

in the fact that in a family or group one or two individuals may only be attacked and the rest escape, than that in a family one or more may be attacked with tubercle of the lungs and the others escape, though living under identical conditions. The seed may be often present; it will only grow on a suitable and selected soil, and in the case of leprosy the exact conditions of soil are difficult to obtain, hence the slow and erratic progress of the crop.

GLEANINGS FROM THE ATTE DELLA  
SOCIETA PER GLI STUDI DELLA  
MALARIA, VOL. III.

COMMUNICATED BY LIEUT.-COL. G. M. GILES,  
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THE last volume of proceedings of the above Society, for the opportunity of perusing which I am indebted to Prof. Celli, contains much of interest to Anglo-Indians, and in especial two papers—one by Prof. Celli, in collaboration with Dr. G. Gasperini; and the other by Dr. H. J. M. Schoo, a Dutch observer, which taken together possibly contain the foundations of most important applications in practical hygiene.

The first-mentioned paper, as also a third contribution, by Dr. G. Romanin-Jacur deal with instances in which localities remain entirely free from malaria, or practically so; although they apparently present every one of the factors essential to the production of the disease, while other similarly situated localities, it may be close by, are virulently infected.

Dr. Schoo's paper, on the other hand, deals with the recrudescence of malaria in Holland, a country in which it was believed to be as extinct as is the case in England. It is evident, therefore, that in the English fens and in such places, as Padua, Pisa, &c., some immunising influence must be at work, which may, as has happened in Holland, disappear as inexplicably as it has come.

A hint, however, as to the possible nature of this "x" factor appears to me to be continued in one of Dr. Schoo's incidental observations in connection with the reappearance of malaria in Holland.

It may be taken as an undoubted fact that all the conditions known to favour the development of malaria—marshy environment, a favourable climate, and the existence of swarms of *anophe-*

*letes*,—may be present without giving rise to the development of the disease.

Apart from the carefully described instances in the "proceedings" now under consideration, instances of this sort have been cited by Nuttall (*Journ. of Hygiene*, I, 1890), by Sargent (Ann. de Pasteur, N. 10; October 25, 1901) and by Pfeiffer (Blatter des Allg. Argt. Vereins, von Thuringen, 1901). The Italian authors especially emphasise the fact that not only are these numerous instances of such immunity to be found in close proximity with existing foci of disease of exceptional virulence, but the introduction of infected persons into such immune areas fails to give rise to any notable spreading of the malady; the local mosquitoes being, to all appearance, to a great extent immune to the disease, though this immunity is, in no sense, absolute. They further clearly demonstrate that this apparently inexplicable immunity cannot be referred to any obvious change of local conditions, whether meteorological or hydraulic, and further that the suggestion that they may be due to the more extended use of quinine is in no way tenable. Moreover, some of these very localities are known to have been virulently malarious within comparatively recent times. We know, for example, that, after a progressive diminution extending over a couple of centuries, malaria has finally disappeared from England within the memory of middle-aged people, and have been inclined to flatter ourselves with the idea that this benefit may be credited to improved sanitary and social conditions.

It is evident, however, that this explanation does not cover the entire case, as Dr. Schoo's paper shows that not only may malaria disappear from a given country, but it may also reappear, without any obvious change of environment, though this is only equivalent to admitting that we have failed to notice some one or more of its details to which such changes must be traceable.

Now Dr. Schoo records a fact in his contribution, which may well be, if not the solution of the difficulty, at least a hint as to its nature, and it may be one of its most important factors. His earlier attempts to infect mosquitoes for purposes of experiment failed; and he subsequently discovered that the reason of this lay in the plan he had adopted of feeding them on acid fruits. Mosquitoes so fed could rarely be

infected, while those that were maintained either on pure water or on non-acid fruits, such as the water-melon, could be infected with approximate certainty.

It mattered not whether the acid diet was permitted either before or after biting an infected person: the result was the same—immunity to infection.

Now Prof. Celli notes in his description of one of the Italian immune localities that it is remarkable for an enormous development of the cultivation of the tomato, a fruit which is not only very rich in vegetable acids, but is also one of which I know mosquitoes are very fond.

He notes also that in these patches of immunity the mosquitoes seemed disinclined to bite. May not the reason of this be found in their being satiated with a food which they prefer?

Again, taking the case of England, let us ask what crop has developed most in cultivation during the two hundred years of progressive diminution of malaria and we shall find that the only staple that has done so is the potato—another plant with a strongly acid fruit, which is actually poisonous to man.

Whether or no mosquitoes care to feed on the berries of this plant, I cannot say, but it may well be so.

Assuming the accuracy of Schoo's observations it is obvious that the existence of an abundance of readily accessible acid fruit cannot fail to render abortive the infection of large numbers of mosquitoes, and it is not unlikely that one of the factors of the immunity of municipal areas may be the fact that in such situations, mosquitoes are not only the parasites, but the commensals of man, and must needs find the bulk of their food by plundering his larder, which is usually stocked with, *inter alia*, a good supply of acid fruits and beverages. Wine, beer, most fruits, and many of our common culinary vegetables contain an abundance of acid, and it is obvious that insects, able to obtain a free supply of such articles, will not only be less disposed to bite (for I am still strongly of opinion that blood is not exactly the normal food of mosquitoes); but will also escape infection when they do so even where their victim's blood is full of parasites.

Now here appears to me a splendid subject of investigation for some of our promising young lieutenants newly joined and luxuriating in the flushness of "unemployed" pay.

