

of plates as against every other previous system not only makes their introduction a distinct era in electrical science, but opens up an increasingly wide field for their use in every-day life. As accumulators built in this form have been working, notably in Paris, for several years, their durability and efficiency are placed beyond doubt. Not only will they be of the greatest service in connection with electric lighting installations, but their high efficiency and light weight render it probable that sooner or later, in some form or other, they will render electric traction over ordinary roads not only a possibility, but a commercial success. It is probable that along the lines of this discovery still further improvements may be made, and each step in advance will probably open up increasingly wide fields for electrical application.

#### LETTERS TO THE EDITOR.

\* \* Correspondents are requested to be as brief as possible. The writer's name is in all cases required as a proof of good faith.

On request in advance, one hundred copies of the number containing his communication will be furnished free to any correspondent.

The editor will be glad to publish any queries consonant with the character of the journal.

#### THE SYSTEMATIC POSITION OF DIPTERA.

IN connection with the discussion that has been had on this subject in the columns of *Science*, Prof. John B. Smith has suggested that I send you some ideas of my own, as expounded in a lecture before the Brooklyn Institute last February, which was substantially the same as one previously given before the Lowell Institute at Boston, in January, 1892. It was on the general subject of social insects, and after showing that the insects treated were among the more intelligent of the insect world, I concluded with a statement of my own views as to the nature of this intelligence, and urged that we can never properly appreciate or bring ourselves into sympathy with lower creatures until we recognize that they are actuated by the same kind of intelligence as we ourselves. I drew attention to the significant fact that, just as among the mammalia, the higher intellectual development, as in man, is found physiologically correlated with the longest period of dependent infancy, and that this helpless infancy has been, in fact, a prime influence in the origin, through family, clan, tribe and state, of organized civilization; so in the insect world we find the same physiological correlation between the higher intelligence and dependent infancy, and are justified in concluding that the latter is in the same way physiologically correlated with brain development, and, at the same time, the cause of the high organization and division of labor. I then alluded to the discussion as to the systematic position of the different orders of insects, and especially to the claims that had been made for the Diptera as being of the highest rank. I argued that such claims were not justified, and pleaded for the Hymenoptera, not only on some of the grounds indicated by Dr. Packard, but particularly on the ground that the highest degree of intelligence among insects is exhibited by the social species in this order. There is a great deal that is vague and unmeaning in the discussion as to what is "high" or "low" in the relations of organisms to each other. If specialization of external structural parts is to be looked upon as an index of high position, then very many animals must be admitted to outrank man, whose bodily characteristics are in many respects embryological and non-specialized; while the parasitic forms among insects would have to be placed among the very highest, since, in a majority of instances, they exhibit the most perfect adaptations and specializations.

Yet these last are almost universally admitted to be degraded forms, while few men will willingly allow that the genus *Homo* does not stand at the apex of the mammalian class. His superiority, however, is just as uniformly conceded to be by virtue of his intellect.

In the same way I urged that the order Hymenoptera, containing, as it does, the more highly developed social and intelligent insects, should, by virtue of these facts, rank above all other orders. This question of rank is meaningless, except as an indication of relative complexity of structure, the organisms best deserving to be ranked above all others in development being those which have acquired the greatest complexity. Nor must this complexity be confined to mere external structure, but must include nervous organization and brain development—in other words, must include psychical as well as physical characteristics. There is probably no more complex animal organ than the human brain, just as among insects there is probably no more complex hexapod organ than the brain of the ant or of the bee.

Such are substantially the ideas I set forth, the plea being that intelligence should no more be omitted from any discussion of the question of development or rank among insects than among vertebrates.

C. F. RILEY.

Washington, D. C.

#### BOOK-REVIEWS.

*Vagaries of Sanitary Science.* By F. L. DIBBLE, M. D. Philadelphia, J. B. Lippincott Company. 462 p., 8 vo.

IMPRESSED with the imperfections, misstatements and inconsistencies of vital statistics in general, and of the reports of boards of health in particular, the author of the above-named work undertook a systematic study of Sanitary Science as practised by its votaries, and from being a believer in the same he has become a bitter antagonist, raising a protest most bitter in tone against all the accepted rulings. The book is outrageous in its sweeping challenge of cleanliness, and the author has certainly laid himself open to criticism in his championship of dirt and filth; but yet there is a certain well defined point of value in that it sounds a note of caution at a time when we are all rushing headlong into an unscientific acceptance of sanitary promulgations. Attention, too, is called to the character of the men who have taken up this branch of work, and, though the general statements are a slur upon the many earnest and scientific workers, still the statements are too often true of the members of many of our city boards.

The origin of the movement is described in the "Introductory" chapter as "a kind of disorderly agitation that suddenly seized the people of Great Britain following an inquiry into the condition and manners of living of the poorer classes of that country." In our own country the origin is ascribed "more to a fondness and habit of imitating the English than to any other cause." The movement is likened to a fanatical religious awakening, and the science to a false religion, whose priests have held whole continents in terror, and who, to gain stability, persistently summon up some new danger to frighten the people, and then caress them into tranquility by the announcement of their discovery of the antidote. The book is recommended by the author—"not for those of life-long prejudice, or who fear to sink into depravity in listening to the innocence of nature's metamorphosis, but for those timid people who have been plagued for the past thirty years by the increasing procession of sanitary terrors, and for those who love truth for truth's sake."

