

the Camberwell beauty. As to their colouring it varies considerably. The large tortoiseshell for instance is yellow with a green band and reddish spots, the black veined white, black with red markings above and greyish black underneath, while in the swallow-tail, sulphur and several others, green is the prevailing colour with bands and dots of yellow, red, black and blue. The connection between the colouring of the caterpillar and the imago is far from being evident in many cases. I give a drawing of the lobster moth larva, as it is unique as a caterpillar.

The larvæ of moths varies as much, some being plain, others tuberculated or hairy, but moth caterpillars are usually much larger in proportion to their imago than butterflies, and while no butterfly larva has a tail many moths have, as is well shown in the death's head.

Larvæ have in all cases thirteen divisions or segments, of which the first is the head, the next three thoracic segments to which belong the three pairs of true legs. Attached to the seventh, eighth, ninth, tenth and thirteenth segments there are usually pairs of what are generally known as pro-legs or claspers which have considerable clinging power. Most larvæ have hairs upon their bodies, arising from small, raised, hardened disks. Each has sometimes a single delicate bristle or bunch of bristles; in other cases a spine, simple or branched; but in many species the covering is much more dense, either short soft down, or hair, short or intermixed with longer, or in part forming thick tufts. Along both sides above the legs and pro-legs is a complete row of minute orifices called the spiracles, through which the air is conveyed to a wonderful series of vessels called *tracheæ* which fulfil the function of lungs. To suffocate a caterpillar therefore you have only to paint down both sides with oil, which filling up these spiracles kills the larva.

Chrysalides of butterflies are either suspended by hooks at the tail of the pupa as in the silver-washed fritillary H and G and Camberwell beauty C and D, or by a silken cord around them as in swallow-tail A and B. Chrysalides which are embedded in a silken cocoon may be always taken for moths, for only the "skippers" spin a cocoon.

It may astonish many readers to hear of lepidoptera singing, yet Darwin in speaking of the butterflies of Brazil mentions one, *Ageronia feronia*, inhabiting the orange groves, which makes a clicking noise, similar to that produced by a toothed wheel passing under a

spring catch. A. R. Wallace corroborates Darwin.

Reaumur was the first who published an account of the note of the death's head, which resembles the faint scream of a macaw. His conclusion was that the note of the moth might be produced "by the friction of the two-bearded limbs against the proboscis."

This moth keeps well in confinement, and a number of individuals living together showed a disposition to pat one another with their forefeet; and a touch of the delicate tarsus provokes a squeak. They had a tendency to die of gluttony. This moth will attack beehives, ravaging the honey and dispersing the inhabitants. Hubner, who first noticed that this moth should prove victorious over thousands of insects armed with stings, asks "may not this moth—the dread of superstitious people—also exercise a secret influence over insects, and have the faculty, either by sound or some other means, of paralysing their courage. May not such sounds as inspire the vulgar with dread be also the dread of bees?"

After several changes of the skin the caterpillar prepares to undergo its change into the chrysalis state, and spins a little hillock of silk, which it seizes firmly with the hooks of its anal feet. It has still, however, to construct a silken girth across the middle of its body, which it effects in a manner the most simple and least liable to accidents of the three modes adopted for this purpose by the different kinds of caterpillars which fasten themselves by girths. The caterpillars of the cabbage white have very flexible bodies, so that they are able to throw back the head until it extends to the back of the fifth segment of the body, its pro-legs being elevated in the air. It then applies the spinneret of its lower lip to the surface on which it is stationed, close to one of the first pair of fleshy pro-legs, and has only to carry its head over the body to the opposite side to fix the other end of the thread. It then causes its head to return by the same route, emitting a second thread in like manner, and by repeating this operation a sufficient number of times the skein of silk becomes strong enough to support the insect which reposes quietly at full length, or rather its body contracts and becomes thicker, and at length the skin of the fore part of the back bursts and the head of the chrysalis appears. By continued writhing of the body the slit is enlarged and the skin pushed backwards beneath the skein of silk and thrown off at the tail.

