved fatal; for a countryman, not many years ago, resolved to rob an eagle's nest, which he knew to be built in a small island in the beautiful lake of Killarney, and accordingly stripped himself for this purpose, and swam over when the old birds were gone but, in his return, while yet up to the chin in water, the parents coming home, and missing their offspring, quickly fell on the

plunderer, and in spite of his resistance, despatched him with their formidable beaks and talons.

Several instances have been recorded, of children being seized and carried off by these rapacious animals. Pontoppidan relates, that in the year 1737, in the parish of Norderhougs, in Norway, a boy somewhat more than two years old was running from the house to his parents, who were at work in the fields at no great distance, when an eagle pounced upon and flew off with him in their sight. It was with grief and anguish that they beheld their child dragged away, but all their screams and efforts to prevent it were in vain. Andersen also asserts that, in Iceland, children of four or five years of age have been sometimes taken away by eagles; and Ray relates, that, in one of the Orkneys, a child of twelve months old was seized in the talons of an eagle, and carried above four miles to its nest. The mother, however, knowing the place, pursued the bird, found her child in the nest, and took it away unhurt. Perhaps it was some daring adventure of this kind that gave rise to the fable of Ganymede's being snatched up to heaven by an eagle.

The following story is related by a gentleman of unquestionable veracity. While upon his travels in France he was invited by an officer of distinction to pass a few days at his country seat. The table was every day plentifully supplied with wild fowl, but he was not a little surprised to observe that not one was served up which had not undergone some mutilation: some wanting wings, and others legs or heads. This being so invariably the case, he was at length induced to inquire into the cause, when his host replied that it was solely to be attributed to the voracious appetite of his provider, who could not be prevented from first tasting what he had prepared. This, instead of allaying, rather excited his curiosity, which the officer satisfied by explaining himself in this manner: "The mountainous parts of the kingdom are much frequented by eagles, who build their nests in the cavities of the neighbouring rocks; these are sought after by the

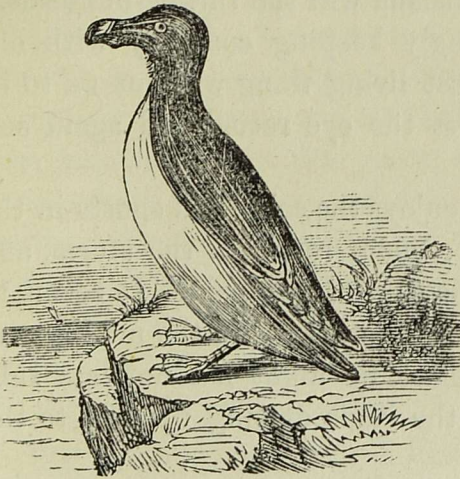
shepherds, and when one is discovered they erect a little hut at the foot of the rock, to screen themselves from these dangerous birds, which are particularly furious when they have young ones to supply with provisions. In this employment the male is busily engaged for the space of three months, and the female continues it until the young bird is capable of quitting the nest; when that time arrives, they force him to spring up in the air, where they support him with their wings and talons, whenever he is in danger of falling. While the young eagle continues in the nest, the parents ravage all the neighbouring country, and seize every kind of poultry, pheasants, hares, partridges, or kids, which come in their way, all of which they carry to their young.

“The shepherds, being thus secured from danger, watch the approach of the parent birds with their food, who merely stay to deposit their cargo, and the moment they have left the nest the shepherds mount the rocks and take away what the eagles have brought, leaving the entrails of some animal in its stead; but as this cannot be done so expeditiously as to prevent the young eagles from devouring part of their food, the shepherds are under the necessity of bringing our supply somewhat mutilated.”

The Golden Eagle is remarkable for its long life and its power of going without food for a surprising length of time. One that died at Vienna had been in confinement above a century: and one that was in the possession of a gentleman of Conway, in Caernarvonshire, was, from the neglect of his servants, kept for three weeks without food. M. de Buffon was also assured, by a person on whom he could rely, that an eagle, being caught in a fox-trap, existed five weeks without any kind of food. It showed no appearance of weakness till the last eight days, and was at length killed, in order to put a period to its sufferings.

THE ALBATROSS.

IF the eagle be the king of birds, the albatross ought to be called the queen, so queen-like and stately is her course on the wing, and so dignified, mild, and unfearing is her expression when captured. Her eye is full, bright, and expressive, like that of the gazelle; the head and neck large, but admirably proportioned; the feathers either a pure white, or delicately pencilled and speckled, except on the upper side of the wings, which are mostly black.



“Off the coast of Patagonia,” says the journal of a traveller, “while the weather permits, some of the passengers, and the watch on duty, occupied themselves in fishing for albatrosses. They are caught by baiting a hook with pork or blubber, fastening a piece of wood near the bait, so that it may be kept floating, and letting it tow astern.

“The noble birds wheel and hover over it, at length alighting on the water like a swan, and often succeed in getting all the bait without being hooked. But at last they are taken and hauled aboard, the unsuspected hook catching in their long bills. They measure nine or ten feet across the wings, and are uncommonly beautiful and majestic, whether soaring sublimely upon the wing, or seen as a prisoner upon the ship’s deck, from which they are unable to rise. Their motion through space is the easiest and most graceful conceivable.”

An anonymous writer, who must have seen the bird in its native seas, says, “This glorious bird, the albatross, is the most beautiful and loveable object of the animate world, which the

adventurer meets with in all the South Pacific. Philosophers might take a lesson of it in æsthetics, for when on the wing it is the very beau-ideal of beauty and grace. Seamen ought to love and prize it dearly, for the drear monotony of life at sea is often relieved by its always welcome appearance, and by watching with admiration, almost envy, its glorious gyrations and curves and swoops in the elastic ocean of air, a free race-ground, where it has no competitor.

“The capture of a whale, especially on the New Zealand whaling-ground, and further south, when eight hundred or a thousand miles from land, will bring them trooping from afar, as a carcase in Mexico or Louisiana will the turkey-buzzards.

“I have watched them singly keeping company with our ship for days together; the last living thing without us to be seen at nightfall, and the first the eye recognized again and saluted in the morning.”

Another traveller says, “It enjoys the calm, and sports in the sunbeams on the glassy wave; but it revels in the storm, and darts its arrowy way before the fury of the gale. It seems to be then in its element; mocking the surges of the mighty sea, and breasting the tempest’s blast, its flight has not less sublimity, perhaps, than that of the eagle darting upward to the skies.

“It is a beautiful sight to behold this noble bird sailing in the air in light and graceful movements. After the first muscular exertion which gives impulse to its flight, its wings are always expanded, like the sails of a ship, and show no motion, as if it were wafted on by some invisible power. It is from this cause that it sustains untired its long and distant flight across the sea. It feeds on small marine animals, mucilaginous zoophytes, the spawn of fish, and blubber.

“Notwithstanding its large size, the albatross does not appear to be a quarrelsome bird, but when attacked by its enemy, the skua gull, seeks safety in flight. It is easily captured, and was used in quantities, boiled and roasted, by Captain Cook and his

crew, who gladly regaled themselves on it after being confined for a length of time at sea to salt food.

“When breeding, the female flies to some inaccessible rock or lonely spot of ground, lays, it is said, but one egg, and makes a nest around it. The male watches with tender anxiety while she is on the nest; and ever on the wing, brings her the daintiest food from his piratical wanderings on the deep.”

GALL NUTS.—The gall-nuts of commerce are found on the branches of shrubby oaks. By the phrase, “gall-nuts of commerce,” is meant those which are of sufficient value to be bought and sold. These galls are usually round, and vary from the size of a pea to that of a hazel-nut. The best of them are black or deep olive colour, also heavy and brittle. In commerce they are known as white, green, and blue. The white ones are those which were not gathered till the insect had made its escape. These are not so heavy as the others, and, being of a lighter colour, are not worth so much. The green and blue galls are gathered before the insect leaves them. These are heavier and darker than the white ones, and yield about one-third more colouring matter. The best galls are imported from Aleppo and Smyrna, in Asia Minor. They are used in making ink, in dyeing black, and also in medicine. Their taste is very astringent, and an unpleasant bitter. To the productions of some little insects are we greatly indebted. From the galls which they produce we obtain a fluid that enables us to converse with our absent friends, be their distance ever so great. The human voice extends only over a small circle, but the pen, dipped in a liquid dyed with the gall-nut, sends forth winged words across seas and over distant lands, bearing our thoughts, and telling the words we would speak. Thus, wherever we turn our eyes in nature, we may behold the hand of an infinite Creator in the wonderful adaptation and usefulness of everything, even of the most inferior of creatures.

PET BIRDS OF INDIA.

ALMOST all the natives of India are fond of rearing pet birds; and the pet is, more frequently than otherwise, a parrot, which is prized for its conversation. In the fifteenth century the same taste prevailed in the city of Paris, where talking birds were hung out at almost every window. This was sometimes attended with awkward results. Leading the public life they did, in which they were exposed to every sort of society, they became fluent in every term of reproach and indecency; and thunders of applause were elicited among the crowd of passengers by the aptness of their repartees.

In India, the taste is the same, but the habits different. The carpenter, while planing the plank, which he holds between his toes, amuses himself by talking to his parrot. The shoemaker, while binding his slippers, or embroidering his rich velvet shoes for the feet of some sable beauty, pauses every now and then to listen to the chattering of his pet. The *guala*, on returning home, after disposing of his butter or buttermilk, first takes up some bamboo twigs, one of which is appropriated to each customer, and marking, by a notch with a knife, the quantity disbursed to each, turns, as a matter of course, to his favourite parrot, and either listens to the recital of his previous lessons, or begins to teach him some fresh invocation to some score of gods and goddesses. These men seldom condescend to teach their favourites anything else; but should a lady be the owner, the parrot's lessons are more varied, and more domestic in their character. He is taught to call his mistress, "Mother," and himself, "Baba mitto" (sweet child). He is sometimes instructed to rail at her neighbours, and sometimes to scold the children; and thus she lives in sweet companionship with her bird, feeding him with steeped grain, rice and milk,

sugar-cane, and Indian corn. Of the two last he is exceedingly fond.

