but when the red rays, for instance, are cut off, a piece of red paper will look black.

Transparency of sea-water.

The usual method of studying the transparency of the water is to lower a large white disc, noting the depth at which it disappears from view. The degree of transparency is found to vary greatly, for in the clear dark-blue water in the middle of the ocean near the tropics the white disc can sometimes be seen as far down as 50 metres below the surface, or even more, while in those places where rivers bring down large quantities of detritus from the land the disc may occasionally be invisible a couple of metres beneath the surface. The enormous quantities of small plankton organisms inhabiting the upper layers may also render the water relatively opaque. The penetration of light thus varies according to circumstances, but few direct observations of the light-intensity have as yet been made. It would be of the greatest interest to know the amount of light at different depths in different seas, and thereby gain a better understanding of the conditions of life, for instance, as regards the development of the plankton, as the small plankton algæ need light for the processes of assimilation.

Gases in the sea.

Sea-water normally contains oxygen, nitrogen (with argon), and carbonic acid. These gases are absorbed at the surface from the atmosphere, and are carried by currents even into the deepest parts of the ocean in varying amounts. A study of these variations is of considerable interest, and may be briefly dealt with here, although no gas-analyses were made during the "Michael Sars" Atlantic Expedition. There are several good methods of analysis. For the three gases named, the method introduced by Bunsen, and further developed by Pettersson and Fox, may be employed, the water-sample being boiled at a low pressure, and the escaping gas collected and analysed. The oxygen may be determined by a very simple titration, according to Winkler's method, or Krogh's method of examining the tension of the several gases in solution may be applied.

Oxygen.

Oxygen is not so readily soluble in salt water as in fresh; the higher the salinity the less the absorption of oxygen by the water. It is also a well-known fact that cold water dissolves more air than warm. This is clearly seen in the following excerpt from Fox's tables, showing the cubic centimetres of oxygen in 1 litre of water at different temperatures and salinities, when the water is saturated with this gas :—