the Wimbledon Sewage Works, England. The principle underlying this plan of dealing with sewage is the employment of "amine" salts in combination with milk of lime. At Wimbledon, herring brine is used, and on mixing with the lime a very soluble gaseous re-agent is evolved, to which the inventor has given the name of "amerinol." This re-agent possesses a peculiar briny odor, and when introduced into sewage is said rapidly to extirpate all micro-organisms capable of causing putrefaction or disease. The effect is almost instantaneous. By the action of the lime, violent flocculation is caused, and subsidence takes place in about half an hour, the putrid smell of the sewage being replaced by the peculiar briny odor. According to Dr. Klein, the destruction of micro-organisms is absolute. The total cost per annum of treating London sewage by this method is put at $625,000. Should the residue prove to possess any value for agricultural purposes, its sale would tend still further to reduce the expense.

VACCINATION IN JAPAN. — Vaccination, according to *Medical News*, has been obligatory for some years in Japan, and every infant is required by the police to be vaccinated. The value of the procedure is, however, well recognized by the people themselves, and the government hospitals in every town are always thronged with applicants on the weekly "vaccination day." In 1886 there were 1,531 vaccinations to each 10,000 inhabitants.

BOOK-REVIEWS.

Benjamin Franklin. By JOHN T. MORSE, Jun. Boston, Houghton, Mifflin, & Co. 12°. $1.25.

THIS is the latest issue in the American Statesmen Series, and is well worthy of its place. It treats Franklin exclusively as a statesman, his scientific discoveries being only incidentally alluded to, and his business life very slightly sketched. His early years, too, are passed quickly over, the author thinking that Franklin himself has recounted his early life so admirably that no one else can successfully deal with it. Accordingly, with the third chapter we find our hero despatched on his first mission to England, and all the rest of the book is devoted exclusively to his public services. Mr. Morse shows perfect mastery of his subject, and his style is clear, refined, and dignified; and these qualities make the book interesting throughout. His account of Franklin's labors in England is sufficiently full, and shows why in the main they failed. The dispute between the people of Pennsylvania and the proprietaries of the province was one that could not be settled, and in fact was not settled, until the people had the entire government in their hands. But Franklin's efforts on behalf of Pennsylvania first, and afterwards of all the Colonies, form a very interesting chapter of American history, which is well set forth in this book. The most important of Franklin's public services, however, were rendered in the capacity of minister to France, and it is this part of his work that Mr. Morse has most elaborately treated. Franklin's labors were by no means confined to securing the alliance of France, but included also the difficult task of borrowing, or begging, money in France and everywhere else where it could be got, together with a great variety of services besides. He had for a time two colleagues, but neither was of much use, while one was a mischief-maker of the first order, so that the whole burden virtually fell upon Franklin; and Mr. Morse probably does not exaggerate when he affirms that Franklin's services to the national cause were only less arduous and important than those of Washington.

With regard to the character of his hero, our author expresses himself with some enthusiasm. "Intellectually," he maintains, "there are few men who are Franklin's peers in all the ages and nations. . . . He illustrates humanity in an astonishing multiplicity of ways at an infinite number of points. He, more than any other, seems to show us how many-sided our human nature is." This may be somewhat exaggerated, but it is substantially true; for few men in history have been great at once in such widely separated departments as politics, science, and literature. With regard to his moral character, Mr. Morse, while not extenuating his faults, prefers to dwell on his excellences, which were undeniably of a high order. "As a patriot, none surpassed him," and "the chief motive of his life was to promote the welfare of mankind." "It is not worth while to deify him, or to speak with extravagant reverence, as if he had neither faults nor limitations. Yet it seems ungracious to recall those concerning one who did for his fellow-men so much as Franklin did. Moral, intellectual, and material boons he conferred in such abundance that few such benefactors of the race can be named, though one should survey all the ages." This is high praise, but it is in the main well deserved; and now, when disinterested patriotism is rare among us, Franklin's example ought to be kept before our eyes, and we hope that this book will be widely read.

Darwinism: An Exposition of the Theory of Natural Selection, with Some of its Applications. By ALFRED RUSSEL WALLACE, LL.D. London and New York, Macmillan. 12°. $1.75.

DARWIN, in the greatness of his unselfish candor, receded somewhat from the claims of his theory of natural selection, yielding to certain adverse criticisms; and now Dr. Wallace, who had independently originated the same theory, shows anew his own magnanimity in coming to the rescue in a volume entitled "Darwinism." The book is opportune, and worthy of its distinguished author, who is a recognized authority. Addressing all intelligent readers, it surveys the whole subject, confining this for the most part, however, to Darwinism pure and simple, which, as given in the title of Darwin's first enunciation, is the "origin of species;" namely, from pre-existing species by natural selection. Dr. Wallace has the advantage of reviewing the subject "after nearly thirty years of discussion, with an abundance of new facts and the advocacy of many new and old theories," especially from the pens of noted investigators and leading evolutionists.

