usually rapid, the chlorophyll bearing organisms, especially the green flagellates appearing first, followed in turn by the animal plankton, Protozoa, Rotifera and Entomostraca. The resubmergence of the bottom lands doubtless starts anew encysted forms left by receding waters. In general the recovery from the flood culminates in a plankton maximum of greater or less importance, depending upon the season of the year and the extent of the flood.

9. Species present in great numbers are often extremely variable, as for example, *Brachionus bakeri*. The varieties are often local, or seasonal, but may also be coëxistent. Variation is often very great in the case of species reproducing parthenogenetically as the rotifer just mentioned, in other rotifers, in Daphnia and in Bosmina.

C. A. Kofoid.

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*MALARIA AND TUBERCULOSIS.**

The visit of certain English physicians to Italy during the Christmas vacation, was in some respects so remarkable as to make a full description of it of general interest. Commendatore Florio, a wealthy and beneficent citizen of Palermo, invited certain English physicians first to Rome, in order to see the work done by their Roman brethren in the investigation of malaria; and, secondly, to Palermo, to inspect a sanatorium for the cure of consumption which Commendatore Florio has erected under the advice of Professor Cervello, of the University of Palermo. The party of English physicians with their friends was about twenty in number, among them being Sir T. Lauder Brunton, Sir Walter Foster, M.P., Professor Clifford Allbutt, of Cambridge, Dr. Manson, C.M.G., and Dr. Cantlie, of the London Tropical School. Dr. Malcolm Morris and Dr. St. Clair Thompson represented the National Association for the Prevention of Tuberculosis, and Dr. Gibson represented Edinburgh. They were received at Charing-cross Station by Commendatore Florio's representative and travelled with him to Rome, where they remained for some days in conference with Professors Grassi, Bignami, Celli, and Bastianelli. Signor Grassi, now Professor of Zoology in the University of Rome, is a Sicilian, and while a professor at Catania carried out the remarkable researches on the propagation of the eel which secured for him the Darwin Medal of the Royal Society.

Professor Grassi, since his removal to Rome, has performed work perhaps no less remarkable in demonstrating the propagation of malaria. This story is not only so interesting in itself, but of such vital importance to our own colonies, some of which are desolated by malaria, that I will try to sketch briefly what will be told in full by Professor Grassi in an illustrated volume to appear very soon both in Italian and English. A few years ago M. Laveran won a place for himself on the distinguished roll of Frenchmen of science by discovering in the blood of malarious patients a minute parasite, a form belonging to the humblest order of animal life. Three different but closely allied species of parasite are severally concerned in the causation of the three kinds of malarial fever. M. Laveran's researches were fully verified by observations both in Europe and in America, and further observations made of their behavior in man. Certain suggestive facts led Dr. Manson to suspect that a gnat or gnats were the means of propagating the parasite, and, having himself returned from the tropics, he pressed Major Ross, then of the Indian Medical Service, to follow up this clue in India. Himself an ardent engineer and now chief of the Liverpool Tropical School, Major Ross set to work with some success, but unfortunately his efforts were impeded by

* From the London *Times*.

the active discouragement of his official superiors in India. Thus hampered he was able, nevertheless, to ascertain that a gnat (a culex) is the means of propagating a malaria in birds but not, as it turns out, any one of the malarial parasites of man. At this point the Roman physicians took up the subject, Professor Grassi on the side of zoology, Professor Bignami of pathology, Professor Celli of prevention. Their researches have proved, and Major Ross has since verified their statements in West Africa, that malaria in man also is propagated by a gnat, but not by a culex; the enemy of man is a dapple-winged gnat, scientifically known as *Anopheles claviger*. Professor Grassi showed to his visitors a large number of beautiful drawings illustrative of the anatomy of this gnat, and of the life of the parasite within it. The gnat, in sucking the blood of an infected man, takes in the parasite; this in a spheroidal form may be demonstrated in the stomach of this fly, and its course, followed closely as it penetrates the walls of the stomach, reaches the juices of the body, as a tiny worm-like creature, and thus wriggles onwards into the salivary (or poison) gland of the insect, whence it is again returned to man by the proboscis. Thus between man and the anopheles these parasites maintain their cycle of life. No man, and no dapple-winged gnat, no malaria.

