

in our opinion it is imperative to appoint one or more officers with special entomological knowledge to study these points minutely. It is true that these reports afford evidence that the officers concerned in these investigations have made additions to our knowledge on these points, but the other duties of these officers are so multifarious that valuable time is being lost through this defect. It is true also that in the epidemic in Uganda the condition of things is so terrible that it is impossible to wait for the solution of all these questions, however important, before any action is taken, and we may now consider what, with the present available knowledge, is being done to check the epidemic. The means of prophylaxis may be considered under three aspects:—(1) Those directed against the fly; (2) those directed against the carrier of the trypanosome, *i.e.* man; (3) those directed against the trypanosome itself.

(1) With regard to measures directed against the fly. It has been found, and it is a matter of the highest importance, that the "natural range" of the fly, *i.e.* the distance to which flies follow from water in search of blood, is, as a rule, under 50 yards. The still more important fact has been determined that clearing and burning or removing the undergrowth for a distance of 100 yards in either direction, *e.g.* from a ferry for a strip 50–100 yards broad, has the effect of banishing the fly. It is this method, then, *i.e.* banishing the fly by clearing from its "normal fly range," that is the basis of the methods now being carried out in Uganda. It is not necessary to clear extensively around a village, but simply to clear comparatively small strips of the "fly range" frequented by man. Although flies may occur in the village itself, unless there is a "fly area" present these flies are those which have followed their victims beyond the "fly range" to the village. If the flies of the "fly range" are banished, then, *ipso facto*, the "following" flies also disappear. A typical fly area, though there are exceptions, consists of more or less open water with contiguous and especially overhanging shade and generally a fairly well-defined bank or shore. If, then, clearing can permanently banish the fly, and we believe that this will be found to be the case, because the fly still has plenty of uncleared area to frequent—though the fact that its human blood supply is at the same time removed may modify the result—it is an important measure of prophylaxis, though its value is perhaps restricted to somewhat small areas and special conditions.

If the fly cannot be removed by clearing, then the population must be deported from the vicinity of the fly. This measure has been extensively carried out in Uganda by the removal of populations from the lake to inland fly-free areas two miles away, to prevent traffic from the lake, which is responsible for the great bulk of the infection; but in many cases there are serious difficulties in the way. Further, the removal of populations still non-infected from a potentially dangerous fly area to a safe fly-free area would be of the greatest importance, and would form a more striking object-lesson to the native of the value of these measures than the removal of an infected population, because a certain, probably high, percentage of these latter will eventually die of sleeping sickness, although in a safe area; whereas this would not be the case if the population removed was non-infected.

(2) As the two measures, clearing and deportation, of the healthy, are undertaken with the object in view of preventing access of the fly to man, so segregation of the sick prevents fresh infection of the fly, and diminution of the infectivity of the fly in a fly area. This implies the removal of the sick of a village to another village or camp in a fly-free area, and it is

important to note that such areas are numerous, and may often be only a few hundred yards away. Fresh infection of the fly is also avoided by preventing the removal of infected natives to uninfected fly areas. The applicability of this measure depends mainly upon the "attitude" of the native.

(3) Measures directed against the trypanosome itself, *i.e.* the treatment of infected persons, are bound up closely with the segregation of the sick. The treatment of the segregated in fly-free areas by atoxyl or other arsenic preparations is the only one that is at all effective, but it must be admitted that the results are disappointing, and that the good results of the drug are in many cases only temporary. The patient's blood becomes free from trypanosomes (and presumably non-infective, though this is not proved), and so the chance of infection of the fly, if patients come in contact with fly areas, becomes less.

Time will show how far these measures, the numerous important details of which we have to leave unconsidered, will be successful. Those engaged in carrying out these arduous and dangerous measures have hope that although sleeping sickness may not be eradicated or the fly totally annihilated, yet that the epidemic will soon be under control. It must be the sincere wish of everyone that this hope may be justified.

