odorants are only partially repellent to the flying moth, and have no effect at all upon the egg or the worm. The benzine spray is the least objectionable destroying agent that we know of. It may be used very safely upon carpeting, but the utmost care should be exercised in using it on fabrics of a delicate character.

One should not confuse the moth with the carpet beetle. Frequently housekeepers discover their carpets eaten, and they attribute it to moths. The perfect beetle is three-sixteenths of an inch long, and when disturbed it draws in its legs and feigns death. It is white and black, scarlet being confined to a strip down the middle of the back. It begins to appear in the autumn, and soon the species pair off and the female deposits her eggs upon the carpet itself, and not in the cracks and crevices as generally supposed. During the daytime these beetles frequently fly to the windows and may be caught there, but they seldom leave the house until their eggs have been deposited. The treatment is similar to that with moths. A hand atomizer, charged with benzine, should be used to inject the liquid into all the floor cracks and under the baseboards, until every crevice has been reached. The carpets themselves, after thorough beating, should be lightly sprayed with the same substance.

THE CHIMPANZEE AT THE ZOOLOGICAL GARDENS.

By W. B. TEGETMEIER.

It is doubtful whether any of the animals exhibited from time to time in our zoological collections are

the head and eat it, skin and feathers included. This food seemed so natural to her that for many months Sally was supplied with a young pigeon, which she killed and ate every night. After a time she became more civilized, when cooked mutton and beef tea were substituted for this part of her dietary. The location of the Zoological Gardens, close to the Regent's Canal, is attended with one very serious inconvenience. The rats from the canal cannot be kept out. They are present in every part of the gardens to which they can get access, in spite of the numbers that have been constantly destroyed. To Sally, however, they were by no means an inconvenience. If a rat entered her cage at night it was invariably caught and killed by her. In these respects Sally differed very much from the ordinary chimpanzee, which Mr. Bartlett informs us he has never known to eat any kind of flesh, and he has had a large number of specimens under his care during the many years that he has been superintendent of the gardens. These were not the only distinctions that characterized Sally. She was undoubtedly far more intelligent than any of the larger apes that have ever before been kept in confinement. She was affectionate, hardly ever tired of romping and playing with her keeper, generally in a very good temper, although she occasionally behaved like a spoiled child. Sally was capable of being taught many things that showed considerable thought and a great amount of intelligence. She always obeyed her keeper, and was trained to such an extent that she could even count to a considerable number. The keeper had taught her to give the exact number of straws asked for, which she would select, pick up, arrange in a little bundle, and hand to him, whether she was told to select three, four, five,

Her portrait was repeatedly published, photographs of her were constantly taken, experiments as to her intelligence were made by scientific investigators, and she was taught to perform actions, to obey orders, as we have said before, to count straws, by her keeper at the suggestion of those who endeavored to investigate her mental condition.

The death of Sally is a great loss to the gardens, and is one not likely to be supplied. No instances whatever are known of any of the larger apes attaining any age approaching to that which she had reached. The extraordinary human expression of her face was partly disguised by the enormous size of her ears. If, however, one of her portraits were taken, and a piece of paper or muslin, cut into the likeness of a mob cap, were placed around her face, her resemblance to a human being became at once wonderfully manifest, and we have seen many types of humanity that do not look as elevated in the scale of creation as the much lamented creature which has now passed away.—*Illustrated London News*.

SOME DIFFICULTIES IN THE LIFE OF AQUATIC INSECTS.*

By Professor L. C. MIALL.

WE understand insects to be animals of small size, furnished with a hard skin and six legs, breathing by branched air-tubes, and commonly provided in the adult condition with wings. The animals thus organized are pre-eminently a dominant group, as is shown by the vast number of the species and individuals, their universal distribution and their various habitat.

The insect type, like some fruitful inventions of man—paper or lithography, for instance—has proved so successful that it has been found profitable to adapt it to countless distinct purposes. I propose to consider one only of its infinitely varied adaptations, viz., its adaptation to aquatic life.

There are insects which run upon the earth, insects which fly in the air, and insects which swim in the water. The same might be said of three other classes of animals—the three highest—viz., mammals, birds and reptiles. But insects surpass all other classes of animals in the variety of their modes of existence. Owing to their small size and hard skin, they can burrow into the earth, into the wood of trees, or into the bodies of other animals. There are some insects which can live in the water, not as the mammal, bird or reptile does, coming up from time to time to breathe, but constantly immersed, like a fish. This is the more remarkable because insects are as a class air-breathers. Air-tubes or tracheæ, branching tubes, whose walls are stiffened by spiral threads, supply all the tissues of the body with air. That such an animal should be hatched in water and live almost the whole of its life immersed, a thing which actually happens to many insects, is a matter for surprise, and implies many modifications of structure, affecting all parts of the body.

The adaptation of insects to aquatic conditions seems to have been brought about at different times, and for a variety of distinct purposes. Many dipterous larvæ burrow in the earth. Some of these frequent the damp earth in the neighborhood of streams; others are found in earth so soaked with water that it might almost be called mud, though they breathe by occasionally taking in atmospheric air. In yet more specialized members of the same order we find that the larva inhabits the mud at the bottom of the stream, and depends for its respiration entirely upon oxygen dissolved in the water. The motive is usually that the larva may get access to the decaying vegetable matter found in slow streams, but some of these larvæ have carnivorous propensities.

