named "pin-eyed" and "thrum-eyed." It was reserved, however, for the genius and perseverance of Mr Darwin to explain the significance of this curious phenomenon and the important part it played in the economy of the flower. Mr Darwin pointed out that an insect thrusting its proboscis down a primrose of the long styled form would dust its proboscis at a part which, when it visited a short styled flower, would come just opposite the head of the pistil, and could not fail to deposit some of the pollen on the stigma. Conversely, an insect visiting a short style plant would dust its proboscis at a part further from the tip, and which, when it subsequently visited a long-styled flower, would

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again come just opposite to the head of the pistil. Hence, by that beautiful arrangement, insects would carry the pollen of the long styled form to the short styled, and *vice versa*. It had likewise been discovered by Mr Darwin that much more seed was set if pollen from the one form were placed on the pistil of the other, than if the flower were fertilized by pollen of the same form, even if taken from a different plant. And it was remarkable that such unions in Primula, were more sterile than crosses between distinct species of plants. But he would now ask them to consider for a moment the manner in which the bees were adapted to the flowers. Although they might in one respect say that the general organization of the insect was modified with reference to these relations, still, the parts which had been most profoundly modified were the mouth and legs. Then if they were asked why they assumed that in this case the mouth-parts and legs had been modified, the answer would be that they departed greatly from the type and found in allied insects; and that between this type and those modified examples, various gradations were to be found. They would observe that the mouth of an insect was composed of (1) an upper lip, (2) an under lip, (3) a pair of anterior jaws, and (4) a pair of posterior jaws. These two pairs of jaws worked from side to side. The lower lip and maxillæ were each provided with a pair of feelers or palpi. In the different groups of insects these organs presented, however, almost infinite variations. The bees belonging to this genus constructed their cells in sand, or in dry bramble sticks, lining them with a transparent mucus, which they smoothed down with their trowel-like lower lip. If they examined the hind legs of bees, they would find similar gradations. In prosopis they did not differ materially from those of the genera, which supplied their young with animal food. Portions of the leg bore stiff hairs, the original use of which probably was to clear the burrowing insect from particles of sand and earth, but which in prosopis assisted also in the collection of pollen. In panurgus the same change was still more marked, and the pollen-bearing apparatus was confined to the first segment of the tarsus, a differentiation which was even more apparent in Anthophora. In the particular class of bee to which he was alluding the pollen was simply entangled in the hairs of the leg as in a brush, but there were other genera, as, for instance, the humble bees, and the hive bee, which moistened the pollen with honey. When thus formed into a sticky mass, it was much more easy to carry. In the humble bee, for instance, the honey was borne on the outer side of the hinder tibiæ. Referring to the diagram the hon. baronet pointed out that the tibiæ was flattened, smoothed, and bordered by a row of stiff curved hairs, which constituted a sort of little basket in which to convey the honey. But in the hive bee the adaptation was still more complete, the hairs on the first tarsal segment being no longer scattered, but arranged in regular rows. Turning again to the subject of flowers and their many astonishing peculiarities, Sir John observed that many flowers closed their petals during rain. This he said was obviously an advantage, since it prevented the honey and pollen from being spoilt or washed away. Everybody, however, had observed that, even in fine weather, certain flowers closed at particular hours. Now, he thought that this habit of going to sleep was surely very curious. The question naturally arose—Why should they do so? In animals they could understand it; they were tired and required rest. But why did flowers sleep? Why did some flowers do so and not others? Moreover, different flowers kept different hours. The daisy opened at sunrise, and closed at sunset. It was on account of this that it received its name "day's eye." The dandelion was said to open at 7 and close at 5; Arenaria rubra to open from 9 to 3, Nympha alba from 7 to 4; the common mouse-ear hawkweed to wake at 8, and go to sleep at 2; the scarlet pimpernel (Aungallis arvensis) to wake at 7, and close soon after 2; while Trogopogon pratensis opened at 4 in the morning, and closed just before 12, whence its English name, "John go-to-bed at noon." Farmers' boys in some parts were said to regulate their dinner hour by it. Now it was obvious that flowers which were fertilized by night flying insects would derive no advantage from being open by day, and on the other hand that those fertilized by bees would gain nothing by being open at night. On the contrary, it would be a distinct disadvantage, because it would render them liable to be robbed of their honey and pollen by insects which were not capable of fertilizing them. The closing of flowers, he believed, has reference to the habits of insects. In support of this he explained that wind-fertilized flowers never slept, and that some of those flowers which attracted insects by smell emitted their scent at particular hours; thus, Hesperis matronalis and Lychnis vespertina smelt in the evening, while Orchis bifolia was particularly sweet at night. Moreover, night flowering blossoms were generally deficient in those spots and lines known as "honey guides," and which, of course, would be useless to such flowers, because invisible in the dark. Again they would observe that night flowers were generally pale yellow or white; thus Lychnis vespertina, which opened in the evening, was white, while Lychnis diurna, (a day flower) was red. It must be confessed, however, that the opening and closing was very gradual, and that the hours varied greatly according to circumstances. So much was this the case, that though it might be possible to construct a flower clock, it would, he feared, be of very little use. For instance, the common dandelion was reputed to be one of the most correct dial flowers, but it sometimes took two or three hours in opening, and as long in closing. He had made several experiments with this flower, and had ascertained that it was greatly influenced by light and weather, as to the time of opening and closing. For instance, a dandelion which he watched on the 26th November—a cold, raw, gloomy day—began to open at seven, but stopped at 7.30. So it remained till one, when it expanded a little further, but commenced to close again at 3.30. On the following day, which was beautiful and bright, the same flower at nine o'clock was considerably opened; and, by means of artificial light, he found that he could cause it to remain open long after the usual hour. Further experiments showed that, on the contrary, by keeping them in the dark, he could beguile some to pass the whole day in sleep. Different flowers seemed to possess individual peculiarities; and, as an instance of this, he might tell them that he once knew a dandelion which kept awake all night. But however that might be, the observations commenced by Sprengel and recommenced by Darwin, had given to flowers an additional interest, and had shown that insects, and especially bees, had an importance previously unsuspected. It could not be denied that to them we owed the beauties of our gardens, the sweetness of our fields. To them flowers were indebted for their scent and colour; nay, their very existence in its present form. Not only had the forms of flowers, their brilliant colours, their sweet smell, and honey, been gradually developed by the unconscious agency of insects; but the very arrangement of the colours, the circular bands and radiating lines, the form, size, and position of the petals, the arrangement of the stamens and pistil, all had reference to the visits of insects, and were disposed in such manner as to ensure the great object which those visits were destined to effect. For it was obvious that any blossom which differed from the form and size best adapted to secure the due transference of the pollen would be less likely to be fertilised than others; while on the other hand those which were rich in honey, which were the sweetest, and the most conspicuous, would most surely attract the attention and secure the visits of insects. And thus, just as their gardeners by selecting seed from the most beautiful varieties had done so much to adorn their gardens, so had insects by fertilising the largest and most brilliant flowers unconsciously, but not less effectually, contributed to the beauty of our woods and fields. (Loud and prolonged applause.)