India abounds in a variety of parrots and paroquets. These learn to speak glibly, being generally taken out of the nest before they are fully fledged. Crutches of various kinds are selected for the poor captive, the most ingenious of which is made of a single joint of bamboo, the two ends being formed into cups, the middle part being cut, and then bent and arched over the fire; the perch being formed of a straight piece of bamboo, which joins the two cups below. A hook fastened to the top of the arch enables the owner to suspend it from the thatched ceiling of his hut; and thus the parrot swings about, listening to his master's pious ejaculations.

Sometimes the taste of the bird-fancier is displayed after a different, but exceptional fashion. A shop, having a square space enclosed with a railing, has a divan in the middle, for the accommodation of the master and his visitors. On this railing a number of birds are perched, many of them little tame bulbuls; these are detained by a ligature, passing over the shoulders of the bird, and tied under the breast, leaving his wings free. The bulbul is a pretty songster, but he is as desperate a fighter as a game-cock. Those, therefore, who delight in cruel sports, bring their little pets to these shops, where, no doubt, birds of the best mettle are to be found; and on the result of a battle, money and sweetmeats are lost and won, while many a poor little bird falls a sacrifice to his master's depraved taste. The tiny *amadavad*, with his glowing carmine neck, and distinct little pearly spots, may also occasionally be seen doing battle; he fights desperately, though he often warbles the sweetest of songs.

The affluent Hindoo Baboo or Mohammedan Nawab, among other luxuries, keeps also his aviary. In these may be seen rare and expensive parrots, brought from the Spice Islands. They delight also in *diyuls* and *shamahs*. The latter is a smaller bird than our thrush, but larger than a lark; his breast is

orange, the rest of his plumage black, and in song he is equal to our blackbird. The diyul also sings sweetly; he is about the same size as the shamah, his plumage black, with a white breast, and white tips to his wings. A well-trained bird of either kind sells for about ten rupees, and twenty will be given for a cuckoo from the Nepaul hills.

Some of the *Minas* (*Gracula*), of which there are several kinds in India, articulate as distinctly, and are as imitative, as the parrots. "One of these birds," says the *Old Indian*, "was once brought as a present to my little girl. The donor took his leave, assuring me that the bird was a great speaker, and imitated a variety of sounds. This I found to be too true, for I was awakened by him next morning at dawn of day. He had evidently been bred in the neighbourhood of the hospital, and also initiated into the mysteries of the parade. He coughed like a consumptive patient, groaned like one in agony, and moaned as if in the last extremity. Then he would call a 'halt!' and imitate the jingling of the ramrods in the muskets so exactly, that I marvelled how his little throat could go through so many modulations. I was soon obliged to banish him to a distance from the sleeping apartments, for some of his utterances were anything but suggestive of soothing or pleasurable sensations."

The hill mina, a mountaineer by birth, seldom lives long in confinement in lowland districts. After having endeared himself to his master and his family by his conversational powers and imitative qualities, he is not unfrequently cut off suddenly by a fit, and sometimes expires while feasting on his bread and milk, or peameal-paste, or perhaps when he has only a few minutes before been calling out loudly his master's name, or those of the children. The hill mina is a handsome bird, a size larger than our blackbird; he is of one uniform colour—a glossy black, like the smoothest Genoa velvet, harmonizing beautifully with the bright yellow circle of skin round his eyes, his yellow beak, and yellow legs.

The grackle is a gregarious bird, greatly enlivening the aspect of the grassy meadows at sunset, when his comrades assemble in large flocks; and having picked up their meal of grubs and grasshoppers, resort for shelter to a neighbouring avenue, where they roost for the night. The grackle is a tame and familiar bird, and will sometimes build its nest close to the habitation of man. Occasionally an earthen pot is placed



for its accommodation in the fork of a neighbouring tree. Though their brood may be constantly removed, they will return, year after year, to the same nest, expressing, however, their discontent and distress when robbed, by keeping up for some days a loud and querulous chattering.

Those who dwell on the banks of the Ganges may sometimes see, during the rainy season, a large boat floating past, having

a raised cabin, like a Bengalee hut, constructed of mat and straw. From the multiplicity of cages, inside and outside, it may be gathered that here are fresh supplies of the bird-fancier, captives from the hills of Rajmahal and Moryheer. The constant fluttering among the inmates of the crowded cages, and their mournful and discordant notes, indicate that they are anything but a happy family—that they have been only recently caught, and are not yet habituated to confinement. They are soon, however, disposed of at the different stations or towns at which the boat anchors, and become in due time apparently happy pets.

A very remarkable sight is frequently to be witnessed in India, in what is called the “rainy season.” The rain, which at first falls at intervals only, becomes at last a continuous deluge. By these rains, and the sudden melting of snow on the hills, vast tracts of country become inundated. In some of the wilder districts of Bengal, when these inundations occur, thousands of wild animals are drowned, or perish from hunger; and birds, serpents, leopards, and other animals, seek to escape the floods by climbing into the trees, where, unable to attack each other, they starve.

ALLIGATORS.

THERE are certain animals in the kingdom of nature peaceable enough if allowed to remain alone, but ferocious as tigers in defence of themselves or offspring. Of this sort is the Alligator.

In excursions through more southern sections of the United States, “I have observed them;” says Colonel Sharpley, “with much interest. Naturalists, who possess the opportunity, should pay more attention to their habits than has yet been done, for little reliable information is recorded in books concerning them. The lagoons, bayous, and lakes of Southern

Mississippi and Louisiana, are their principal places of resort, and there they may be observed to the best advantage. On a hot summer's day, when the deadly miasmatic steam rises from the surface of one of those unhealthy collections, alligators may be seen lying half buried in the ooze, or floating dreamily on the surface, apparently careless of all that moves around them. But don't believe they are in earnest. Just let a hunter's dog endeavour to reach his master by a short cut across the lake, and by the time the cur is a hundred feet from shore, every alligator will be after him. Never did you hear such a splashing and bellowing. Their paddles will lash foam from the water, as they strain every muscle to gain the first bite, for of all meats toothsome to an alligator, a dog's is most delicious. Their foul breath ascends in dense vapour. Their little eyes gleam like a shark's, and poor dog, if he gets half way across before those heavy jaws clamp him, he will be lucky enough. But woe to the reptile who is first in the chase; each of the others, as he comes up, will pitch into him with the heartiest hatred, and ten to one he is immolated on the shrine of covetousness, torn into a thousand pieces by his late friends.

"In every lake there are certain veterans, who, by virtue of their years, or the fame of former exploits,—most likely their great strength,—are allowed pre-eminence by the rest. But the row becomes serious indeed, when two of this sort,—bull-alligators they are styled,—encounter each other. Then Greek meets Greek, Napoleon contends against Wellington, and dire is the strife, for neither party yields until death closes the scene, and one, or both, expires. I found one, sixteen feet in length, lying upon a sand-bar, too much exhausted to move. His under jaw was broken in several places, his bowels were gushing out, and both eyes were gouged. He was evidently the victor, and what success his opponent had met with, might be inferred from his horrid condition. Well might the conqueror declare, 'One more such victory will undo me,' if,

indeed, he were not already lying in the agonies of death. Only three of his teeth remained unbroken of all his goodly palisade of ivory, and those, each thick as my thumb, I secured for my cabinet."

It is not generally known that the alligator, like the turtle, lays her eggs upon the land. When ready for this interesting charge, she crawls from the water for some distance into the dense cane-brake, and then paws up, with her immense paddles, big clumps of muddy earth, until a pile is formed a few inches high, and some four feet diameter. Upon this she lays her eggs, then heaps dry leaves above them, with sticks and mud, until the mound is nearly as high as a man's head, and the good lady returns to her element, leaving heat and moisture to do the rest. As soon as the progeny is hatched, they hasten, like ducks, to the water, and if they escape being eaten by the turtles, cat-fish, or their own tender mammas, they attain, in a few years, a good size, and are allowed to participate in the fights, feasts, and frolics of the lake. The greater part, however, are destroyed in infancy.

An anecdote is told of a dandy English sportsman, who had gone yachting to New Orleans, and penetrated to the interior for a shy at this kind of game. But his very first excursion to the cane-brake eventuated in his being lost, and lying out alone, amidst such clouds of mosquitoes as only Vermillion Bay can produce. They almost tapped his heart's blood. Daylight found him on the brink of a lagoon, with an army of alligators in view. Horrified at the sight of the monsters, he struck precipitately into the thicket again, but only to fall over a large one that was egging it upon her huge nest. The reptile struck him over the back with her flexible tail, and knocked him senseless; and had she followed up the blow, he had doubtless made a morning's meal for her ladyship. As it was, he recovered his senses, but with a bruised shoulder, and some time the next day returned to the house, minus his gun and hat.

There are two specimens in Koch's Museum, St. Louis, that are known when living to have engaged in a fight before a crowd of spectators, and could not be separated until they fell over the balcony into the street, and were both killed by the shock.

In several points there is a resemblance of habits between the alligator and the large thick-shelled turtle. Both love to bask in the sun, so hot as to fry up everything else; both are highly tenacious of life; slowly aroused to anger, but fierce as demons when their ire is excited; both possess the most powerful instruments in their front paddles that are known in mechanics, as may be seen in their skeletons, clumsy, but mighty in leverage. There is one striking point of difference, however, the turtle being the most timid animal in the lake—starting from his log, and plumping into the water at the slightest alarm, while the alligator will lie and watch you with a calmness that is indicative of an innocent heart.