The butterfly appears in the perfect state about the middle of May, or earlier if the weather be favourable. It deposits its eggs at the end of the month, the caterpillars from which are soon hatched and feed together until the end of June, when they change to chrysalides, which period lasts from seven to about sixteen days. The perfect butterfly appearing therefore in July and depositing eggs which produce caterpillars which become full fed so as to undergo their change to chrysalis in the autumn, in which state they remain till the following May.

Reaumur, who described the transformation of the small garden white, says that it spins the silk as just recorded, and that the change is going on under the skin of the caterpillar, and its final transition is the affair of an instant, and the chrysalis by shortening and lengthening itself finally pushes the old skin out of the silken mesh where it lies until ready to emerge a butterfly.

Reaumur in his *mémoires* says—"The chrysalis of the peacock butterfly is suspended head downwards. To accomplish this after attaching itself by the hooks of its hind feet in the button of silk, as mentioned in the former case, it hangs with its head down. Whilst thus suspended, it succeeds after at least twenty-four hours' contortion in forming a slit down its back, through which the head of the chrysalis is protruded and the caterpillar's skin pushed upwards to the tail. A delicate operation has still to be performed; the caterpillar was suspended by the hooks of its own hind legs to the silken button; but not only has the still partially enclosed chrysalis to disengage itself entirely from the skin of the caterpillar and attach itself to the silken button, but also to get rid of the old and no longer necessary caterpillar skin. To effect these objects, the chrysalis carefully withdraws its tail from the skin, seizing hold of the outside of the latter by pressing two of the rings of its body together and enclosing between them part of the old skin. By repeating this proceeding, it at length pushes its tail upwards, till it reaches the silken button, to which it fastens itself by means of the hooks with which the tail of the chrysalis is furnished.

Those readers who wish for more details are referred to Dr. Knagg's *Lepidopterist's Guide*, Reverend J. Green's *Pupa Digging*, and Reverend I. S. St. John's *Larva Collecting and Breeding*.

(To be continued.)

## DRESSES OF STRANGE MATERIAL.



NOT long ago, the Infanta Eulalie had presented to her a dress of most curious material—glass! and the following is a description thereof. The foundation is a silk warp, woven with five strands of glass, in each of which there are two hundred and fifty almost invisible threads. Three women can only make three-quarters of a yard of this material in a whole day, so that its cost may easily be imagined. The fabric is arranged as a gored skirt over one of white silk. It is bordered with a flounce of chiffon partially veiled with a glittering fringe of glass. The bodice is of silver

cloth, woven in with threads of glass, and glass epaulets glitter above the chiffon sleeves. This dress is white, but it can be made in several colours, and even shot effects can be produced, but it is not sewn—the various seams being glued together. But an Austrian inventor has gone further than this, and sells dress lengths and bonnets of glass cloth—the material being perfectly soft and pliable with the same shimmer as silk. If it gets dirty it need only be scrubbed with soap and water, to be like new again; and, in addition to this, it is waterproof.

But glass is by no means the only curious material of which dresses have been made. The Russians have long made a cloth from a mineral found in the Siberian mines, which is split up by some secret process and spun into thread. The finished stuff is quite soft, and when dirty is simply thrown into a hot fire when it becomes spotless again. It is

said to be far stronger than the strongest silk, and to be practically indestructible.

Not unlike this material is asbestos cloth. It is cleaned in the same way of course, but is not nearly like so strong, and very fine qualities of it cannot be made. Asbestos, however, has been used for making lace, and the Princess of Wales has, in her collection, supposed to be the finest in the world, several beautiful pieces of asbestos lace.

We all know that gold is capable of being drawn out into exceedingly fine wires. It has been drawn out so finely that it can be spun into very pliable threads, and one of the ruling Indian princes possesses a splendid gown of this pure gold cloth, which is so fine that its weight is not uncomfortable.