Not the least interesting part of the visit was the excursion with the professors into the Campagna, where two farms had been selected for experiment. In the one protection was given against the access of the insects; in the other no such precautions were taken. Other things were equal; in the former farm was no malaria, in the latter malaria prevailed as before. Fortunately *anopheles* rarely bites men on the move; secreting itself in their cabins or chambers it attacks them while at rest—especially at night, when by certain apparatus its inoculations may be avoided. Whether *anopheles* can be extirpated or not is a large and difficult question. This gnat breeds in pools of a certain kind, not quite stagnant, but supporting confervæ (Limna), on which its larvæ subsist. From such pools these larvæ were collected and exhibited in abundance to the visitors. A small spoonful of common petroleum oil will destroy all the larvæ in a square yard of such water, and it seems possible, therefore, that by drainage, where possible, and the supplementary use of oil the insect might be removed from large areas. In turning up new ground such pools are apt to form and breed the gnat, a result which might be avoided by no very difficult provision. By his generous invitation Commendatore Florio has enabled skilled English observers to verify these invaluable researches—researches into the minute habits of very obscure creatures which will have nevertheless a very large effect upon the well-being of man in fertile tracts of the world now too pestiferous for continuous occupation, at any rate, by white men.

The cure and prevention of tuberculosis has of late years excited the public interest more than of malaria, of which fell disease our home population now happily knows little. From Rome Commendatore Florio's guests were taken to Palermo, and were entertained in the Villa Igiea, the exquisite palace, for I can call it no less, in which consumptive patients are to be received and treated on the open air system, with all advantages that a beautiful and uniform climate, a lovely site, and every luxury of life can give. The sanatorium, which will be completed in a few months and then opened by the King and Queen of Italy, is built outside Palermo upon the rocks on which the deep sea of the bay actually beats. In the clefts of these sunny rocks are marble benches, temples and grottoes,

and about their sinuous margins winds terrace upon terrace broadening up to the plateau on which, some forty yards from the sea, the sanatorium stands, sheltered behind to the north by the mass of Monte Pellegrino. Of this great and splendid curehouse, Professor Cervello is the physician in chief, and Baron Fassini, whose charming qualities as a host endear him to his guests, is the director. The most perfect modern systems of cure have been studied in Germany and elsewhere by Professor Cervello, whose dietetic regulations will be rendered less oppressive by the ministrations of a first-rate French chef, and whose draughts of fresh air will be administered to those who desire it in a beautiful yacht of 300 tons, which is always to be at the call of the patient. In Palermo Commendatore Florio himself, the Messrs. Whittaker and other residents did their utmost by brilliant hospitality and constant kindness to make the visit of the English physicians and their friends a memorable one; and not the least delightful of their memories will be that of the sanatorium and its grounds illuminated by myriads of lamps and hundreds of men with torches as they steamed away from the harbor on the night of their departure.

It is urged on behalf of the Villa Igiea that Palermo is the nearest place to the Continent of Europe where so delightful a climate is to be had, where there are so many resources for quiet cheerfulness and so much charm for the eye and imagination. But it is needless to add that residence in a fairy place, with a French cook and a yacht at command, can be no cheap cure. The sanatorium when finished will accommodate about 100 patients, who must necessarily belong to the wealthiest class of society.

In respect of finance I must add that Commendatore Florio did not issue his generous invitation with any eye to commercial advertisement. He has built the Villa Igiea with no intention of personal profit; after providing a fund for repairs and contingencies, all surplus is to be set aside for building a sanatorium or sanatoriums for the poor. He was also wishful that English physicians should see at work a method of inhalation of the vapor of formaldehyd which Professor Cervello believes will prove a very valuable ally in his treatment of pulmonary phthisis. This method the Professor has used for some time in the consumption wards of his hospital with, as it appears to him, satisfactory results. Whether this method turns out to be valuable or not, and this time only can show, there can be no doubt even now that the Villa Igiea offers incomparable advantages as a sanatorium for the modern system of cure of the most grevious of all pests of man.

SCIENTIFIC BOOKS.

Social Laws. An Outline of Sociology. By G. Tarde. Translated from the French by Howard C. Warren, Assistant Professor of Experimental Psychology in Princeton University, with a preface by James Mark Baldwin. New York, The Macmillan Company. 1899. Small 8°. Pp. xii + 213.

This little book consists of a collection of lectures delivered by M. Tarde at the *Collège Libre des Sciences Sociales* in Paris during the month of October, 1897. The French edition appeared in 1898 under the title, *Les Lois Sociales; Esquisse d'une Sociologie.* It has now come forth very opportunely in an English dress, which enables those who do not keep a close watch for important contemporary foreign literature to acquaint themselves with the views of one of the leading thinkers of our time. It does not claim, as the author is at pains to say, to give a summary of his three principal works, The Laws of Imitation, Universal Opposition, and Social Logic, but rather to show what there is in common in these works, and how they together constitute a system of social philosophy.

There is one respect in which Tarde may be