And now for the best anecdote on this subject. Colonel Sharpley took his way, in the month of September, 1837, to the Louisiana land office, to make certain entries of valuable tracts. The day was hot, the dust smotheringly thick, the air perfectly still. About the middle of the afternoon he arrived at Moore's Ferry, on Plum Bayou, a sheet of stagnant water, filled from the river in spring freshets, and serving for a breeding pond of fish and reptiles, the greater part of the year. The ferryman lived about a mile off, as ferrymen always do; but for the convenience of travellers, he had suspended a cow's horn on a sapling, with the tacit understanding that he would come whenever he heard it.

"Now, I never could sound a note even on a French bugle," says the Colonel, "although I have heard Gambati blow two trumpets at a time; and as my lungs were of the weakest, I didn't even attempt the cow's horn, which is harder than five trumpets. Gambati would find it so. And now, there was the ferry-boat occupying one side of the picture, I and my horse

the other. Land speculators are a shifty set, and up to most emergencies, but I was nonplussed here. I saw too plainly the danger of swimming, for a glance at the mud-bank a little way to the left, brought to view several long, black, humpy objects that *might* be logs, but were probably alligators, ready to be aroused at the slightest splash.

“I sat down under an umbrella-looking beech, pulled out my field notes, and began to make calculations for future profit. But nobody came. Night drew on; I became weary of my estimates, and putting up my book, began to wonder what I should do. It was ten miles back to the nearest house, and the probability was, that if the ferryman had no fares from his own side of the water, he would not come down for a day or two. The idea of camping out was a disagreeable one; though, barring mosquitoes and the prospect of a bad cold, I cared nothing for the danger. But little was stirring around me. Occasionally, a long, lank garfish would turn a neat caper out of the water, and disappear again, as if satisfied with the exploit. Then a kingfisher or two screamed above some fry they had caught, and flew off in amicable mood, as old friends should. Then a snowy white crane, on stilts long as a Savoyard's, waded within fifty feet of me; now groping under the water for a morsel, now pluming its spotless feathers with coquettish care.

“But such objects have little charm for land speculators. I arose and glanced around for an idea. One puff at the cow's horn showed me the fallacy of the attempt: for the sound I made was about as loud and harsh as the notes of its original wearer. A pile of drift wood hard by suggested the notion of a raft; and thankful for the thought, at it went I with double speed, determined, if I could get across to the ferry-boat, to return with that, and convey my horse over. The substratum was soon laid with large pieces of wood, dry as tinder, which I tied firmly together by grapevines. These were crossed, tier above tier, by others, all being

well tied at the corners ; and thus I had a structure built in half an hour, large and buoyant enough for anybody. A stiff piece of bark sufficed for a paddle, and I boldly launched out, congratulating myself upon my ingenuity.

“ But I had not gone more than half across, before the knobbed back of a bull alligator broke water within a few feet of me, and I saw that I should have company on my way of a dangerous sort. Every time I dipped my paddle on that side, the big upper-jaw would open a short way, and rows of glistening pegs, four inches long, dripping in slime, met my trembling gaze.

“ No wonder then that my track was tortuous and my progress slow. The monster made no attempt to stop me ; and now the ferry-boat was but a few yards ahead, and hope was becoming buoyant, when things took another turn.

“ It will be recollected that every lake of this sort has several of these veteran bulls, whose prowess secures them from all attack except from each other. The large one that had accompanied me was so deeply scarred as to prove him a quarrelsome case, and when, as it happened, another one of the same sort, which was prowling about, approached the raft, the motion was taken as a challenge, and a desperate fight immediately commenced. Each seized the other by the head and commenced lashing with their tails, making some such turmoil as a whale with its flukes.

“ Instantly, the paddle was dashed from my hands, my eyes were filled with spray, my raft upset, and it was all that I could do to recover my footing. All this was bad enough, but it was not the worst.

“ The alligators, a as tribe, are pugnacious, and the sound of a fight calls them together as naturally as it does a crowd of Irishmen. So it was but a few minutes before the little raft was surrounded by a whole shoal of them, young and old, dividing their eager gaze between the strife and its unlucky object. I stood aghast. I had often been the centre of an

angry crowd of squatters at a land sale, and bore myself boldly, though antagonistic to all. But this was another affair, and the excited crowd around me reminded me of what I had read of battle-fields, where the hungry wolves stand a little way off, to wait their time of carnage.

“And now the evening breeze began to blow my raft up the Bayou, leaving me no other prospect than to spend the night upon the water, surrounded by these creatures, maddened by the smell of blood. How I wished myself by the side of my good horse, that stood gazing upon me, in the twilight, as if in mute astonishment at his master’s movements. ‘Ah, Colonel!’ thought I, “your last quarter section has been entered, and your brethren will never drop the sprig of evergreen into your open grave!’ All this time the fight continued, and even increased in fury.

“The military tactics of the alligator tribe are far more simple than Scott’s. They only consist in catching your opponent’s jaw in your’s, then banging his side with your tail. What threshing machines those tails would make!

“While the raft floated along, the scene of fight was continually shifted, so as to keep it conveniently near; it being understood by both parties that the spoils were to be the victor’s, and this I too plainly understood, by their anxiety to keep me in view.

“Once I approached so near a point of land that jutted out from the bank, that had I possessed a stick I could have reached it; but I was powerless, and on I went, the victim of destiny. Still the rivals fought, and still I looked on. The ferry-boat was now out of sight. A turn in the land hid my horse, who gave me a loud neigh by way of good night. Darkness settled over me, and the horrors of my situation began to work upon my mind.

“One last thought of home and wife and children, no more to hail my coming—and I sank down upon my tottering raft, folded my arms, and a few minutes more would have ended

my fate, for I felt that the power to preserve my balance was fast leaving me. But suddenly a light flashed upon my eyes, I heard a loud, harsh voice exclaiming, 'Halloo, boys! a bull-fight, as I'm a man!' and, invigorated by hope, I sprung to my feet, and hailed the new comers. They were fishermen by torchlight, and their fortunate arrival, and the glare of their torches, saved my life.

"Another half hour, and I was sitting at the ferryman's table, my horse up to his eyes in corn and fodder, and at least one grateful heart silently praising God for a great deliverance."

COTTON.

COTTON is one of the natural productions of the earth. It grows spontaneously in Asia, Africa, and in many of the numerous islands with which the oceans are dotted. We generally speak of it as a production of the torrid zone; but although it will not grow in cold climates, the best produced is found in the southern parts of the north temperate zone.

When cotton is cultivated, it is raised from seed. The seeds are planted, about the middle of March, in drills or rows, four feet apart. The stalks are thinned out, and left about a foot from each other. When the plant first comes up, it resembles buckwheat in appearance, but soon begins to branch out. The usual height is from four to five feet; but in rich soil it sometimes grows six or eight feet high.

The blossom, which yields one of the most useful productions enlisted in the service of man, lasts but three days. The first day it is white, the next day it is red, and the third day it changes to purple, and then falls off. Thus the age of the blossom is readily ascertained by its colour.

The pod, or ball, is of large and ample form; and when it is mature, it then bursts, and exposes the cotton. The pods

begin to burst in July, and from that time until the plant is killed by frost, or has become fully mature, buds, blossoms, balls, and ripe cotton can be found upon the same stalk.

When a field is ready for picking, it looks, at a little distance, almost as white as if covered with snow. The cotton is usually picked five or six times during the season; and the work is generally performed by negroes, as in the latitude where it is mostly raised, the weather is too warm for white people to work comfortably.

Cotton picking is a light and pleasant labour; and a quick hand will gather from two hundred and fifty to three hundred pounds weight in a day.

The different names which are given to this production are usually derived from the location where it is raised. The finest quality that is grown in the United States is the Sea Island cotton, which is raised on the numerous islands off the shores of Georgia and the Carolinas. This is the best and longest staple, and is the most like silk in fibre of any that is raised. It is much sought by manufacturers of thread and the finest cotton laces.

There is much good cotton among the upland productions, although the staple is generally shorter than that of the Sea Island, and consequently does not make as good yarn. Those who are adepts in the matter generally mix the staples of different lengths, thus making the yarn better than when made of cotton that is all of the same length.

There is one variety which is but little raised; it is of a yellowish colour. This is woven into the fabric sold under the name of nankeen, and which is noted for its lasting colour.

After the cotton is gathered, before it is ready for the market, it must be separated from the seeds. When this labour is performed by hand, it is a very slow work, as the cotton adheres to the seeds very closely. In four pounds of the crop, as it comes from the field, there are about three pounds of seeds and only one of cotton, and to separate them by hand is

considered a day's work. This is so tedious an operation, that unless some method had been found to facilitate the process, the price at which cotton could be offered, would have been much greater than now, and, consequently, its consumption in manufactures much less.

Much ingenuity was used to invent some machine to expedite the work. The most simple, and probably the first used, was composed of two plain cylinders, revolving so near each other that the seeds could not pass between, while the cotton was drawn from them by friction, and worked through between the cylinders. The roller machine, or gin, as it is called, with the fluted cylinders, was an improvement upon, and superseded the use of this plain one. This was brought into use about the time of the Revolution. Although much better than any that preceded it, this could only clean about two and a half pounds an hour. About this time Mr. Whitney, a native of Massachusetts, seeing the wants of the people, turned his attention to making improvements in this machine. The result of his labours was the gin now in use—a machine of incalculable benefit to the world at large.

THE STRUCTURE OF WOODS AND HERBS.

NATURALISTS have discovered, by the aid of the microscope, that all plants consist of two kinds of organic matter, essentially distinct, the *woody* portion and the *pithy* portion; and that the several parts of a plant, however differing from each other in form, texture, and appearance, are still composed of the same two substances, but varying in the proportion and arrangement. The woody portion has also received the name of the *vascular system*, while to the other division has been assigned the appellation of the *cellular tissue*; and these will now be described.