There have been many attempts to make silk, and one of these attempts came to something. It was made with wood—ordinary sawdust. This was treated with acids and other

chemicals, and finally pressed through a tube containing a number of minute holes. The silk so made was then spun, rendered fireproof, and when quite finished was indistinguishable from ordinary silk—that is to the touch, eye, etc., but it was almost as dear as the regular article.

How would our readers care to wear garments made of spider's silk? The thread one sees a spider spinning is made up of several smaller ones, but a wire made of the strongest steel would, were it only as thick as one of these multiple threads, be about a tenth as strong. A gentleman recently succeeded in manufacturing a pair of stockings from this material, but it took him some years to collect the silk and a good many thousand spiders to supply it, so that spider-silk cloth will not become very fashionable, although it is ten times as strong as sheet steel.

Savages sometimes wear dress of curious material—that is when they do wear it. The Indians of Brazil wear a kind of cloak which is grown on trees. Don't laugh, 'tis true. It forms the inner bark of these trees, and is obtained by stripping it off without breaking. They cut arm-holes and gather in the top, and lo! they have their cloak ready, and it looks exactly like a piece of coarse sacking.

Another cloak of curious fabric is worn, or was worn by a tribe of the fast dying-out Red Indian. This weird relic was composed entirely of the scalps of slain foes, and was for long a bone, or rather skin of contention amongst Indian tribes, as it was a unique specimen.

To conclude we will describe a cloak of much more artistic composition. This is the

one which was worn by the kings of Hawaii. It is part of the regalia, is eleven feet long by five broad, and composed entirely of the golden feathers of a certain bird. Only the king may wear it, but he no longer does so, though even to this day it is laid across the throne on very great state occasions. Its value is inestimable, for the bird, a species of blackbird which furnishes the golden feathers, only possesses two feathers which can be used, one under each wing. A new cloak used to be made every time one of the kings died; so that it may be imagined what a slaughter of these innocents there must have been to get a single cloak. At last, to prevent the extinction of the species, the specimens were merely caught, plucked of the coveted feathers and set free again.

RAYMOND T. REID.

"CANDIES."

By the Author of "We Wives," etc.



EVER since an enterprising brother, intent on scientific research, found that a lump of sugar applied to the flame of a candle resulted in beads of crimson colour, candy-making has been a favourite

pastime of ours. "Candle-beads," pretty as they look, are apt to taste of tallow and smoke. Sugared candies of other sorts are, or ought to be, free from such drawbacks.

Our "popped-corn parties" (*vide* THE GIRL'S OWN PAPER for April, 1896) could assemble all the year round if approved of. But our "candy club" only met at stated seasons. It was as a law of the Medes and Persians that butter-scotch (for instance) should only be made when the first blizzard powdered our wide prairie land with soft fleeces of snow. That raspberry-rock should be baked only when bluff and shoulder-ridge were pink with the wild cane. That "cream-toffee" and "honey-ball" should only make their appearance when a cow came into the dairy for the first time, or a hive of wild bees were rifled of their store.

If any reader of THE GIRL'S OWN PAPER is inclined to follow our family pattern and start a candy club, I would advise some such rules to be made. Sweets are apt to cloy when too often indulged in, and cookies are sometimes cross (at least they are in America). Of course the club should always provide sugar, fruit, and tins. Mothers, generally, do not grudge other flavourings and fire.

Most likely when this paper appears, every garden in "Eū-rope" will be rich in raspberries, or have just laid by a store of the seedy jam or crimson syrup. So I will begin by telling you how our candy club made

*Raspberry Rock.*—To every pound of lump sugar or refined molasses we allowed three-quarters of a teacupful of cold water. We boiled it until the syrup thickened, and "beads" of heat broke out on the surface. Very careful we were to keep stirring all the

time, especially when the candy began to "crack."

