

that the pupil should strive, not only to *know*, but to *reason*. It is, indeed, precisely at this point that the power and merits both of teacher and writer become most apparent; and we have no hesitation in saying that it is in this sphere that the efficacious distinction between one manual and another lies.

After "Directions to the Reader" (as to the most advantageous mode of using the book), a list is given of the chapters into which the subject is divided. An exhaustive series of questions follows each chapter. A great deal of space has been gained by printing many of the necessary comments and descriptions in a smaller type than the more important text; and the illustrations, though generally of diminutive size, are no doubt large enough, and certainly distinct enough, for most readers. It need hardly be said that the province of *Chemistry for Schools* is comprised within the limits of the "metalloids" and their immediate allies. The nomenclature employed is throughout what has been termed "Berzelian," but is, in fact, derived from the hereditary Latin forms, which have been common for centuries to the whole of natural science, and are still the only ones which can be legitimately adapted to the requirements of our own language. The writer terminates with some useful appendices, not the least valuable of them being a list of necessary apparatus and chemicals, with approximate cost.

Mr. Gill has fairly earned the thanks of scientific chemists; nor will the schools be slow to appreciate a manual which has been thus well devised and executed by an author who has himself been a successful school teacher.

**The Blow-Fly.**—*A Monograph on the Anatomy and Physiology of the Blow-Fly.* By Benjamin Thompson Lowne. (Van Voorst.)

IN this little volume, just issued by Van Voorst, Mr. Lowne has treated the subject of his monograph very exhaustively. The text is judiciously divided into two parts, the first comprising a neat popular sketch of the organisation of this familiar and pertinacious little companion of domestic life; and the second containing the more technical and elaborate account of the author's own dissections and investigations, which are illustrated by ten very beautiful plates, engraved by his own hand from his own microscopical demonstrations.

The book is eminently satisfactory, as being a clear and complete statement of what is known of fly-organisation. But it has also, in some degree, the stamp of original research upon it, and represents a remarkable amount of labour and industry. The nature of the all-embracing integuments, and the way in which they are modelled to form the external organs and implements of the creature's active life, are in the first instance dwelt upon. The theme then passes on to the examination of the digestive and assimilative apparatus, the arrangements for circulation and respiration, the nerve structure, and the organs of special sense. It would be possible to pause upon matters of particular moment and interest in each one of these departments of the treatise. But it must, for this occasion, suffice to draw attention to the explanation of the way in which the so-called false tracheæ of the trunk are modelled into an exquisite strainer, to enable the fly to draw off the finer and more nutritious parts of the half rotten pulpy matters that are used as food, and to the manner in which the terminal lip of this sucking trunk is furnished with supplementary rasping teeth and salivary pores, to allow such matters as loaf sugar to be broken down and dissolved into a juice also available for suction. The description of the manner in which the poisers, properly the abortion of the second pair of wings, are turned to account as ears which receive the vibrations of sound upon terminal knobs, instead of within trumpet cavities, is also most worthy of notice. But before all must stand Mr. Lowne's demonstration of

the fly brain. He shows that the fly has a sense-centre, or cephalic ganglia, some thirty times larger than that of the most portly beetle, which sufficiently accounts for the energy and vivacity of the insect's life; and that it has also, in common with the bee and the ant, a small rudimentary convoluted brain, attached by a little footstalk to the larger and simpler nerve-mass of the head. Mr. Lowne holds that the fly clearly exhibits some trace of mental faculty, such as memory, in virtue of this shadowing forth of true cerebral organisation.

**Terrestrial Physics.**—*Ueber die Lehre von den Meeresströmungen.* By Dr. Adolf Mühry. (Göttingen, 1869. London: Williams and Norgate.)

THIS is a very successful attempt to introduce something like order into the complicated phenomena of oceanic currents. The author sketches first the two well-known main systems, viz. (1) the great west-current which forms a belt of nearly 50° of latitude on both sides of the equator, and to which the earth's rotation, combined with the inertia of the ocean, is assigned as cause; (2) the great thermal circulation from the poles towards the equator, with its compensating current in the opposite direction; both are, according to the author, produced by the difference in density of cold and warm water, and he refutes, with great knowledge and sagacity, the opinions of previous writers, of Maury among others, who seek the cause in differences in the amount of evaporation and rain, the prevailing winds, and the amount of saline matter in the sea.

Then follows an *exposé* of comparatively local systems. Here the author supplants the incompleteness of known facts by his own speculations, which are neither always clear nor above the suspicion that doubtful points have been decided by the author, with a view of confirming his own hypotheses. Thus a very elaborate chapter on the currents in the North Polar Basin rests entirely on his assumption that sea-water behaves like pure water as regards the temperature at which it has the greatest density. He describes some very crude experiments made by him, which prove the fact in his opinion, but are contradicted by the well-known experiments of such a distinguished physicist as Despretz, who found different points of maximum density for different saline solutions.

B. L.

**Protozoæ Helvetica.**—*Mittheilungen aus dem Berner Museum der Naturgeschichte über merkwürdige Thier- und Pflanzenreste der schweizerischen Vorwelt.* Edited by W. A. Ooster and C. von Fischer. Ooster. Part I. Basle and Geneva, 1869. 4to, pp. 14, map and two double plates. (London: Williams and Norgate.)

THIS is the first fasciculus of a series intended to illustrate the palæontology of Switzerland. The work is intended chiefly as a means of making known by descriptions and drawings a number of interesting fossils from the animal and vegetable kingdom, in part at least new to science. Most of these have been derived from the Swiss Alps, and are now preserved in the Bern Museum of Natural History. It is also intended to serve as the organ for shorter palæontological communications from the whole extent of Swiss territory, the several authors being answerable for their own views. The first part contains a short paper, just completed, "On the Red Limestone of Wimmis and its Fauna;" the next will contain plates and descriptions of various remarkable fossils from the Swiss Alps. Three, or at most four such parts will form a volume, with a title-page and index will be issued.

We need only add that the plates before us contain figures of fish-teeth (*Oxyrhina*, sp.), mollusca (*Inoceramus Brunneri*, and an undetermined species), and echinodermata (*Collyrites Friburgensis* and *C. capistrata*), that the drawings are of large size, and, except for occasional flatness in the shading, well-executed.

H. B. B.