The woody part of a plant, whether herb or tree, is not solid, but is composed of a vast number of small tubes, extending from the roots, and ramifying through the stem and branches to every part of the plant; even the oldest and most compact species of wood is nothing else than a collection of vessels and cells, the sides of which consist of extremely thin and delicate membranes.

In the more highly organized animals the vital fluid is distributed through appropriate channels by the action of the heart, throughout every part of the body. Near the heart these conduits are large, and few in number; but decrease in size, and become less numerous, as they are more remotely situated.

In plants no such central fountain exists; but the fluids necessary for their life and development, entering from the soil through countless mouths at the roots, flow upward along the minute tubes of the plants, and are disseminated to every part where their presence is needed. The form of these tubes is generally cylindrical, and much difference exists in respect to their size. On account of the great minuteness of these pores it is extremely difficult to estimate their number correctly. An approximation to the truth may, however, be attained by first driving off the fluid that fills the pores, without destroying their figure, as is done in the preparation of charcoal, and then examining a cross section with a microscope. This method was pursued by Hooke, who numbered in a line, the eighteenth of an inch in length, no less than one hundred and fifty tubes. In an inch long there would consequently be (18×150) twenty-seven hundred tubes; and in a square inch $(2,700 \times 2,700)$ seven millions two hundred and ninety thousand tubes. The examination of decayed wood, where the tubes were empty, led to the same result; and further corroboration was obtained by Dr. Hooke from the inspection of petrified wood, where the situation of the pores was very conspicuous. In woods that are remarkable for their compactness and density, the vessels

or tubes are still smaller and more numerous within a given space. The largest tube observed by Hedwig, in the stem of the gourd, possessed an apparent size of one-twelfth of an inch, when seen through a microscope that magnified two hundred and ninety times. Its real diameter was, therefore, one-twelfth of an inch, diminished two hundred and ninety times, or the three thousand four hundred and eightieth part of an inch. If, therefore, within the extent of a square inch a collection of tubes like these occupied but one-half of the space, no less a number than six millions fifty-five thousand two hundred would be comprised within this small compass.

These tubes are not arranged singly throughout the trunks and branches, but are collected into small bundles; in the stems of herbs and of roots each small bundle is composed of from thirty to one hundred tubes, and sometimes of many hundreds. In *herbs*, the bundles are often placed at considerable distances from each other, without any symmetrical arrangement, while in *trees* they are regularly disposed in concentric circles; and when cross sections of wood are viewed through a microscope, are seen distinctly arranged in a great variety of the most beautiful and elegant figures. It was supposed by the earlier writers on vegetable anatomy that the tubes which have just been described were of two kinds; the office of the first class being to convey sap, and that of the second to carry air to the different parts of the plant. The tubes were thence denominated sap-vessels and air-vessels. The latter class also received the name of spiral vessels, from the peculiar manner in which the tube is formed. It is now, however, believed by distinguished naturalists, that there are no vessels exclusively employed for the conveyance of air, but that all the tubes found in the woody parts of plants are sap-vessels of one kind only, and that in different plants, and different circumstances and conditions of vegetation, these vessels or tubes are capable of assuming various forms, sizes, and characteristics; a circumstance which has led many observers to the belief that they

constituted several distinct species, which subserved different purposes conducive to the life and growth of the plant.

The tubes just described are bound together by a tissue filled with minute cells, which has thence been denominated the cellular tissue. It is a constituent part of every organ of the more perfect plants, and in many herbs forms the principal portion of their substance; while the lower order of vegetables, as mosses, mushrooms, &c., are said to consist of it entirely.

The appearance which this tissue presents is extremely diversified. At one time it is seen to be of a loose, porous texture, every part of which is transparent and succulent. Under other circumstances, it meets the eye in the condition of a solid body, the cells being so closely pressed together that the peculiarity of its structure is almost lost. In a third case the cells likewise vanish from another cause; for the tissue then spreads out into a membrane so extremely delicate and thin, that all traces of their existence disappear. The cells or cavities of the cellular tissue are generally arranged in a direction opposite to that of the tubes of the vascular system, and are therefore displayed in the longitudinal and not in the cross section of the plant.

The forms of the cells are exceedingly various. In some plants they are of a globular shape, in others angular, but differing as to the number of sides; several kinds being triangular, others square, but the greater proportion exhibit hexagonal or six-sided figures.

When a cross section of a tree or plant is viewed by the naked eye, it is seen to consist of three parts—the pith, the woody texture, and the bark. The size of the pith varies in different trees, in some being from two to three inches in diameter, and in others from five to six; and of all plants herbs and shrubs have the greatest quantity of pith in proportion to the other parts. The pith is found to consist entirely of cellular tissue, and the cells are of various sizes. Those of the thistle appear under the microscope as large as the cells of

a honeycomb; those of plum, wormwood, and sumach, are smaller, and the cells in the pith of the apple and pear are still less; while those of the oak are so minute that one hundred only equal in size a single cell of the pith of the thistle. The size of the cells is not proportioned to that of the pith; for in the plum, the pith of which is less than that of the pear, the cells are from four to five times as large; and the cells of the pith of the hazel, which is three times smaller than that of the holly, are ten times greater than those in the holly.

The envelope which encircles the wood is composed of two parts, the true bark and the outer skin which covers it; both of which are made up of vessels and cellular tissue like the wood. The tubes or vessels belonging to the bark are denominated proper vessels, and are filled with the fluids peculiar to this portion of the plant. In some herbs these vessels often cluster together in separate columns, and are arranged in a circular form; in others they present a radiated appearance. In trees, the tubes are more distinct, and assume a greater regularity in their disposition.

They are usually found near the inner margin of the bark, next to the wood, and, when viewed in the direction of their length, present an appearance like net-work. In the bark the vessels are found to possess different sizes as well as in the wood. In the pine, for instance, the tubes containing the turpentine exceed the common sap-vessels in magnitude by three or four hundred times, and are surrounded by a ring of smaller tubes. In the drawing, the proper vessels of the bark containing the milky juice of the sumach are arranged in arched clusters, each cluster consisting of several hundred distinct tubes; and so small are these tubes, that a single turpentine vessel of the pine sometimes vies in magnitude with an entire arched cluster of the sumach.

Commencing on the outside of the tree, the exterior covering is the skin or rind, consisting, as has already been stated, of several distinct layers. Beneath this is the bark, composed of

cellular tissue and bundles of tubes or vessels running longitudinally, and at first parallel to each other. When a cross section is made of a shoot of a year old, only a single ring of vessels, or cluster of vessels arranged in a circle, is found surrounding the wood, and this, with the tissue in which they are enveloped, constitutes the bark of the plant. During the second year, a new layer of bark with its vessels and tissue grows within the former, and next to the wood; and every successive year a new layer of bark is thus added: the entire thickness of this envelope being constituted of a series of layers, increasing in number from within.

Next to the bark, the wood is found, consisting, as we have seen, of vessels and cellular tissue; and the cross section of a plant or shoot of one year's growth exhibits the wood arranged around the pith, and composed of a ring of vessels banded together by cellular tissue. The growth of the succeeding year gives rise to a new ring of vessels outside of the first ring, and beyond this second ring a third circle of vessels appearing during the third year. The wood of the tree, therefore, increases from within outwards, in a direction contrary to the growth of the bark; and consists of a series of rings, equal in number to the years indicating the age of the tree. The outer ring is whiter and more full of sap than the rest, and has received from this circumstance the name of sap-wood. In the last annual layer of wood and bark, by which the trunk is increased in size, the sap-wood and new bark are in contact; but the layer of the next year pushes up between, and separates them by its entire thickness. Every year a new layer is thus interposed in the midst of the others, the last-formed layers of wood and bark touching each other, while the oldest are the most widely separated; the first ring of wood directly enclosing the pith, and the first envelope of bark constituting the outer surface.

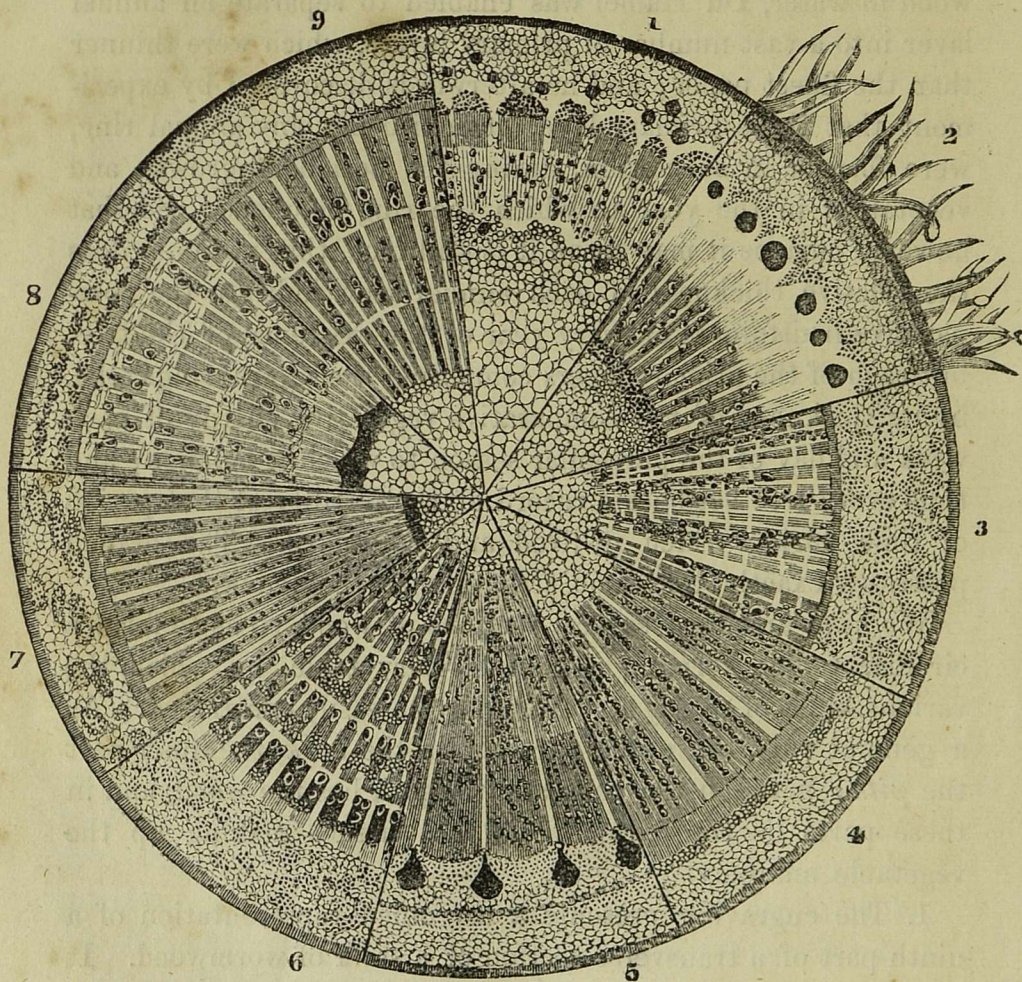
The layers of wood annually formed are not simple in their structure, but are each composed of a great number of other