We tried if it was done enough by dropping a little into a cup of cold water. When a "snap" followed and the droppings looked crisp and crinkly, we removed the pan from the fire and stirred in one of two things, either three dessertspoonfuls of jam boiled, with a little water, and run through a sieve, or as much raspberry acid. I will tell, at the end of this paper, how to make this acid. But, as our candy is popping and cracking, we must finish it up first. On the deal-table we always had some well-buttered plates. After stirring in the flavouring (and adding a few drops of cochineal, if needed, to improve the colour), we filled each with the hot syrup. It cooled slowly, and after a few minutes its face had to be scored with a knife, in diamonds or squares. The rock is too hard to break when cold, except with a sledge-hammer, unless this is done.

Some of the candy we used to "pull" into twists and true lovers'-knots. This is fascinating work, the feel of the soft, yielding, smooth stuff between one's fingers being especially delightful to a child, whilst well-boiled candy can take such pretty shapes!

The syrup or acid for this rock is made as follows:—It can be used as a delightful summer drink mixed with plain cold water. But it is (a brother's expression comes in here) "scrumptious," if added to a tumbler of "fizz," either soda-water or lemonade.

Take twelve pounds of raspberries. Put them into a pan, and pour over them two quarts of cold water, previously acidulated with five ounces of tartaric acid. Let all remain undisturbed for twenty-four hours, then strain through a flannel jelly-bag or piece of fine muslin, taking care not to bruise the fruit.

To each pint of this clear crimson liquid, add one pound and a half of finely-powdered sugar. Stir frequently. When quite dissolved, and after removing any scum that may have risen, bottle the syrup and store in a dry place.

This acid requires no boiling and will keep for a couple of years if required. It can be made from ripe strawberries in the same way, but, to my taste, the latter fruit is too luscious and the syrup lacks just the *souçon* of tartness necessary.

*Cream Toffee.*—This is just a variation of the ordinary butter-scotch. To every pound of brown sugar, or molasses, we allowed a pint of thick cream. When the sugar boiled

we stirred in the yellow, leathery stuff, instead of using mother's freshly-churned butter.

It was all boiled together until it "snapped," then turned into fanciful buttered tins and left till cold. Cream toffee is crisper and "shorter" than the ordinary stuff, but not quite as rich.

*Butter Candy*, heralded in, as it was, by the first snowstorm, was perhaps our favourite sweetmeat. It meant the beginning of stoves and hickory fires and winter sleighing. It meant the approach of long evenings spent in the pine-panelled kitchen busy with book or brush or plane. It meant earlier to bed and later to rise. It meant home lessons instead of school marms. So it was altogether suggestive of cosiness and cuddling and crooning and a great many other "C's"!

To make this, we always took half and half of butter and sugar. The browner the sugar the better the candy. It had to be boiled until clear and transparent, then poured into buttered paper. Some roughly chopped almonds sprinkled on it turned butter-scotch into almond candy. Or desiccated cocoanut strewn on its face masked it into cocoanut candy.

It was always stored in wide-mouthed bottles with tin tops. How long it lasted depended on how much we made, and on how many of the young fry were at home.

For "honey balls" we took half as much honey as butter and of course no sugar. We boiled until the "beads" appeared as in raspberry rock. When nearly cold, instead of "pulling" the honey candy, we rolled it into balls and set it aside to dry.

I think our candy club had one advantage many readers of this paper may fail to appreciate. Of course we had failures. Sugar "catches" easily, and burnt molasses is an abomination. But to our door sometimes came alarming looking squaws robed in buffalo and fringed with beads. On their backs always—we never saw a squaw unaccompanied in this manner—were one or two brown-faced, black-eyed, soft-skinned "papooses." What better way of hiding our failures (at the same time of propitiating the brave) than presenting a potful of "candy" to the dear things. They do not mind smoke, or tallow, or burn! A papoose with a cold potato in one hand and a hunch of burnt cream toffee in the other, is a sight to remember. And are there no wild Red Indians on the London streets? Whenever you fail in your candies call in the next little *gamin* that passes and see!