J. W. W. S.

THE CONTAMINATION OF MILK.

THE contamination of milk has been the subject of a detailed research by Dr. Orr, carried out on behalf of the councils of the county boroughs of Bradford, Hull, Leeds, Rotherham and Sheffield, and the administrative counties of the East and West Ridings of Yorkshire. Of previous investigations, Delépine concluded that though his results did not exclude the possibility of infection at the home of the consumer, or during transit from the farm, they did indicate that infection at the farm, or through vessels infected at the farm and used by the farmer for the storage and carriage of milk, was of paramount importance. On the other hand, Newsholme attaches little importance to infection at the cowshed. Dr. Orr's investigation was carried out in a systematic manner, and not only were the bacteriological examinations carefully performed, but, in addition, the condition of the cows and cowsheds and the effects of season and atmospheric temperature were noted. First, the bacterial content of the milk in the udder was estimated, and it was found that the fore-milk (that first milked) contained from 18,000 to 48,000 microorganisms per cubic centimetre, and the milk after the removal of the fore-milk 890 to 4800 per cubic centimetre.

It is generally agreed that the milk as secreted is sterile, the microorganisms in the milk as drawn being derived from lodgment and multiplication in the teats and cistern.

Dirt on the udder is a fruitful source of contamination, and, during milking, dust, &c., from the udder adds much to the bacterial content of the milk. Dust in the cowsheds, and the entrance of dirt during transit and delivery, further add to the contamination, so that the milk, when it reaches the consumer, may contain an appalling number of microbes. The chief conclusions derived from Dr. Orr's work are:—

(1) Of the total organisms in the milk used by the consumer, the greatest number are contributed by the farmer. During railway transit, at the retailer's premises, and in the consumer's house, smaller amounts are added, the amount in each instance being apparently about the same.

(2) Of the glucose-fermenting or intestinal organisms and the streptococci, by far the greatest number are added

at the farm. The retailer adds a certain number, the consumer none.

(3) The sediment or "dirt" gains entrance to the milk chiefly at the cowshed. In 86.8 per cent. of the samples examined there was no increase in the sediment when sold by the retailer, but a decrease in 68.8 per cent.

(4) The farmer was responsible for the *Bacillus enteritidis sporogenes* (Klein) in the milk consumed in 66.6 per cent. of the samples. In 11.1 per cent. of the samples these bacilli were added by the retailer or the consumer, while in 22.2 per cent. the source was doubtful.

Various suggestions are made for improving the milk supply, and the imposition of the following standards is advocated:—

(1) A bacterial standard of not more than 50,000 organisms per c.c.

(2) Milk not to contain glucose-fermenting bacteria in less than 1/10 c.c.

(3) A sediment standard (at first) not exceeding 40 volumes per million.

Altogether, this report on the milk supply is one of the most important that has appeared in this country, and should be brought to the notice of all producers and retailers of this important article of diet.

THE WINNIPEG MEETING OF THE BRITISH ASSOCIATION.

WE are now in a position to give some further details about the local arrangements for the British Association meeting in Winnipeg during the last week in August next, and also the provisional programmes of the sections.

The Drill Hall will be used as the reception room. The main floor is 147 feet by 87 feet, so that there is no fear of undue crowding. Arrangements will be made for free access to the Parliament building grounds adjoining.

On the opposite side of Broadway are the University building and grounds. The University is a small and by no means beautiful structure. It resembles, in fact, in size and general style the public elementary schools of the city. But it must be explained that the University at present only teaches scientific subjects. Arts, medicine, and agriculture are taught in "affiliated" colleges which are scattered in various parts of the city. Thus, the classics and modern languages are taught in the four "affiliated" denominational colleges, St. Boniface (Roman Catholic), St. John's (Church of England), Manitoba College (Presbyterian), and Wesley College (Methodist); medicine is taught in the Manitoba Medical College, and agriculture in the Manitoba Agricultural College (Provincial Government) at Tuxedo Park. The University of Manitoba (also a Government institution) has been a teaching institution for five or six years. Founded in 1871 as an examining board, the University itself at present undertakes instruction in mathematics, chemistry, physics, botany, physiology, pathology and bacteriology, and civil and electrical engineering. But chairs in English history and political economy have been recently established, and these new departments will commence work next October. The government and organisation of the University is undoubtedly in an unsatisfactory state, and is, in fact, the subject of a Government Commis-