This limitation to evolution of species, in twelve of the fifteen chapters, avoids many perplexing questions, and gives simplicity and unity to the argument. The author regards the main proposition, in its application to existing or comparatively recent species, as all that can be proven, every thing beyond that lying in the region of probable conjecture. The difficulties, popular or scientific, relate chiefly to the origin of the larger divisions of the organic kingdom, the first development of complex organs, and the like. All this is too remote and too imperfectly recorded to be entirely solved; yet he believes that the generic and ordinal differences among plants and animals are of the same nature as those found in many groups of species, only greater in amount. As we rise to classes and sub-kingdoms, the difficulty is much increased, and we may reasonably doubt whether a radically distinct plan of structure is due to the action of the same laws that have developed species.

In the second chapter, on the struggle for existence, old and new facts are presented, ending with an ethical vindication of nature. In the third the variability of species is illustrated by statistical diagrams and otherwise, showing that it superabounds and offers always and everywhere material that is plentiful for natural selection, rather than slight and rare, thus obviating one of the common objections to transmutation of species. After discussing in further chapters the subjects of artificial and natural selection, and after meeting certain objections (the utility of all specific characters being especially asserted, with some qualification, and the swamping effects of intercrossing denied), the author treats of infertility of crosses, and sterility of hybrids, and opposes the "physiological selection" of Romanes. Going a step further than Darwin, he regards infertility as beneficial under certain circumstances, and increased by selection. Four chapters are given to color, exhibiting the author's well-known views as to its origin and its uses, re-enforced by Alfred Tylor's observations on structural decoration. Darwin's theory of sexual selection of the ornamental is rejected, there being, for example, no evidence, except to the contrary, "that slight variations in the color or plumes, in the way of increased intensity or complexity, are what determines the choice."

The concluding chapters consider geographical distribution; the geological evidences of evolution; certain fundamental problems of variation and heredity, with criticism of the recent speculations of Spencer, Cope, Karl Semper, and Geddes, referring particularly to the improved Lamarckian doctrine, lately revived, that acquired characters are inherited; and, finally, Darwinism applied to man.

The descent of man from some ancestor common to him and the anthropoids is advocated, but it is argued that the law of continuity does not require that the human mind has been developed by the same causes that account for man's physical structure. As the glacial age introduced into the earth's history a new cause, with new effects, so a new agency is needed to explain the appearance of the higher faculties, which are not necessities of our earthly existence, and "appear almost suddenly and in perfect development in the higher civilized races." A new cause manifested itself first in organic life, next in sensation and consciousness, and last in a rational and moral being; and these manifestations of life "probably depend on different degrees of spiritual influx." The Darwinian theory, carried to logical conclusion, does not, in the judgment of Dr. Wallace, oppose, but lends decided support to, the spiritual nature of man.

Such are the principal topics of interest. Others, as, for example, an offered solution of complex modes of cross-fertilization of plants, might be mentioned. A regret may be expressed, that, in treating of variability, the author has confined himself too much to variation in mere proportions of form and color; also, that, on the subject of habits and instincts, he has not taken into consideration the quickness and permanence of sense-association and of associated impulses in animals, remarkably illustrated, for instance, in the dog-and-goose incident from the *Revue Scientifique* lately given in our pages. But the work is as comprehensive as might be expected in view of its special purpose.

The Child and Child Nature. By the BARONESS MARENHOLTZ-BUELOW. Tr. by ALICE M. CHRISTIE. Syracuse, N.Y., C. W. Bardeen. 8°. $1.50.

