Although some measure of success has been reported from the actual spraying of the fauces with emulsions of *Staphylococcus Pyrogenes Aureus*, yet this method does not appear to be entirely devoid of risk. It should be stated that the use of Diphtheria anti-toxin for the treatment of carriers has not produced satisfactory results, and quite apart from the danger of inducing the Anaphylactic state, there are no theoretical grounds for the hope of any success in this direction. It is interesting to note that several years ago the Lister Institute of Preventive Medicine prepared an anti-microbial serum which was used for preparing lozenges for the treatment of this condition. Certainly, there is more chance of dealing with these microbes by means of the development of antibodies in the blood, resulting from the injection of vaccine, than by local application of lozenges, or other external applications. In obstinate cases the method of the enucleation of the tonsils appears to be of practical service, especially when they are in any way enlarged.

PROPHYLAXIS.—A certain amount of passive immunity is developed after the injection of diphtheria anti-toxin. It should be remembered, however, that this condition is temporary, lasting usually only about six weeks. A very serious objection to the use of serum, however, is the danger of inducing the anaphylactic state, which in my opinion altogether outweighs any advantage that may accrue from the protection from a possible attack of diphtheria. This objection also holds good in regard to the method of Behring, who induces prophylaxis by the injection of a mixture of diphtheria toxin and anti-toxin (*Lancet*, June 7th, 1913). It is true that the danger of anaphylaxis can be reduced by employing anthropogenous sera, but this modification introduces further difficulties and objections. Undoubtedly the inducing of a satisfactory prophylaxis must be looked for along different lines.

The method I am at the moment investigating depends upon the injection of a sensitised vaccine: this vaccine is prepared by treating the diphtheria bacilli with an anti-microbial serum prepared by inoculating diphtheria bacilli washed free from toxin, into animals. On theoretical grounds this method should be of value, and a vaccine of this type should also be efficacious in the treatment of diphtheria carriers.

It is obvious that the value of vaccine treatment in regard to diphtheria has not been

entirely elucidated, and a considerable amount of work is required in order to prove beyond doubt the efficacy of this method. At the same time on theoretical grounds, and also from such experimental evidence as is available, it is maintained that in treatment by means of vaccines of one type or another, we appear to have a valuable method of dealing with the diphtheria carrier and of preventing the spread of the disease amongst contacts.

The danger of inducing a fatal anaphylaxis precludes, in my opinion, the use of Diphtheria Serum for any condition except the treatment of the actual toxic symptoms arising in the early stages of the disease.

It should be noted that in regard to the use of vaccines, the fear of a fatal anaphylaxis can be excluded as, in so far as the writer knows, no fatal case has ever been recorded as the result of anaphylaxis following on the injection of a vaccine. When the extremely small quantity of albuminous matter in even the largest dose of vaccine is compared with the amount of albumen present in 10 c.c. of horse serum, this difference in the behaviour between Sera and Vaccines in regard to anaphylaxis is readily explained.

DISCUSSION ON MEASLES REGULATIONS.

YORKSHIRE BRANCH OF SOCIETY OF MEDICAL OFFICERS OF HEALTH, MARCH 24TH.

*Notes of remarks made by W. Angus, M.D., D.P.H.,
Acting Medical Officer of Health, Leeds.*

I PROPOSE first to give some details of the notifications received in Leeds since January 1st, and then to describe what administrative action has been taken.

When the regulations came into force on January 1st, notifications began to come in at once, and have come in fairly steadily since at the rate of about 200 per week, or 2,364 for the eleven weeks ended March 18th. Of the notifications received, approximately 80 per cent. were from doctors, 11 per cent. were from parents, and 9 per cent. were cases (mostly secondary) found by the women inspectors in the course of visiting. In many cases parents appeared to be aware of the requirement to notify, but preferred to call in a doctor first to verify the diagnosis. As the result of notification, doctors are certainly seeing more cases of measles, and parents have often said to the inspectors that the fact of measles having been made notifiable makes them think that it must be a disease of some consequence, calling for medical attendance.

The ages of the cases notified were as follows :—

Ages.	Number of Cases.	Percentage.
0—1 year	152	6.4 per cent.
1—2 years	334	14.1 „ „
2—3 years	376	15.9 „ „
3—4 years	383	16.2 „ „
4—5 years	412	17.4 „ „
5— years	707	30.0 „ „

A surprising number of cases were found in households with only one child, even when the child is under school age. These are cases where infection might well be prevented, if mothers would not take their children so often into other houses where there is sickness.

In two-thirds of the homes the affected child was the only susceptible, whether an only child or not, any other children having already had the disease. Of the remaining third, 75 per cent. had only one other susceptible child in the house, and this child invariably got infected.

Deaths.—There were 69 deaths in the period, which is equal to a mortality of 2.9 per cent. of the notifications. The accuracy of this as a mortality rate depends on whether the notifications were complete. One fact which suggests that notification is fairly good is that of the 69 deaths, only 9 were not notified during life, and of these 9, 3 took place in the first week when notification was an innovation.