A series of observations on the immunising effects of various articles of food or of weeds capable of easy cultivation, and especially such as mature during the rains, might be of the greatest value; and provided that Government could be persuaded to so far depart from their usual custom as to leave a few Jail Superintendents for two or three consecutive years in one station, invaluable experiments on the practical prophylaxis of malaria might be made by them, as their opportunities of doing so are unrivalled; though, under our present regime, their opportunities are made absolutely nugatory by the practical certainty of a purposeless transfer long before one can observe the result of any measures taken. Carefully conducted observations on the effects of various food plants in modifying the liability to infection of mosquitoes feeding on them might prove of incalculable value; but such experiments require time and can not be transferred from hand to hand, like an office for the sale of postage stamps; nor can any results be expected by the deputation, for a definitely short period, of one or more officers on emoluments calculated at something practically less than their usual pay.

The discovery of some anopheles-immunising plant capable of growing under the same conditions as irrigated rice, and fruiting at the season during which the rice-fields are kept flooded is also a great desideratum, as the systematic planting of patches of such a plant amongst the rice cultivation would go far to neutralize its deleterious effects on health.

All this, if Dr. Schoo's observations can be confirmed as, let us hope, it may be, and no other that has yet come to light, appears to offer such large and inexpensive possibilities of prophylaxis on a large and practical scale as this appears to do.

Another fact that may be gleaned from the present volume is that, unlike our Indian authorities, the Italians are commencing everywhere to put to the test of practice the lessons taught by science as to the rational prophylaxis of malaria, and, moreover, that wherever this has been done, their efforts have been crowned with a very fair measure of success. In many instances, too, they have demonstrated that much practical good can be effected for but a small expenditure of money, and they emphasise the truth of my contention that the measures adopted must be everywhere based on a careful study of local

conditions. In Northern Sicily, *e.g.* Drs. Insinna and Mangilla (Atti, III, p. 611, *et seq.*) show that the breeding places of the anopheles are there mainly pools in the beds of rivers and torrents, which only contain any considerable volume of water during periods of heavy rain. From the nature of the case little can be expected from works of a permanent character, even if the expense of regulating works of this character were not prohibitive, and it was found better to employ only temporary expedients renewed from year to year. On page 115, he describes how a considerable suburb of the city of Palermo was dealt with, the malariousness of which was traceable to pools in the bed of the Orete and of those of canals connected with it.

Sig. Comm. Mario Benso, the Engineer of the locality, had the following works carried out:—

1st. To dig a small ditch about a yard wide carefully levelled throughout the course of the streams lying within the Municipality of Palermo so as to carry off quickly and easily the residual waters and avoid the pools that form in the wide beds of watercourses of this description.

2nd. To clean out the mud and obstacles of every sort that could retard the passage of the water from the channels of canals and mill-courses.

3rd. To clear away the algæ and other aquatic plants and their roots.

4th. To destroy reeds and other plants growing on the banks, the roots of which extend into the water (so producing small stagnant areas).

5th. To maintain a careful watch over any deviation of water from streams, canals, &c., so as to avoid the formation of marshy patches.

6th. To inspect all stables, &c., within the zone, so that they may be kept in a good sanitary condition.

The adoption of these measures has resulted in a notable diminution of malaria within the area involved, and that at a cost of only about £200 per annum; and though they may be of little interest as regards the majority of our towns in the plains, it is obvious that they exactly fit the cases of Hurdwar, Kathgodam, and other submontane towns, where malaria of the most virulent type is lamentably prevalent.

Another fact worth noting is that the substance known as "larvæcide"—an aniline derivation manufactured by a German firm—has been found practically useful for the destruction of larvæ, while a similar substance "culicide" has been

found to lack sufficient solubility to be of practical use. The general impression, however, appears to be that as yet we have nothing that surpasses petroleum for such purposes.

The entire volume is, in fact, full of interesting results of sound work; and the fact that so few of us read Italian will, it is hoped, be taken as sufficient justification for the above brief notes on its contents.

## LONDON LETTER.

### THE OYSTER SCARE.

THE possibility of typhoid fever being communicated by means of oysters and other shellfish taken from sewage-contaminated waters was pointed out by Sir Charles Cameron in 1880. Since then, at various times and by various authorities, attention has been directed to the subject, and cases and instances have been reported, which more or less strongly supported Sir Charles Cameron's views. Inquiries have been instituted with a view to discovering what measure of danger to public health proceeded from this source, and legislation proposed with the object of removing risks of serious infection. Very recently the matter has been forced into unpleasant prominence by events which occurred simultaneously in the towns of Winchester, Southampton and Portsmouth. Mayorial banquets were held in these towns on the occasion of the Annual Civil Elections and oysters formed part of these feasts. These molluscs were obtained from Emsworth, which is situated on one of the numerous tidal creeks, which scollop the southern coast of Hampshire and which receive the sewage of various towns and hamlets. Waters of this sort are favourable for oyster cultivation, and all round the coast similar estuaries are utilized for this purpose. The industry is a large and profitable one. In due time cases of typhoid fever began to occur among those who had attended these banquets—many of the sufferers being church dignitaries and men of position. Several valuable lives were lost in consequence. Investigations at Emsworth revealed indisputable evidence of sewage contamination, and bacteriological examination of the oysters and of the water disclosed the presence of fæcal and even of typhoid bacilli. These examinations were extended to other places and other descriptions of shellfish—cockles, mussels and periwinkles—and the re-