In chapter I, the history of "Sanitarians—Ancient,

Mediæval and Modern," is reviewed, and the law-giver of the Jews suffers not less than the modern inspector as he comes under the author's withering sarcasm. The birth of sanitary science in the great sanitary awakening is then described. The next four chapters are devoted to "the tripod on which sanitary science rests"—air, water and soil. The general arrangement of these chapters, as of others throughout the book, is: to first introduce the subject with general remarks; second, to repeat numerous cases where disease has been supposed to originate in filth, then to analyze these cases, expose their feebleness, and, finally, to close with an array of scientific experiments which tend to show that no connection whatever can have existed between this filth and the diseases presumed to have arisen therefrom. Most prominent among these scientists are: Flügge, Pettenkofer, Koch, Miquel, Karlinski, Kraus, Crookes, Tidy, Odling, and Hueppe. Water is attacked through the weakness of the chemical methods in vogue, and also in the fact that typhoid bacilli, etc., according to the testimony of a number of the writers above mentioned, flourish in pure and sterilized water, but quickly disappear in water contaminated with sewage and containing putrefactive bacteria. The same idea is worked out in the discussion of the air and soil. Sewer gas is described as the result of the earlier sanitary measures, and we have it now produced and laid in our houses. The triple alliance the reformers had made with the ladies and clergy was now reinforced by the plumber, who became the "sanitary plumber." Numerous cases are cited in towns, jails, etc., and among workmen employed in the sewers where the sewer gas failed to produce zymotic disease. The sewer gas doctrine is spoken of as "a pure creation, begotten in and floated from the sanitary brain without any investigation, it was, without any examination, accepted and devoutly cherished by almost the entire people, wise and simple, of Great Britain and America—a creation that from the first was viewed with contempt by scientific men of other countries. Pettenkofer said that it was as easy to show that infectious diseases had the same relations to lines of illuminating gas tubes and telegraph wires as to lines of sewers."

Cemeteries, "chronologically the first which the sanitarians erected to affright and torment the people about the health," forms the subject-matter of chapter VIII., with the same discussion as before and the same conclusions. The dangers supposed to lurk in diseased meats and in adulterated and contaminated milk are disposed of in two chapters, and then we have a discussion of filth and fecal diseases, typhoid fever, etc., yellow fever, cholera, and diphtheria. In the case of the first mentioned, typhoid, its parallel development with the sanitary reform is spoken of, the history of the disease is given, and, as before, numerous examples of imperfect identification of the cause. The chapter on cholera containing the testimony of Koch is interesting. A brief history of the world's greatest epidemics is followed by a scorching section on Boards of Health. Dr. Dibble holds "that in so far as they have directed their efforts and consumed their energies on subjects which have no influence on individual or public health, and in so far as they have diverted the attention of the people thereto, just so far have they retarded and obstructed true progress in that branch of medical science which is devoted to hygiene, and just so far they have been a positive detriment to the public health."

Dangerous as the book would undoubtedly be in the popular hand, to the thinking physician it sounds a note of warning, a call for scientific investigation in place of mute acceptance of sanitary rulings, for a superior board of health, and for experimental work. In short,

that as hygiene and sanitary science bid fair to play an important, if not the most important, part in our social economy, and to approach with their sister, Medicine, an exact science, that then, with the aid of the biologist, bacteriologist and chemist, these new sciences should rest upon a scientific basis. C. P.

*Handbook of Greek and Latin Palæography.* By EDWARD MAUNDE THOMPSON, D. C. L., LL.D., etc. New York, D. Appleton & Co. 1893. 343 p.

THIS volume of the International Scientific Series is designed especially to facilitate the study of the ancient manuscripts, rather than classical epigraphy, although it does not neglect the development of rustic writing and the majuscules. The first few chapters present a succinct and clear description of the accessories of ancient writing—as the tablets of wax or wood, and the paper, linen, clay, parchment or other surfaces on which it was to be placed; the pens, styles and inks which were employed, and the forms of the books, rolls or codices.

This preliminary matter supplied, the author turns to Greek palæography, explaining first the antiquity of the writing, and the forms of it as shown by various documents. Some of the oldest and most remarkable of these have been obtained at different times from Egypt, and carry us back about two centuries before the Christian era. From this date the characteristics of the Greek uncial and cursive hands are shown, down to a recent period. The remainder of the work is devoted to Latin palæography, from Roman times, through the Lombardic and Merovingian periods and the Middle Ages, and concluding with the Chancery hands, the Charter hands, and the Court hands.

A special feature of the book is the accurate presentation by photogravure of numerous specimens of the hands described, the tables of alphabets, and a useful list of palæographical works.

*An Elementary Text-Book of Biology.* By J. R. AINSWORTH DAVIS, B. A. Second Edition. London, Chas. Griffin & Co.

THE appearance of the second edition of this text-book is indication enough that its plan meets a general want among the people for whom it was designed. The purpose of the present book is to furnish a treatise on theoretical biology, which will serve as a general accompaniment to the various books on practical biology which have appeared from time to time. The author takes up a long series of types, first describing their morphology, then giving a more or less thorough discussion of the physiology of the type, and, lastly, of its development. These three methods of treatment, particularly the last two, make the present text-book one of the most comprehensive text-books in general biology that has appeared in the English language. The morphological part is full and complete, and the descriptions are well illustrated by figures. The sections on physiology and development form the unique feature of this method of teaching, and great praise should be given to the author for putting together in such brief compass the essential principles of theoretical biology. Throughout the book there is that liberal use of italics and full-faced type which aids so materially in making a book intelligible and drawing attention of the student and reader to the important as compared to the unimportant portions of the text. The book is also thoroughly illustrated by figures, most of which are very good and clear, but a few of which are extremely crude and poor. It is hardly possible for one to make much out of the figure describing the anatomy of the pigeon or the frog, and one regrets that the second edition has not seen some of these poor cuts replaced by better ones.

The new edition of the book is entirely rewritten and very much enlarged. So much larger has it been made