layers. These delicate membranes can be distinctly perceived in the oak by the aid of a common magnifying glass, when the branch or shoot is cut obliquely. By macerating the rings of wood in water, Du Hamel was enabled to separate an annual layer into a vast number of primary layers, which were thinner than the finest paper; and he afterwards discovered by experiment that these primary layers, constituting any annual ring, were formed in succession, during the period of growth and vegetation in the year to which the ring belonged. So that however curious it may seem, it is still true, that not only does the relative thickness of each annual ring indicate the comparative fruitfulness of every year of the existence of the tree, but each of the primary layers composing the several rings tells, by its thickness, of the comparative vegetative energy of each week and day of the particular season to which it belongs; and thus every tree becomes a record of the fertility of that period of time during which it lived and flourished. The branch possesses exactly the same structure as the trunk.

We have arranged several sections of wood, so as to form a circular tablet, forming a kind of fairy table, by which the various kinds of woody structure may be easily contrasted. As a general rule, the outer part shows the *bark*, the inner part the *pith*; between the bark and the pith lies the wood, and in these parts lie the curious cells and tissues making up the vegetable anatomy.

1. The engraving presents a magnified representation of a ninth part of a transverse section of a stalk of wormwood. It is a structure of extreme regularity, and the great size of the pith, compared with that of the wood, shows at a glance its herbaceous character. The spherical cavities of the cellular tissue form a broad ring, and within this space a number of large vessels, indicated by dark spots, are situated, arranged in a circular row along the inner margin of the ring of cellular tissue. These are termed the resiniferous or gum-vessels, which secrete the aromatic fluid peculiar to the plant. Some vessels

of this kind are also found within the pith. The semi-circular figures are clusters of sap-vessels. Within the woody part the spiral vessels are seen, but quite thinly and irregularly scattered.



SECTIONS OF VARIOUS WOODS AS SEEN UNDER THE MICROSCOPE.

- | | | |
|--------------|-----------|----------------|
| 1. Wormwood. | 4. Holly. | 7. Pear Tree. |
| 2. Sumach. | 5. Hazel. | 8. Walnut. |
| 3. Oak. | 6. Elm. | 9. Ash Branch. |

The broad insertions in the woody part, and which diverge from each other as if proceeding from the centre, are the rays of cellular tissue, which in this plant are seen to be of compara-

tively great thickness, and commence and terminate in a different manner from the same rays in wood.

2. This figure represents one-ninth part of a cross section of the common sumach of one year's growth. The bark is covered with a down of fine hairs, which, when magnified, fringe the section with the thorn-like figures. Most of them taper to a point, but some of them, as is seen, are rounded and knobbed at the end.

3. A section of oak of three years' growth, varying in some respects from the kinds of woods which have already been described. It will be readily seen that the vessels of the bark are here arranged in different ways. Through the middle of the bark an unbroken band of vessels extends, while a row of large oval clusters, standing at equal distances from each other, are seen next to the wood. The vessels of this inner row are of a peculiar nature, and are termed by Grew *resiniferous* vessels, since they contain a thick juice of the oak, which is not sap, but bears the same relation to it in the oak as the turpentine of the pine to the sap of that tree.

4. A magnified cross section of a holly branch of three years' growth. The several parts constituting the twig are here distinctly seen.

5. A section of a hazel branch, when magnified, exhibits a figure of exquisite beauty and symmetry. In the engraving, a ninth part of an entire cross section of a bough three years old is faithfully delineated. The bark is enriched with clusters of vessels of various shapes and figures. The skin of the bark is represented by the ring, to which succeeds a broad band, consisting of the cells of the cellular tissue; within this band is another ring, composed of sap-vessels. The next space is filled partly with cellular tissue, and partly with sap-vessels, in pear-shaped and semi-oval clusters, alternating with each other at equal intervals. The wood is divided into regular and equal compartments by great radial insertions of cellular tissue; and these compartments are still further subdivided by more deli-

cate and minute rays of tissue, running from the pith to the bark. Throughout the wood spiral vessels are profusely scattered, and are found to be most numerous near the bark, or in the growth of the last year. The size of the pith is small compared with that of the wood; but its cells are much larger than those belonging to the pith of the holly.

6. The section of an elm branch which appears in the engraving is an exceedingly rich figure, and the several divisions are boldly defined. The skin of the bark possesses considerable thickness, and the pores of the cellular tissue belonging to this integument are exceedingly small. Throughout the bark bundles of the proper vessels are seen profusely scattered in oval or egg-shaped clusters. The wood is the growth of four years and a half. The annual rings are very distinctly marked by the white transverse lines.

7. In the engraving is presented one-ninth part of a section of a branch of a pear-tree. It exhibits the same general features as the section of the holly, but varies in some particulars. The rows of vessels stretching out from the pith to the bark are less broken than in the holly, and the rays of cellular tissue are more regularly arranged, branching out at equal distances from each other, and presenting, with the numerous vessels dispersed throughout the wood, a remarkably elegant figure. The three rings of the true wood, denoting the age of the branch, are distinctly marked; and beyond them, just within the bark, the sap-wood.

8. Here is displayed a magnified section of a branch of walnut, four years old, and which presents a most beautiful configuration. The proper vessels collected together in the bark in round clusters are distributed in two circular rows. The sap-vessels distributed through the wood are not numerous, but their size is comparatively great, and, as in the elm, they are grouped more thickly together near the pith, the cells of which are quite large, compared with those of the pith of the elm. The pith itself is also much larger than in many other

woods of the same age. The most remarkable peculiarity in the walnut is the broad *white-arched bands*, running across the rays of cellular tissue, three of which are exhibited in the figure before us; in the elm they are also seen disposed in a similar manner, but much narrower.

9. This is a cross section of part of an ash branch, three years old, as it appears when magnified to a considerable extent. Within the bark, next to the skin, and nearest to the wood, clusters of minute vessels are seen extending in circular rows from side to side. The pith, composed of large cells, occupies the centre, and the wood the remaining portion of the figure. The arrangement of the radial insertions of cellular tissue is very beautiful; the rays diverging from the pith to the bark at equal distances from each other, and maintaining nearly always the same size. The position of the large spiral vessels in the wood is very distinctly marked, gathering in near two divisions of the annual growth.

PEARLS.

PEARLS are not, as poets have feigned, "rain from the sky, which turns into pearls as it falls in the sea," but they are the secretions of an oyster. Several species of bivalved shellfish produce them, but the greater number, the finest and the largest, are procured from the *Lamarck*, a native of the sea, and of various coasts. A considerable number are likewise taken from another variety which inhabits the rivers of Europe; and it is singular, as remarked by Humboldt, that though several species of this genus abound in the rivers of South America, no pearls are ever found in them.

The pearls are situated either in the body of the oyster, or they lie loose between it and the shell, or, lastly, they are fixed to the latter by a kind of neck; and it is said they do not appear until the animal has reached its fourth year. They

have a beautiful lustre, which must be familiar to all, but there is nothing peculiar in their chemical composition, consisting merely of carbonate of lime.

The Romans were extravagantly fond of these ornaments, which claimed the first rank after the diamond; and they gave almost incredible prices for them. Julius Cæsar presented Servilia, the mother of M. Brutus, with a pearl worth £48,417 10s.; and Cleopatra, at a feast with Antony, of which Pliny has given a long and interesting account, drank one dissolved in vinegar, of the value of £80,729 3s. 4d. They wore them in great profusion, not only in the ears, and on the fingers, head, and neck, but strung over the whole body; and the men as well as the ladies were thus adorned. The naturalist in deprecating this effeminacy becomes eloquent, and in his censures there is something, perhaps, not inapplicable to ourselves:—"What have the waves to do with our garments? That element does not rightly receive us, unless we are naked. Grant that there is so great communion between the sea and our food, what has the sea to do with the back? It is not enough that our food is procured through perils, if perils are not also encountered for our raiment. Thus, in all that pertains to the body, things acquired at the risk of human life are most pleasing."

The principal fisheries of the Romans were in the Red Sea, the Gulf of Persia, and the Indian Ocean,—the pearls from the former places being the most highly valued, as superior in size and lustre; and it is said that Cæsar was induced to invade Britain from some exaggerated accounts he had heard of the pearls of our coasts, or rather of our rivers: but if these were his object he was disappointed, for they were found to be of a bad colour and inferior size; nor have they improved in their reputation.