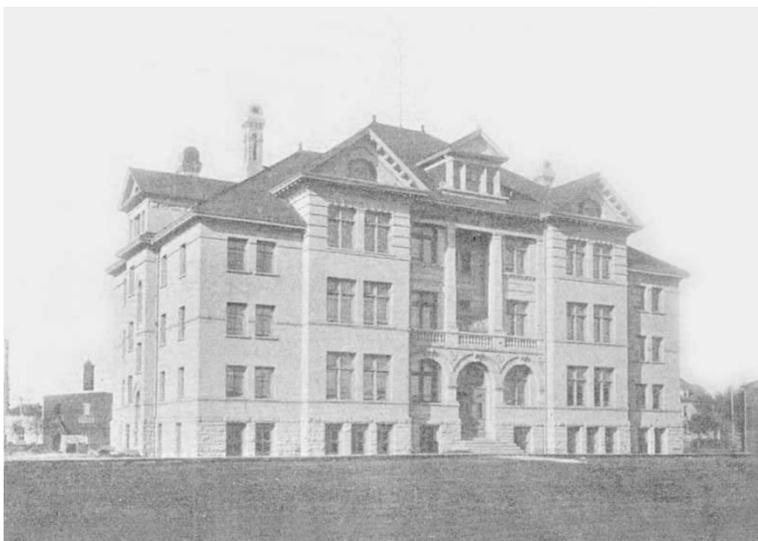
sion at the present time. There is a widespread feeling that the province ought to have a provincial university of the type provided in many States of the Republic to the south, and entirely free from any denominational influences.

Five of the sections (B, D, G, I, K) will meet in the University building. Section A will find its temporary home in Wesley College, where three rooms will be set aside for the meetings. Section E will be placed in the Convocation Hall at Manitoba College, and Section F in a class-room of the same institution.

Section L will have the honour of sitting in the Legislative Chamber of the Provincial Government, while agriculture (subsection of K), and Sections H and C, will meet in the Alexandra, Carlton, and Isbister Schools respectively.

All these meeting places are conveniently near the reception room.

The local sectional secretaries are as follows:—A, Prof. F. Allen, professor of physics, University of Manitoba; B, J. W. Shipley, assistant to the professor of chemistry, University of Manitoba; C, R. T. Hodgson, Brandon Collegiate Institute, Brandon;



University of Manitoba. (For Sections B, D, G, I, and K.)

D, C. A. Baragar, University of Manitoba; E, Alex. McIntyre, Normal School, Winnipeg; F, W. Manahan, Winnipeg; G, Prof. E. Brydone-Jack, professor of civil engineering, University of Manitoba; H, not yet appointed; I, Dr. Wm. Webster, demonstrator of physiology, University of Manitoba; K, Prof. A. H. Reginald Buller, professor of physiology, University of Manitoba; Principal W. J. Black, Manitoba Agricultural College; L, D. M. Duncan, registrar of the University of Manitoba.

A few hints to travellers may not be out of place. For the ocean voyage, heavy coats and wraps and a travelling rug would be great comforts, if not absolute necessities, as it is never very warm on the North Atlantic route. These, however, should be packed away for the overland journey, otherwise they will give rise to considerable inconvenience.

Travellers from Europe are specially warned not to carry with them in the train more baggage than is absolutely necessary for the journey. Each person ought, indeed, to be content with a suit-case and perhaps a small handbag. All kit-bags, gladstone bags, and such like are quite out of place, as there is no space provided for these, and they may be a great