

rays of the solar spectrum are the more active in the process.

It would be easy to multiply criticisms of this kind, but enough has been already said to show that the book is unsuitable for the use of students, at least of those who are not already tolerably advanced. The first essential of a good handbook for students is that it should give a clear and, as far as possible, complete account of the actual attainments of the science of which it treats. This Prof. Müller's book certainly does not do. Many points of importance are either omitted or treated far too superficially, whereas others of less importance are discussed at great length in a highly theoretical manner, which, be it said, is often ingenious and interesting. The book cannot, therefore, be regarded as a successful handbook; its merits are rather those of a treatise upon those parts of the physiology of plants which are susceptible of a physical and mathematical treatment.

It only remains to add that the general appearance of the book, the paper, type, and figures are good, and to express the regret that there is not an alphabetical index at the end which might serve as a guide through the somewhat intricate mazes of the contents.

OUR BOOK SHELF

On the Urari, the Deadly Arrow-poison of the Macusis.
By Richard Schomburgk, Ph.D. 4to. Pp. 18.
(Adelaide: E. Spiller.)

In this pamphlet the author describes the researches made by himself and by his brother, Sir Robert Schomburgk, into the modes of preparation of urari. Although an arrow-poison is prepared by a number of Indian tribes in Guiana, and between the Amazon River and the Orinoco, yet that prepared by the Macusi Indians is much stronger, and other tribes come very long distances in order to obtain it. This greater strength is thought by the author to depend upon the use by the Macusi Indians of the *Strychnos toxifera*. The bark of this plant contains all the properties of the urari, and the Macusi Indians add to it a number of other substances. With great difficulty the author prevailed upon an old urari-maker to show him the process of preparing the poison. The ingredients were—bark of *Strychnos toxifera*, 2 lbs.; from Yakki (*Strychnos schomburgkii*), $\frac{1}{4}$ lb.; Arimaru (*Strychnos cogens*), $\frac{1}{4}$ lb.; Wakarimo, $\frac{1}{4}$ lb.; the root of Tarireng, $\frac{1}{2}$ oz.; the root of Tararemu, $\frac{1}{2}$ oz.; the fleshy root of Muramu (*Cissus spec.*); four small pieces of wood of a tree of the species of *Xanthoxyleæ*, called Manuca. (Manuca is the strong bitter wood of a tree of the *Xanthoxyleæ*. The bark and the root are used as an effective remedy against syphilitic sickness on the Rio Negro, Amazon, and Rio Branco.)

These ingredients were crushed singly in a mortar, and the bark of *Strychnos tox.* was thrown first into a pot containing about seven quarts of water. As soon as the water began to boil he added at intervals a handful of the other ingredients except the muramu. The whole was then kept boiling very slowly, the foam being carefully skimmed away, for twenty-four hours, the mixture being kept at an equal heat. At the expiration of that time the extract had been reduced by boiling to about a quart, became thick, and assumed the colour of strong coffee. It was then strained through a large funnel made of palm-leaves and filled with fresh silk-grass. The filtrate was exposed in a flat vessel to the sun for about three hours, and he then added the slimy juice expressed from the

muramu root, which had been previously soaked for a short time in the boiling poison. The urari immediately underwent a remarkable alteration, curdling to a jelly-like substance. The poison was then poured into very flat earthen vessels, in order to still further concentrate it by exposure to the sun. When it reached the consistency of thick treacle it was poured into small calabashes, where it ultimately changed into a hard substance. During the preparation a number of superstitious precautions are taken, in order, as they imagine, to prevent the poison losing its efficacy. No certain remedy is known for the effects of the poison; those employed by the Indians are the juice of sugar-cane either alone or mixed with an infusion of the leaves of the tree *Eperua falcata*. Salt and urine are sometimes also employed as remedies.

The author mentions the researches on the physiological action of urari by Waterton and Virchow, but seems unaware of, or at least does not allude to, the observations of Bernard, or the more recent works of German observers. This pamphlet is, however, interesting as containing the author's own original observations upon the mode of preparation of the urari, made, as they were, under great difficulties.

Notes of Observations on Injurious Insects. Report, 1879.
(London: W. Swan Sonnenschein and Allen, 1880.)

THIS report, for the production of which we are mainly indebted to the exertions of Miss E. A. Ormerod, the Rev. T. A. Preston, and Mr. E. A. Fitch, is, this year, one of unusual interest, inasmuch as it reviews the destructive work of the insect world to our garden and field crops during a summer unequalled for its want of sunshine and continued heavy rains. Moreover, owing to the energy displayed by the editor in inducing gardeners, foresters, &c., to record what observations they may have made, we have, as the result, a very full and very varied report. Notwithstanding that the temperature was below and the rainfall above the average, "the returns show insect attack fully up to the usual amount, and insect presence often exceeding it. The unusual cold of the winter and the depth to which the frost penetrated the ground do not appear to have acted prejudicially on larvæ subjected to them, either at the time or in subsequent development, and the only cases in which the weather appears notably to have had effect in ridding us of insect attack is where the persistent rainfall or the tremendous downpour of summer storms have fairly swept the insects from the plants, or in some cases of leaf-feeders, where the plant-growth has (conjecturally) been driven on past the power of the larvæ."

Referring to the power of the frost "during the past winter" (the report is dated December 19 last), it is stated that at Dalkeith it penetrated the earth to a depth of fifteen inches, while in Perthshire it went down to from twenty to twenty-four inches. Miss Ormerod alludes to the prevalent idea that "cold kills the grubs," and gives her experience of an examination of all larvæ and pupæ found fully exposed to its influence, whether unsheltered, under bark, or in frozen ground. In every case, even where the ground was frozen so hard that it required a hammer to break it, and the larvæ and pupæ were perfectly rigid, on thawing they showed no sign of injury, "and in the case of the larvæ of the cabbage weevil (which was the only instance in which any immediate action was to be expected) they continued the operation of making their earth cases for pupation (as is usual with this grub on disturbance from the gall) as if nothing had happened."

The extreme severity of the winter was also favourable, in other respects, to insect-preservation, large numbers being secured from the attacks of birds by being buried under the snow or in the frost-bound ground.

The report, which embodies notes from observers all over the United Kingdom, is one of very great value not only