Ceylon continues to be, as it was in the time of the Romans, the most productive of these ornaments. The ancient fisheries in the Red Sea, however, are now either exhausted or neglected,

and cities of the greatest celebrity have in consequence sunk into insignificance or total ruin. Dahalac was the chief port of the pearl trade on the southern part of the Red Sea, and Suakem on the north; and under the Ptolemies, or even long after, in the time of the Caliphs, these were islands whose merchants were princes; but their bustle and glory have long since departed, and they are now thinly inhabited by a race of miserable fishermen. Nor are the rivers of Britain now fished, nor were they at any time of much value in this respect. Good pearls have indeed been occasionally found in our river mussel, but too seldom to be worth the search.

A notion prevails, that Sir Richard Wynn, of Gwydir, chamberlain to Catherine, Queen of Charles II., presented her Majesty with one taken in the Conway, which is to this day honoured with a place in the regal crown. In the last century several of great size were obtained in the rivers of the counties of Tyrone and Donegal, in Ireland. One that weighed 36 carats was valued at £40, but not being pure, lost much of its worth. Other single pearls were sold for £4 10s., and even for £10. The last was sold a second time, to Lady Glenlealy, who put it into a necklace, and refused £80 for it from the Duchess of Ormond. In his tour in Scotland, in 1769, Mr. Pennant, from whom the above particulars are derived, also mentions a considerable pearl fishery in the vicinity of Perth, from which £10,000 worth were sent to London, from 1761 to 1799; but by the indiscriminate destruction of the mussels, the fishery was soon exhausted.

After the discovery of America, the traffic in pearls passed, in a great measure, from the east to the shores of the western world. The first Spaniards who landed found the savages decked with pearl necklaces and bracelets; and among the civilized people of Mexico and Peru they saw pearls of a beautiful form as eagerly sought after as in Europe. The hint was taken; the stations of the oysters were sought out, and cities rose into splendour and affluence in their vicinity, all supported

by the profits of these sea-born gems. The first city which owed its rise to this cause was New Cadiz, in the little island of Cubagna ; and the writers of that period discourse eloquently of the riches of the first planters, and the luxury they displayed ; but now not a vestige of the city remains, and downs of shifting sand cover the desolate island. The same fate soon overtook the other cities ; for, from various causes, and particularly from the never-ceasing and indiscriminate destruction of the Meleagrinae, the banks became exhausted, and towards the end of the sixteenth century this traffic in pearls dwindled into insignificance.

At present, Spanish America furnishes no other pearls for trade than those of the Gulf of Panama and the mouth of the Rio de la Hacha. The bulk of them, as formerly mentioned, are procured from the Indian Ocean, particularly from the Bay of Condeatchy, in Ceylon, the Taprobane of the Romans. It will naturally be inquired, how it has happened that in all other stations the oysters have disappeared, while here they continue in undiminished numbers, though fished for centuries. The answer is, that the fishery has been conducted in a different manner, and with an eye to the future. The banks, which extend several miles along the coast, are divided into three or four portions, and fished in succession ; a repose of three or four years being thus given to the animals to grow and propagate. Further, the beds are carefully surveyed, and the state of the oysters ascertained, previously to their being let or farmed, and the merchant is permitted to fish them for only six or eight weeks ; but from the number of holidays observed by the divers of different sects and nations, the fishing days do not in reality much exceed thirty.

The fishing season commences in February, and ends about the beginning of April. During its continuance, there is no spectacle which Ceylon affords more striking to a European than the Bay of Condeatchy. " This desert and barren spot is at that time," says an eye-witness, " converted into a scene

which exceeds in novelty and variety almost anything I ever witnessed. Several thousands of people, of different colours, countries, castes, and occupations, continually passing and repassing in a busy crowd; the vast numbers of small tents and huts erected on the shore, with the bazaar or market-place before each; the multitude of boats returning in the afternoon from the pearl banks, some of them laden with riches; the anxious, expecting countenances of the boat-owners, while the boats are approaching the shore, and the eagerness and avidity with which they run to them when arrived, in hopes of a rich cargo; the vast numbers of jewellers, brokers, merchants, of all colours, and all descriptions, both natives and foreigners, who are occupied in some way or other with the pearls, some separating and assorting them, others weighing and ascertaining their number and value, while others are hawking them about, or drilling and boring them for future use;—all these circumstances tend to impress the mind with the value and importance of that object which can of itself create this scene.”

The inference is just; and yet, when we remember in what manner, and by whose means, these vain ornaments are and have been procured, the impressions which such a gay scene conveys come not unalloyed. Poor negroes, sold to slavery, were compelled to dive for them, and we cannot read of the cruel treatment they received from the American Spaniards, without feelings of indignation and horror. Nor is it unreasonable to view the desolation which overtook their cities, and the departure of the “pomp of their strength,” as the just punishment of their wickedness. The divers, it is believed, now employed are not slaves, nor are they maltreated, but still they pursue a laborious trade, and one not void of danger, for the ground shark prowls among the banks, and is ever on the watch to devour them.

The importance of the pearl mussel need not be further dwelt upon, but the reader may form his own opinion on that

point from the facts above stated. It should not, however, be omitted, that Linnæus in part owed his elevation to nobility to a discovery he made of causing the fresh-water mussel of Sweden to produce pearls at his pleasure. It is conjectured that he accomplished this by drilling small holes through the shells; but his method is not certainly known, nor is this of any consequence, since it seems to have been soon abandoned. The States of Sweden viewed it at first in such an important light, that they rewarded the illustrious naturalist with a premium of about £450, which, in that country, must have been a very considerable sum.

THE IGNIS FATUUS, OR JACK O' LANTERN.

Jane. Well, Alfred, I have been reading about a traveller who was benighted on a journey, and who, thinking he espied a light burning in a cottage, followed that light until he walked into a marsh; and then he recollected that *Jack o' lantern* was often seen about those parts, and became much afraid; now who is *Jack o' lantern*?

Alfred. Well, Jane, you cause me to smile by asking that question. I have often sat beside the hearths of the country people and listened to their stories, and many times have I heard them rehearse their adventures with *Jack o' lantern*, *Will o' the wisp*, or *Ignis Fatuus*, as it is called. They were generally pretty much alike in their nature. A simple countryman, passing through a churchyard at night, would see this light, and getting scared, he would run away, but the light would follow him. Another would get benighted on a lonely moor, and run toward this deceptive light supposing it to be a dwelling, when it would dance before him and lead him on until he stumbled into a bog or marsh.

Jane. Well, but I should like to know the cause of this light.

Alfred. I shall now explain it to you. It is produced from *Phosphureted Hydrogen*, which is a substance called phosphorus, combined with hydrogen gas.

Frank. I notice one thing about those hard words that you sometimes need to use. You require to explain their meaning, and that makes us know more and think more. Now, what is *phosphureted hydrogen*?

Alfred. Phosphorus is a pale, amber-coloured substance, somewhat resembling bees-wax in appearance. The word comes from two Greek words, which mean to *produce or carry light*. This substance is contained in all living bodies.

George. I have seen putrid fishes sparkling at night,—was it phosphorus that shone?

Alfred. Yes, that is spontaneous phosphorus; but the phosphorus that I described is obtained by heating bones to a white heat, by which means all the animal matter and charcoal are consumed, and a substance called phosphate of lime is left behind.

Jane. What is phosphate of lime?

Alfred. It is phosphorus mixed with oxygen gas and lime. When sulphuric acid is added to this, and the whole is heated, the lime unites with the acid and the pure phosphorus remains.

Frank. Is phosphorus of use to anybody but chemists?

Alfred. Yes; that part of a lucifer match which ignites when rubbed, is phosphorus; and 250,000 pounds of it are used every year in the city of London alone, in the manufacture of these matches.

Jane. Well, is *Jack o' lantern* phosphorus?

Alfred. *Jack o' lantern* is a light that arises from the gas of putrefying animal and vegetable substances, especially from decaying fish. It is impure *phosphureted hydrogen*, which bursts into flame when it mixes with the air, or with pure oxygen gas.

Frank. Will not pure phosphureted hydrogen ignite of itself?

Alfred. No, Frank; it must be impure or it will not burst into flame.

George. If this gas rises from all dead bodies, then it must be that which causes the smell in burial places.

Alfred. Yes, and that is the reason that *Jack o' lantern* is sometimes seen there too.

George. What do you mean by *Ignis Fatuus*?

Alfred. It means the fire of fate, from an old foolish idea that it predicted death to those who followed it.

Frank. So it did, I think, if it led them into marshes.

Alfred. The truth is, that the persons who follow it cause it to move by the forward motion they impart to the air, and those who run away from it make it follow them, from rushing against the air and causing a current which attracts the light inflammable gas after them. Thus we see that a popular superstition is explained by a natural cause; and probably many ghost stories are attributable to *Jack o' lantern*.

BALLOONS, HYDROGEN GAS, AND HEAT.

“MOTHER, did you ever see a balloon ascend?”

“I never did, Alfred; but why do you ask me that?”

“Why, cousin Ann was telling me last night of one which she saw at the Crystal Palace last summer; and I should like to know how it is they can ascend so high in the air?”

“What are your own ideas upon the subject, Alfred?”

“Why, I don't know, but I suppose they must be filled with something that is lighter than the air, that causes them to ascend like smoke, or else the force of gravitation would keep them down on the earth.”

“Your idea is correct. Balloons that are now used are filled with hydrogen gas, which is fourteen times lighter than air.”

“Were they ever filled with anything else?”

“Yes; when first invented they were inflated with rarified or heated air, which, as I have already told you, is lighter than cold air.

“Who invented balloons of this kind?”

“They were invented in 1782, by Stephen and John Montgolfier, paper manufacturers, of France. Previous to this, however, Mr. Henry Cavendish had discovered that hydrogen was considerably lighter than atmospheric air; and several celebrated persons had commenced, in a small way, to experiment upon the subject. Their progress, however, was but slow.”

“How did the Montgolfiers succeed?”

“Admirably. They inflated a large balloon with rarified air, which rapidly rose to the height of 6,000 feet.”

“Did either of them ascend with it?”

