hardly necessary to take it up page by page, as is so often done with volumes intended for students, and point out various slips, typographical and otherwise. The author disclaims any idea of expressing the whole truth, but feels the obligation of saying nothing but the truth. This limitation, not always felt by writers of popular works on botany, may be responsible for some of the omissions noted.

After a particularly good discussion of the relation of botanical science to society, one chapter each is devoted to the cell, the seed, the root, the leaf, the stem, growth, the flower, plants and animals and the origin of organic form. This latter chapter is distinctly pro-Darwin; in fact, there is little if any reference to the recent work along this line and the whole discussion smacks strongly of *Zweckmässigkeit*. The reason for adding as an appendix a lecture delivered in 1875 on the plant as a source of energy is not manifest. Unfortunately there is no index.

G. T. M.

The Toxicity of Caffein: an Experimental Study on Different Species of Animals. By WILLIAM SALANT and J. B. RIEGER. Bureau of Chemistry Bulletin 148, pp. 98.

The Elimination of Caffein: an Experimental Study on Herbivora and Carnivora. By WILLIAM SALANT and J. B. RIEGER. Bureau of Chemistry Bulletin 157, pp. 23.

One can not help feeling, on looking through these two bulletins filled with a wealth of detailed investigation on so important a drug as caffein, that the authors left no stone unturned in their quest for truth. So many experiments were made that their presentation in abstract form is extremely difficult. However, a few of the salient features can be briefly stated.

The principal object of the work describd in the first paper seems to be the determination of the toxic and of the fatal dose of caffein for the rabbit, guinea-pig, cat and dog. Theoretically this is simple. But as the authors have shown, the toxicity of caffein, like that of any other drug, depends upon such conditions as the age of the animal, its diet, the method of administering the drug, and still other factors which complicate the question of toxicity. Only after the most extensive investigation can all of the questions taken up in the bulletin be answered with any degree of certainty.

So strongly has the influence of diet, method of administration, etc., on the action of a drug been emphasized that one can not help wondering whether the toxic and fatal doses of caffein are really definite quantities for more than one set of experimental conditions. The conservatism of the authors, as exemplified in the following statement from page 91 of their bulletin, is certainly commendable: " . . . the most striking effect of caffein observed in the work herein reported was the comparatively wide range of variation in the resistance of individuals of the same species to this drug. This was found to be the case even when the conditions of experimentation were approximately uniform. . . ."

In their second bulletin the authors present their work on the elimination of caffein. They found that " Caffein administered subcutaneously, by mouth, or intravenously, is eliminated in part unchanged, in the urine, into the gastrointestinal canal, and into the bile. . . ."

Since the appearance of the above bulletins, at least two other pharmacological researches have been published which show how extremely careful the investigator must be before coming to final conclusions regarding the toxicity of a drug. In the *Proceedings of the Society for Experimental Biology and Medicine*[1] Kleiner and Meltzer describe some experiments on the reduction of the toxicity of strychnin by the simultaneous administration of large quantities of fluid. They state " that the toxicity of strychnin is definitely reduced not only when it is administered in great dilution, but also when saline or water is administered nearly simultaneously in other parts of the body, thus, perhaps, diluting the poison within the body. . . ."

Traube[2] states that the pharmacological ac-

[1] Vol. IX., p. 101, 1912.

[2] *Biochemische Ztschr.*, Bd. 42, p. 494, 1912.

tion of many alkaloids may be appreciably influenced by the presence of certain types of salts such as alkali carbonates.

Who knows but that the toxicity of caffein may be influenced by the mineral matter of the diet and by the quantity of water the animal drinks?

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Catalogue of the Lepidoptera Phalænæ in the British Museum; Catalogue of the Noctuidæ in the Collection of the British Museum. By SIR GEORGE F. HAMPSON, Bart. Volume X., 1910, Volume XI., 1912. London (England).

The two volumes comprise 2,140 species, in the subfamilies Erastriinæ, Euteliinæ, Stictopterinæ, Sarrothripinæ and Acontiinæ. They are illustrated by two volumes of colored plates, Nos. CXLVIII. to CXIX., inclusive. There are also many cuts in the text illustrating typical species in each genus, giving both the general appearance and structural characters. Keys to the genera in each subfamily and to the species in each genus are given. There are also genealogical trees for each subfamily, showing the author's ideas of the evolution of the genera. The treatment is the same as in previous volumes of this work, which we have had occasion to notice. The genera are arranged upon adult structural characters, selected by the author. Resort has been had to many minor characters, such as modifications of the tuftings of the vestiture, tubercles on the front of the head, spines on the legs, etc. These characters are in many cases of little phylogenetic importance, so that the classification is to a large degree arbitrary and artificial. This appears distinctly in the arrangement of species within the genus also, where primary groups are made on modifications of antennal structure in one sex and other secondary sexual characters, so that really closely allied species are often widely separated. It would be rather difficult, however, to have avoided this and still keep the keys in a workable condition, especially where the vast majority of the early stages and life histories are unknown, as is the case with these insects. The nomenclature of the North American species included in the book is greatly changed from that familiar to us. This appears to be unavoidable, as the classifications of different authors based on restricted faunal regions are here combined. The names here established will probably tend to be permanent. as it will be long before any one attempts to treat the Noctuidæ of the world on new lines with material equal to that afforded by the British Museum.

The British Museum collection, rich as it is, does not make a practise of retaining long series of specimens of common species. Consequently the author of these catalogues occasionally suffers from lack of sufficient material. We notice in the genus *Iscadia* (vol. XI., p. 362) some errors due to this cause. The subfamily Sarrothripinæ, to which *Iscadia* is assigned, is defined by the presence of a bar-shaped retinaculum on the fore wing of the male. In *Iscadia aperta* Walker and *I. duckinfieldia* Schaus this is absent. Sir George notes its absence in *I. aperta,* but having only one male he supposes it may have been broken off. Furthermore, *I. aperta* has simple flattened antennæ in the male, not bipectinate, as given in the table. *I. duckinfieldia* is abundantly distinct from *I. aperta,* not possibly an aberration, as suggested, for it has pectinated antennæ in the male and differs in markings, the double black line above the reniform-mark being absent. The separation of *I. duckinfieldia* on the brown costal shade is ineffective, as this shade is as often absent as present. These imperfections would have been obviated by larger series of specimens of these rather common species.

HARRISON G. DYAR

SPECIAL ARTICLES

THE NATURE OF THE FERTILIZATION MEMBRANE OF THE EGG OF THE SEA URCHIN (ARBACIA PUNCTULATA)

MANY widely held hypotheses, *e. g.,* on the dynamics of cell division, etc., are based on