Rev. W. W. Fowler, who has kept and watched the species, as having the peculiar habit of walking on the under-side of the surface of the water with its back downwards, after the fashion of a fly on a ceiling, a thin film of air contained between the body and the edges of the elytra seeming to act as a float ; the larva, too, is so completely permeated with air by means of its large tracheæ as to be rendered quite buoyant, and to find, apparently, as much difficulty in sinking as a man with a cork jacket on ; so it needs no efforts to maintain itself in its inverted position just below the surface.

Water-beetles, as we have already said, are not confined to the water, but at night frequently leave their native ponds and enjoy themselves in the air, or migrate to other quarters. No collection of water is so small as not to prove attractive to them ; even cart-ruts that have been converted into so many miniature canals by a heavy rain may soon become tenanted. They cannot boast of any great brilliance of colouring. Yellows of no very conspicuous hue, browns, greys and blacks, singly or intermixed, are the prevailing tints. Some few of the brighter yellow species are spotted with black, and so become rather pretty, and some of the Philhydrida, are slightly adorned with spots and patches of a metallic tint something like that of "peacock copper ore," but with these few exceptions they are a sombre set of insects, and their chief interest certainly lies in the remarkable modifications which fit them for aquatic life.

We now pass to the Dipterous fauna of the middle depths. The Diptera it will be remembered, are the two-winged flies, and none of these in the perfect state inhabit water ; some, however, are aquatic during their two earlier stages. Omitting a few very aberrant forms, there may be considered to be two very distinct types of flies, one slender, with abnormally long and fragile legs, and with antennæ of moderate length, and frequently tufted or fringed with hairs ; the other stouter and more substantial, with much shorter legs, and antennæ so inconspicuous as often to be unnoticed. It is to the former of these groups that most of the species whose larvæ are aquatic belong. They consist of certain kinds of gnats, midges, and daddy-longlegs, insects whose *names* are as familiar as household words, thought no very exact signification appears to be popularly attached—at any rate to the two former of these, which are often vaguely used for any minute and delicate flying insect, of whatever nature. Very varied are the habits of the long-legged, long-horned flies : some of them are the causes of certain gall-like excrescences that occasionally disfigure plants, and inside which their larvæ live ; the larvæ of others, again, live in the earth, especially in damp places, and it is only a few members of the group that are aquatic, and these we have now to deal with.

It may seem difficult to conceive of a method by which so fragile a creature as a gnat, which would be irretrievably damaged by contact with the water, can manage safely to convey its eggs into such a position as will permit the larvæ hatched from them at once to get into their proper element. Most wonderful, indeed, is the plan adopted. Finding some floating shred of straw, stick, grass, or other such support, the expectant mother rests her two fore-legs on this, allows the next pair gently to touch the water, and crosses the third pair behind to form a sort of vice in which to hold the eggs as they are deposited. Then a long oval egg is lodged in the angle formed by the crossed legs, with its longer diameter vertical ; another, following it, is glued on to the side of the first in a similar position, and so on till some 200 or 300 are fastened into a sort of raft, or rather life-boat, as the mass is curved upwards at each end. Then the little vessel is abandoned to the mercy of winds and wavelets, and so floats about for a few days, benefiting by sun and air, till the growing embryos, finding their quarters too close, push open a kind of trap-door in the floor of the egg and take a dive at once into their watery home. They are quaint-looking creatures, with a big head and thorax and long, tapering body, and they swim about head downwards. Near the tail, a straight branch, carrying a number of hairs on its tip, projects at an angle with the body. This is a respiratory tube, and communicates both with the outer air at its tip, and with the trachael system at its base. All that is necessary for breathing, therefore, is that the tip of this tube should be above the surface. Accordingly, when at rest, the larva takes up this position, while at other times it goes wriggling about through the water, being of sufficient buoyancy to rise without effort to the surface when occasion demands. After several changes of skins the pupal state is reached, and and the last moult is accompanied by a remarkable alteration in the appearance of the insect. The head and thorax now appear as if thrown into one large mass, from which the body tapers away. But the most astonishing change of all is that which takes place in the respiratory system ; the entrance to this is now transferred to the opposite end of the body, and appears as two small twisted horns projecting from the gigantic head. If now the insect were to retain its inverted position, there would obviously be no possibility of bringing these breathing horns nearer the air than a whole body's length ; therefore, it turns a somersault in the water, and henceforth goes about head uppermost, an attitude which, when it is at the surface, brings the organs in question just above the water. Though the creature is now a pupa, and can take no nourishment, it is possessed of almost as much freedom of motion as before, and jerks itself about by vigorous wriggling of its awkward form.

(To be continued.)

Miscellaneous Notes.

AUSTRALIAN TIMBER.—A Board appointed to inquire into and experiment on the best kind of timber grown in the Australian colonies, and adapted for the construction of railway vehicles, has sent in its report. Among the woods which the Commissioners mention as suitable are blackwood, mountain ash, bluegum, and Gippsland mahogany. Under test the blackwood presented results which were superior to any other timber. The mountain ash was second to the blackwood for railway purposes. It should be felled, the Commissioners think, during the winter months, when it has attained maturity, and is between 4 ft. and 5 ft. in diameter, and it might remain felled for six months before being broken down into planks for seasoning. Bluegum should be treated in the same manner. Going somewhat beyond its reference, the Board deals with the question of timber licenses, and recommends that getters be compelled to pay for the timber felled, and to confine their operations to a given area, or otherwise that selected lots of trees be sold by tender. It is also strongly recommended that a forest board should be called into existence. [The above, taken from *Engineering*, serves to show that the continually-increasing demand for timber is causing considerable anxiety, not only in Europe and America, but in every quarter of the civilised world.]

DIAMONDS IN AUSTRALIA.—The diamond field of Bingera, New South Wales, bids far to rival in richness the famous Kimberley District of South Africa. During the last few months hundreds of diamonds have been discovered, the size and number increasing with the depth of the diggings. The work of the miners has been seriously impeded for want of water for washing purposes, but recently a plentiful supply has been struck at a depth of from 50 to 60 feet, the result being not only increased activity on the part of the diamonds miners, but also the formation of new diamond mining companies, and the taking up of nearly all the land in the district for diamond-mining purposes.

BLEACHING TALLOW.—*The Oil, Paint and Drug Reporter* recommends the following as the best process known to it for bleaching tallow :

About 50 lb. of caustic soda lye are placed into a clean boiler and the steam is turned on. Salt is then added to the lye until it shows 25-28 deg. B. The fat—300 lb.—is now placed in the boiler, and the steam is turned on until the mass is brought to a boil, when the steam is shut off to prevent overflowing. It is allowed to boil up 1-2 inches at the most, and then left to itself for 3 5 hours, so that the fat will clarify. At the end of this time, the upper saponified layer is ladled off ; the pure tallow is removed and passed through a hair sieve or linen into a clean vessel, until the lower saponified layer is reached. The residue in the boiler, consisting of sponified fat and lye, is removed and used in the preparation of curd soap, together with the upper layer.

The kettle is thoroughly cleansed, and about 30-35 pounds of water with ¾-1 pound of alum are heated to boiling. To this solution the fat is added, and the mass is allowed to boil for about 15 minutes, until all the filth has disappeared from the fat. The mass is then transferred to another vessel, and left by itself for 3-5 hours.

The pure fat is then again placed into the boiler and heated to boiling, until it shows a temperature of 170-200 deg. C. In