“No. At first only small animals were placed in them; but it was soon found that human beings could ascend with equal ease.”

“Who was the first person that attempted it?”

“Pilatre de Rozier, a Frenchman, who ascended at Paris, October 15th, 1783.”

“But, mother, I should think, after the balloon was a great way up in the air, the rarified air being condensed by cold would become heavy, and cause it to fall rapidly to the ground?”

“So it would; and this, with other inconveniences to which that method of inflating balloons was subject, soon caused it to be laid aside as inconvenient and unsafe.”

“I suppose hydrogen gas was then substituted in its place, was it not?”

“Yes; philosophers then turned their attention to Cavendish's discovery, and they came to the conclusion that balloons filled with this gas would be much safer, and answer just as well in other respects, as those contrived by the

Montgolfiers, besides possessing several additional advantages. Their first experiment was made a little before the ascension of De Rozier, and finding it succeeded so well, the use of rarified air was soon after pretty generally abandoned."

"When persons in a balloon wish to descend, how can they do it?"

"By letting out some of the gas, which makes the balloon relatively heavier; and then, you know, it will of course come down."

"Cousin Ann said, the man that she saw go up had a parachute with him. What is that, and what is its use?"

"It is a thing that looks a great deal like a large umbrella open; and when any accident happens to the balloon, the person that is in it can save himself by holding on to the handle of the parachute."

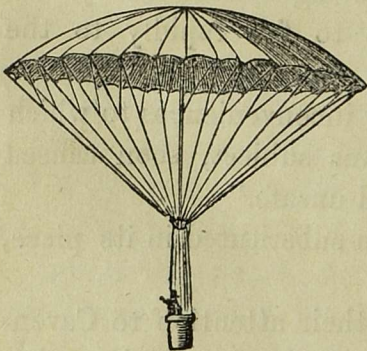
"How can that save him?"

"Because the air that it covers supports it so much that it comes very gently to the ground."

"Have these parachutes been long in use?"

"Yes; they have been in use nearly fifty years. The first individual who descended with one, I believe, was M. Garnerin, in 1802."

"Did any accident happen to his parachute?"



"No; it was altogether an experiment. While at a distance so great from the earth that he could scarcely be perceived, he cut the rope, and in an instant he was separated from the balloon, and trusting to the parachute for safety."

"Did he get to the earth without receiving any injury?"

"He received none to speak of."

"Such excursions appear to me to be very dangerous. I wonder persons are not often injured by them."

“So they are, Alfred. Sometimes the balloon falls into the sea, and the persons in it are drowned; at other times it will fall with great violence to the earth, and those within are much injured. Rozier, the first aeronaut, lost his life in this way. He and his companion, Romain, had ascended with the intention of crossing the Channel to England. For about twenty minutes all went on very well; but when they were about three quarters of a mile from the earth, the balloon took fire, and they both fell to the ground and were instantly killed.”

“Oh, how dreadful! Was their balloon filled with hydrogen or rarified air?”

“They had first a large balloon filled with hydrogen, and underneath this a smaller one, filled with rarified air.”

“Poor creatures! I wonder this accident did not deter others from engaging in it. But is hydrogen gas used for anything else?”

“Yes; the gas that is used for lighting the streets, shops, and houses in cities, is hydrogen. It is also one of the constituents of water.”

“Of water, did you say? Is there hydrogen in water?”

“Yes: water is composed of eight parts of oxygen, and one of hydrogen. It was for a long time considered as a simple substance, but it has now been fully proved to be a compound.”

“Speaking of water has put me in mind of a question I was going to ask you—how is it that throwing water on a fire will put it out?”

“Because when water is thrown on a body that is burning, it is instantly converted into vapour, and this deprives it of a considerable portion of its caloric, which causes the fire to be extinguished, as we term it.”

“What do you mean by caloric?”

“Simply heat. Here is a piece of wood; do you feel any heat in it?”

“No, not any.”

“Rub it briskly for a few minutes against this other piece.”

“It is quite warm now,” said Alfred, after he had rubbed it a little while.

“This latent, or hidden heat, has been termed caloric, to distinguish it from the peculiar sensation which this matter produces. If you place your hand upon the stove when it is hot, a portion of its caloric passes into your hand, and the sensation you feel is termed heat. But if you place your hand upon a piece of ice, part of the caloric in your hand leaves the hand to unite with the ice, and the sensation of cold is produced. Do you understand this?”

“Yes; but is caloric found in all bodies?”

“Yes; but it exists in much greater quantities in some than it does in others. Some substances, too, are better conductors of caloric than others.”

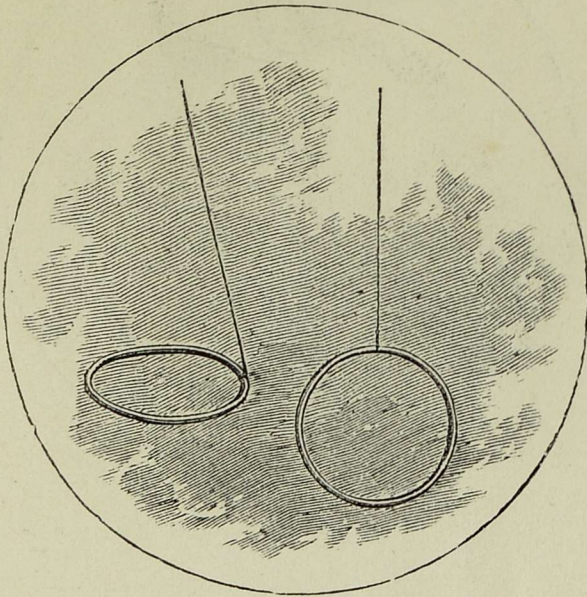
“I suppose, then, that is the reason why a room will feel cold to one individual, and warm to another, at the same time.”

“Explain yourself a little more fully.”

“I recollect one day last winter, when you came out of the garden into the dining-room, you remarked how warm the room was. I had just left the kitchen, where there was a much larger fire, which made the dining-room feel quite cold to me.”

“Yes; a portion of the caloric, that was in the air of the room, left it, to unite with my body, which made me feel warm, while a portion left your body and united with the atmosphere of the room, which made you feel cold. It is well to pay attention to all our various sensations, and to notice the circumstances under which they occur. In this way we shall gather much information, and many things that we read with an imperfect understanding will be explained and indelibly fixed upon our minds.”

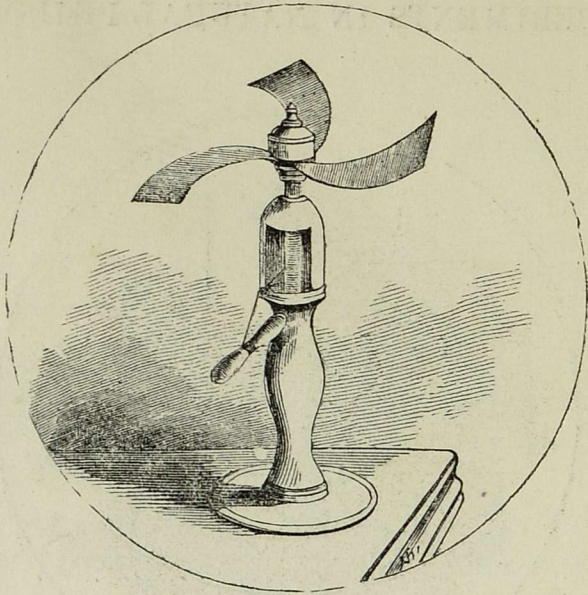
SIX EXPERIMENTS IN NATURAL PHILOSOPHY.



No. I.

Attach a ring to a Cord, so as to let it hang vertically ; then give it a circular motion, and the position of the Ring will become horizontal. Why ?

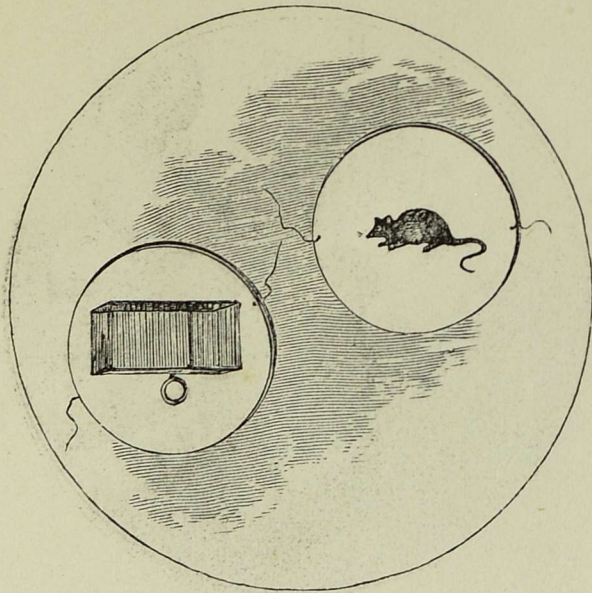
Every body has three principal axes upon which it may revolve, but the shortest one is that upon which it will be found to permanently and steadily rotate. When any impulse is given to such a body, by which it is caused to spin upon any other than its shortest axis, it will constantly exhibit a tendency to return to that axis.



No. II.

Take a "Flying Top," as shown in the diagram. Pull the string, and the top will rise into the air. Why?