Other insects merely dive into the water, coming up from time to time to breathe or skate upon the surface.

Nearly every order of insects contains aquatic forms, and the total number of such forms is very large. I believe that all are modifications of terrestrial types, and it is probable that members of different families have often betaken themselves to the water independently of one another.

The difficulties which aquatic insects have to encounter begin with the egg. It is in most cases convenient that the egg should be laid in water, though this is not indispensable, and the winged, air-breathing fly is, as a rule, ill-fitted for entering water. Some insect eggs hatch if they are merely scattered, like grains of sand, over the bottom of a stream, but others must be laid at the surface of the water, where they can gain a sufficient supply of oxygen. If the water is stagnant, it will suffice if the eggs are buoyant, like those which compose the egg-raft of the gnat, but this plan would hardly answer in running streams, which would carry light, floating eggs to great distances, or even sweep them out to sea. Moreover, floating eggs are exposed to the attacks of hungry creatures of various kinds, such as birds or predatory insect larvæ. These difficulties have been met in the cases of a number of insects by laying the eggs in chains or strings and mooring them at the surface of the water. The eggs are invested by a gelatinous envelope, which swells out the moment it reaches the water into an abundant, transparent mucilage. This mucilage answers more than one purpose. In the first place it makes the eggs so slippery that birds or insects cannot grasp them. It also spaces the eggs and enables each to get its fair share of air and sunlight. The gelatinous substance appears to possess some antiseptic property, which prevents water-moulds from attacking the eggs; for long after the eggs have hatched out, the transparent envelope remains unchanged. The eggs of the frog, which are laid in the stagnant water of ditches or ponds, float free at the surface, and do not require to be moored. The eggs of many snails are laid in the form of an adhesive band, which holds firmly to the stem or leaf of an aquatic plant. Some insects, too, lay their eggs in the form of an adhesive band. In other cases the egg-chain is moored to the bank by a slender cord.

The common two-winged fly, *Chironomus*, lays its eggs in transparent cylindrical ropes, which float on the surface of the water. During the summer months

SALLY, THE CHIMPANZEE AT THE ZOOLOGICAL GARDENS.

viewed with as much interest as those that constitute the nearest of our poor relations, the anthropoid or human-like apes, of which three distinct groups are known—the orang-utans from Borneo, the gibbons from tropical Asia, and the gorillas and the chimpanzees from Western Africa. These are the most highly developed of all the animal creation, and approach the nearest to man. Unfortunately, they are all short-lived in our temperate climate, seldom living a sufficient time for their habits and instincts to be accurately studied. One remarkable exception, however, has been long familiar to the London public. Sally, the bald-headed chimpanzee, that was recently living in the Zoological Gardens, was a well known figure in London life. When Sally arrived at the gardens, in October, 1883, she was quite an infant, not having shed her first teeth; probably she might have been between two and three years old. As soon as she arrived, it was seen that she differed from the ordinary chimpanzees, of which, since their commencement, more than thirty specimens have been exhibited in the gardens, all of which, unfortunately, were short-lived. The most important differences between Sally and her predecessors were that her face was almost black in color, that her head was destitute of hair, whereas in the ordinary chimpanzee the hair divides on the top of the head, falling to each side in tolerable abundance, and, again, her ears were very much larger. Hence Sally was regarded as the type of a new species, differing from the old one, and was called the bald chimpanzee, or, in scientific language, *Anthropopithecus calvus*. No sooner was this young creature located in the gardens than she showed a disposition to live upon animal food. If a small bird were let fly in her cage, she would adroitly catch it as it flew past her, bite off

six, or seven; it was even said that she could go on to a greater number. She always recognized those who made her acquaintance, and paid marked attention and evinced an extraordinary amount of interest in colored people, whom she would receive with a loud cry, which sounded much like the syllables "bon, bun, bun."

The chimpanzee may be regarded as the animal which approaches most nearly to man. Although smaller than the full grown gorilla, there is not the great disparity in the size or structure of the two sexes that there is in that animal. When the chimpanzee stands upright the arms reach only a short distance below the knees, being in this respect more human-like than any other ape. The face is furnished with distinct whiskers, eyebrows, and eyelashes. The forehead is more vaulted, and the brain, as might be expected from the intelligence of the animal, larger than in any other ape. The tusks are much smaller, and the whole of the teeth make a close approximation to those of the human species. The comparatively long life which Sally has passed in confinement is doubtless due to the conditions under which she was placed. Instead of being put in the crowded monkey house, she had, as most of our readers must be aware, a large room very much to herself, where the air was comparatively pure, and she was not irritated by the presence of other animals of the same kind. Her death was due to a complication of diseases. She did not die of that one which is generally, but erroneously, supposed to cause the death of the majority of monkeys—namely, consumption.

As, perhaps, the nearest approach to humanity that has ever been seen or studied in an adult state in this country, Sally excited very great and general interest.

* Evening discourse, delivered before the British Association, Cardiff, 1891, by L. C. Miall, Professor of Biology in the Yorkshire College.—*Nature*.