THE object of this work is to explain and defend the system of education devised by Froebel, and especially the series of exercises and songs that he invented for mothers to use in training their children. The authoress is deeply impressed with the failings of humanity in the present age, and especially with its moral defects, and thinks that the only way to counteract them is by the reform of education. Froebel's system she believes to be the right one, and she has devoted many years to the work of propagating it. A considerable part of this book is taken up with an exposition of Froebel's peculiar philosophy, which we have always found repulsive, but which seems to have a strange attraction for some minds. Froebel's theory is that education must proceed according to the universal law of development, which is "the reconciliation of opposites," or "the law of balance." What this so-called law really is, it is hard to find out, though in one place we are told that "Newton calls the law in question the law of gravitation." Then we are treated to remarks about "the continuity and inter-connection of all things in the universe," and so forth; but what all this flummery has to do with the education of children we are unable to see. Being at last out of this quagmire, the authoress proceeds to explain the practical methods of teaching devised by Froebel, beginning with the kindergarten, but devoting most attention to the exercises designed for the use of mothers at home. In most of these exercises the child makes a kind of figure with his hands which is supposed to represent some natural or artificial object, and the mother then sings a song. The resemblance, however, between the figure made with the hands and the object it is said to represent is not apparent to us, while the songs as they appear in English are little better than nonsense. Besides these exercises, which are to be systematically practised, Froebel wished to place the young child under a mass of other regulations, and even to regulate and systematize the mother's caresses. What merit there may be in his devices, only actual trial can determine; but we should think that such artificial treatment at the very beginning of life must seriously hamper the natural and spontaneous development of the child. We are not surprised, therefore, to find the authoress remarking of the book in which this system is set forth — the "Mutter und Koserlieder" — that she has learned by repeated experience "that in no way is so much opposition to Froebel's system excited as by any endeavor to propagate this book." She, however, is enthusiastic in its favor, and those who wish to understand the system it advocates will find it elaborately set forth in her book.

AMONG THE PUBLISHERS.

AMONG the popular scientific articles to be published in *The Century* during the coming year will be reports of the latest studies and discoveries made at the Lick Observatory in California, furnished by Professor Holden. Professor Putnam of Harvard has written a series of papers for the same magazine on prehistoric America, in which he will give the result of his own explorations of caves, burial-places, village sites, etc. A detailed account of the strange earth-work known as the Serpent Mound of Adams County, O., will be printed, and the illustrations of some of the papers will include a number of terra-cotta figures of men and women in a style of modelling heretofore unknown in American prehistoric art.

— The Appletons have published "A First Book in American History," by Edward Eggleston, intended for beginners in historical study. It is really a series of biographies of men more or less prominent in American annals, beginning with Columbus and ending with Lincoln, the author believing that children cannot follow the political development of a nation understandingly, and that biography is for them the natural door into history. There is much truth in this view, and Mr. Eggleston has been pretty successful in carrying it into practice, the men whose lives he relates being not only leading actors in American history, but also representatives of American character. The style in which the stories are told is likely to interest children, and the numerous illustrations in the book add to its interest and instructiveness. There is, however, no attempt to connect the various lives recounted so as to make a continuous narrative, and the reader gets no idea of the course of American history as an organic whole. In short, the book is not history, but only an introduction to history, and as such it has considerable merit.

— "Pensions for All" is the title under which Gen. M. M. Trumbull will give a severe lashing to the treasury raiders, in the October *Popular Science Monthly*. The writer was a general in the civil war, and is anxious for the honor, as well as the due rewards, of the former soldiers, and he expresses the fervent wish that the "pension temptation" may not "change the character or diminish the fame of the Grand Army." Dr. M. Allen Starr will have an article on "The Old and the New Phrenology," showing, with the aid of illustrations, what has been definitely learned about the location of the various mental faculties in the brain, and how the errors of Gall and Spurzheim have been exposed. A lively picture of "Evolution as taught in a Theological Seminary" will be given by Rollo Ogden. The writer finds his material for criticism in the lectures on dogmatic theology given in the Union Theological Seminary. Professor J. Howard Gore will contribute an article on "Anthropology at Washington," describing the investigations of the customs and history of the Indians and Mound-Builders which are being made by the government scientific bureaus.

— It is not generally known that there was an American governor of Emin Bey's province in Africa, which has recently attracted so much attention, owing to Stanley's relief expedition. Colonel H. G. Prout, who is now editor of the *Railroad Gazette*, was the immediate successor of General Gordon as governor of the Equatorial Province, and was one of his most trusted friends. It is announced that in the November *Scribner* Colonel Prout will fully describe Emin Bey's province, and will give many interesting recollections of General Gordon, with extracts from some unique private correspondence, and with a number of facsimiles of Gordon's letters and maps.

— The Rev. A. K. Glover will shortly publish a small volume entitled "The Jews of the Far East, or the Jews of the Extreme Eastern Diaspora," with the original Chinese texts of the inscriptions discovered at Kaifung-tu.

— D. C. Heath & Co. will publish in September, a translation of "Lindner's Empirical Psychology," by Charles DeGarmo, Ph.D., of the Illinois State Normal University. As the name implies, it is based on common experience rather than on metaphysical theories. It is written from the Herbartian standpoint, and is of interest from the light it throws on the science of teaching. The common complaint is that our ordinary abstract and verbal systems of psy-