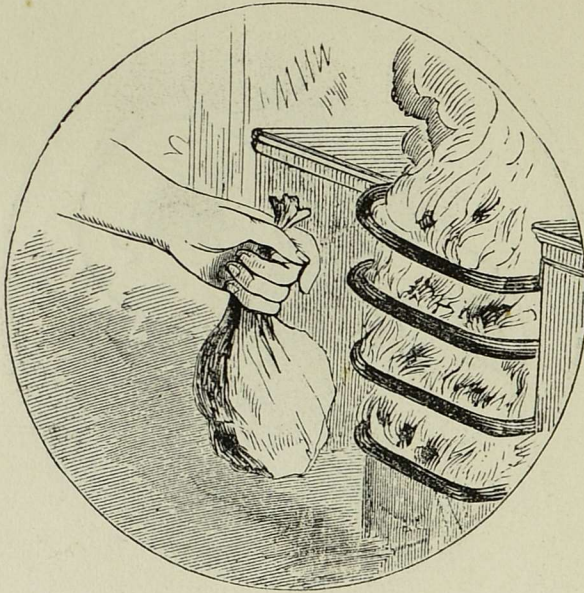
A body moving rapidly against a still air, produces an effect similar to that which would be exerted by wind upon a body at rest. The oblique vanes of the flying top striking the air in a slanting direction, cause an effect equivalent to that of a moving wind striking the sails of a ship, and impelling the hull of the vessel forward.



No. III.

On one side of a circular piece of cardboard, draw a mouse ; on the other side, a trap. Twirl the card rapidly, by means of bits of string fastened to the sides, and the mouse will appear to be in the trap. Why ?

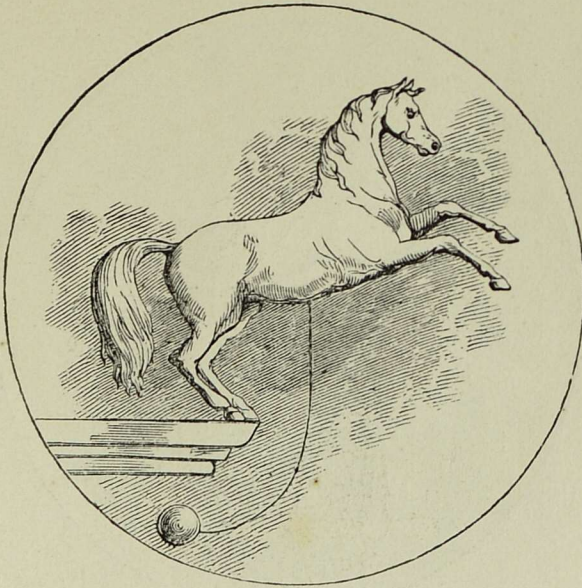
An image made upon the retina of the eye, remains for a minute space of time after the object which created the impression has been removed. When, therefore, two or more objects are presented to the eye in rapid succession, their images become blended.



No. IV.

Hold a closed bladder, partly filled with air, before a fire, and the bladder will become full. Why?

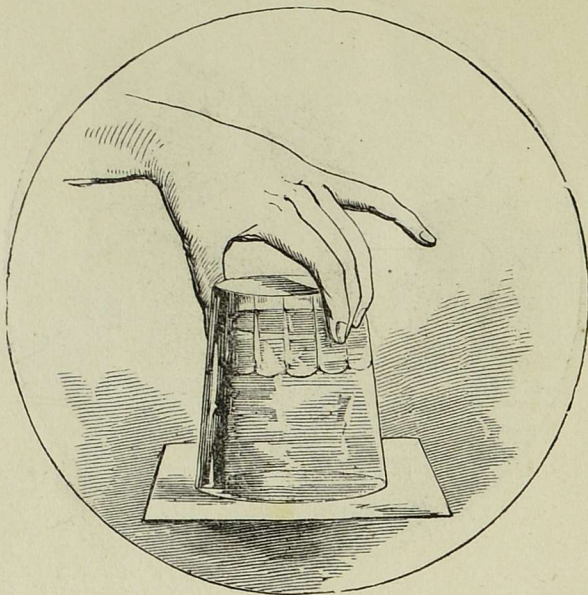
Heat expands all bodies, either by itself occupying space between the particles of bodies, or by causing those particles to repel each other. Air consists of particles, thus capable of separation or repulsion. Dry cold air is dense and heavy; warm air, and warm moist air, are light. The action of heat upon the air in the bladder illustrates the effect of temperature upon the mercury in the bulb of a thermometer.



No. V.

There is a toy called the "Flying Horse," which stands upon its hind legs, and rocks upward and downward. Although it rests upon the merest point it does not fall. Why?

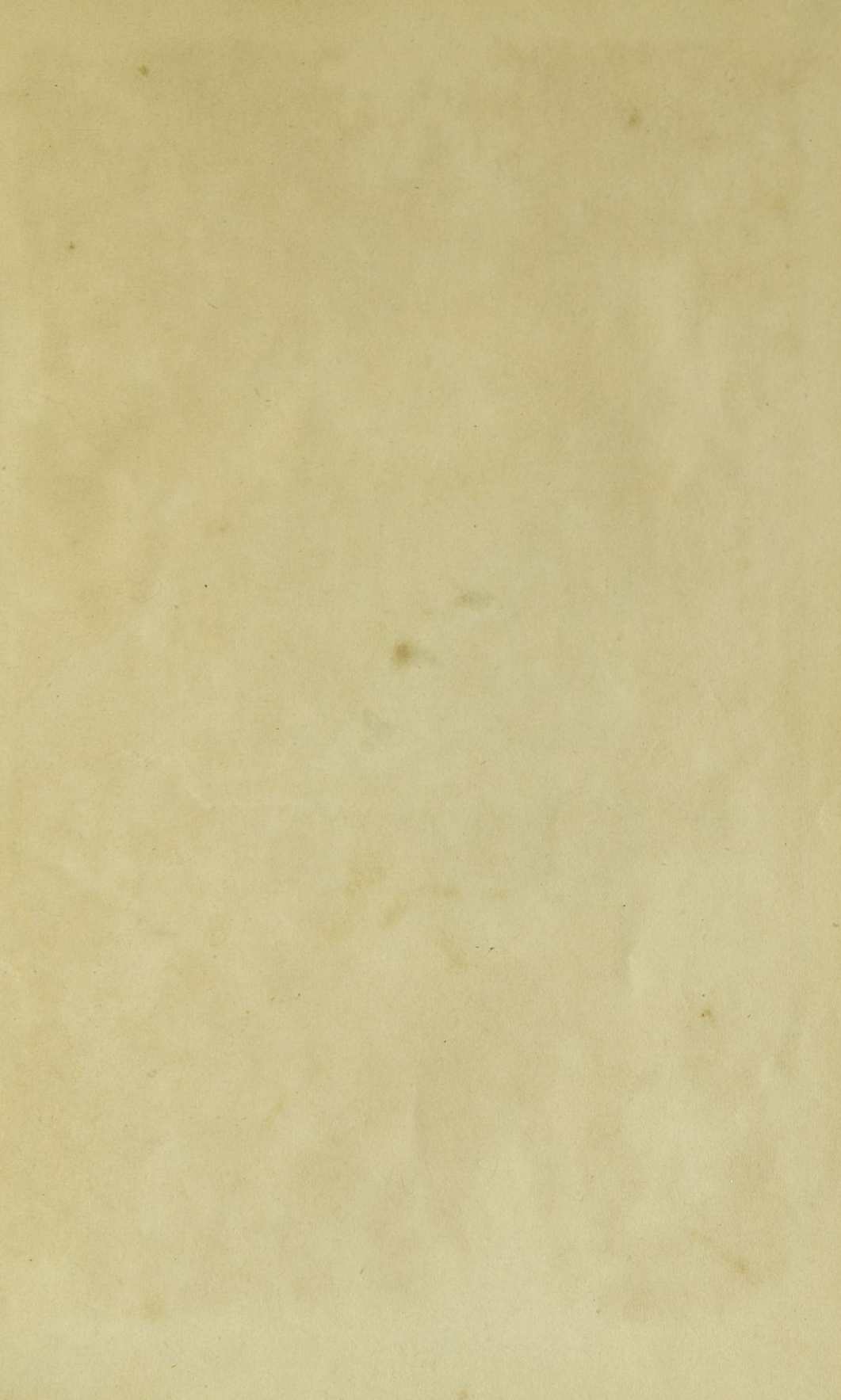
The body of the horse has a tendency to fall by its own weight. The leaden ball is attached to the wooden figure in such a way as to counteract the tendency of the horse to fall, by throwing the centre of gravity into the ball, which is in a line with the hind feet of the horse. As these rest upon a point of suspension, the fall of the horse is prevented.



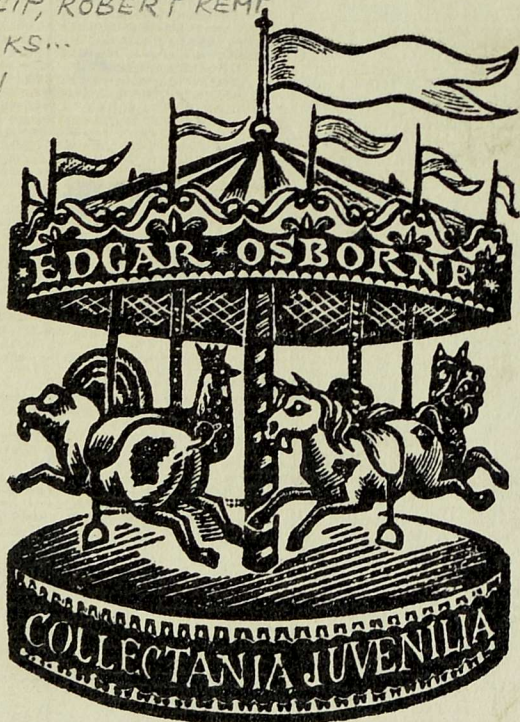
No. VI.

Fill a glass with water, place a card over it, and carefully invert it. The water will not run out. Why?

The pressure of the atmosphere upon all bodies at the earth's surface is equal to fifteen pounds to the square inch. Air being excluded from the glass by water, the external pressure of the air supports the weight of the water. As soon as air enters, the atmospheric pressure is communicated to the interior of the glass, and the water is forced out.



NS
PHILIP, ROBERT KEMP
WALKS...
1861



37131 009 559 402

II, 833