The deaths were grouped according to age and sex as follows :—

Age.	M.	F.	Total.
0—1 year	2	12	14
1—2 years	13	14	27
2—3 years	7	7	14
3—4 years	5	3	8
4—5 years	2	—	2
5— years	—	4	4
29	40	69	

It will be seen that of the deaths, 41 were of children under the age of 2, and on comparing the age grouping of the notifications, one finds that one-fifth of the cases occur under age 2, but three-fifths of the deaths.

The case fatality at different ages was as follows :

Age.	Case Fatality.
0—1 year	9.2 per cent.
1—2 years	8.1 „
2—3 years	3.7 „
3—4 years	2.1 „
4—5 years	.5 „
5— years	.6 „

On comparing it with the chart in Dr. News-holme's memorandum of the case fatality in Aberdeen, where measles has been notifiable for many years, it will be seen that the figures are very similar, except that the case fatality under age 1 is less in the Leeds figures.

Administrative Action.—All cases are visited by a health visitor on the same day as the notification is received. The mother is advised about the nursing of the child, the special points emphasised being (1) *the hygiene of the mouth and nose*, as it is probable that a septic condition of the nasopharynx pre-disposes to an attack of bronchopneumonia, and (2) *the necessity of fresh air and ventilation*. Mothers are usually found to be anxious to keep the child warm, but the means adopted leads to an extremely foul, stuffy atmosphere, again pre-disposing to pneumonia. Directions are also given as to the avoidance of infection by not allowing other children to visit the infected house.

I have been specially impressed by the necessity for a re-visit about the third or fourth day after the first visit. The notification is usually sent on the first day of the rash. The first visit is paid on the following day, and at this stage it is impossible to foretell whether any case of measles is going to be severe or not. The worst stage is about three or four days later, and when pneumonia is most likely to set in, and this is the stage at which it is most necessary to impress upon parents the gravity of the illness.

Nursing.—I think the provision of nursing is likely to be the most valuable measure in cases of measles, and that it can best be made through existing District Nursing Associations. Such an arrangement has been made in Leeds. If it is not possible to nurse all cases, then nursing will be limited to children under the age of four, as this group accounts for 90 per cent. of the deaths, but represents only about 50 per cent. of the cases. Where cases are concentrated in one area, special nurses to do only measles will be put on, but where cases are scattered, the same nurse will attend them as is doing other district work, suitable precautions to avoid infection being taken.

Hospital Provision.—It has not been possible to provide for cases of Measles at the City Hospital, but the difficulty has been shortage of nursing and medical staff, rather than of beds. This question will be dealt with at a later date.

The main difficulty always felt in making provision for measles, has been due to the fact that the disease always comes in marked epidemic waves about every two years. *A graph of the deaths from measles during the last ten years, taking whole years and the City as a whole, shows the prevalence of the disease regularly every other year. If the graph be based on the deaths for each quarter of the year, it is seen that the periodicity is not quite regular, varying from one and a half to three years, with non-epidemic intervals not so well marked.

If the deaths in the various districts of the City during each quarter be similarly charted, it will

*Three charts were shown illustrating these points.

be seen that the times of maximum incidence in the different districts do not always exactly coincide. This may be of importance, as it suggests that the administrative difficulty of providing staff to deal with measles, owing to the tremendous fluctuation in the number of cases, may not be so great as anticipated, if the disease gradually spreads from one district to another. Further, it is possible that by dealing with this disease in earnest, we may bring about a changed state of affairs in which measles, instead of sweeping through a community attacking every susceptible within a few months, and then becoming almost non-existent for a time, will be a disease always with us varying in its incidence to a less marked extent. That alone would be a great step won.

I do not lay much stress at the present time on attempting to prevent infection, except in educating mothers to avoid the infection of young children in homes from which no children are going to school. Finally I think it should be possible to reduce the number of deaths by nursing, and although it may not have been an opportune time to introduce the new Measles Regulations, I am certainly of opinion that we should do our utmost to give them a fair trial. The notification of measles has often been discredited, because it was not followed by the procedure likely to give good results, and surely it would be a weak policy on the part of those responsible for the Public Health to give up the measles problem as a hopeless one simply because of some local failures.

DISCUSSION.

DR. EDMUND M. SMITH (York) welcomed the establishment of the compulsory notification of measles and hoped it would not be treated as a temporary measure merely for the period of the war and in order to please the War Office, for he had held for years past, as witness his previous Congress papers and other contributions on the subject, that universal compulsory notification of all such epidemic diseases as Measles, German Measles, Whooping-cough, and Chicken-pox, was desirable and sound in principle, and he was certain it could be made beneficial. Indeed, it was very illogical that all such infectious diseases were not notifiable, and also very misleading to the uneducated public, who argued—quite logically—that these diseases were evidently of no importance, even with regard to their infectiousness. And yet, on the other hand, for years past, we had been trying to educate this same public that these diseases were very infectious and that measles and whooping-cough, at any rate, were very important as no diseases caused more damage to childhood. Over and over again he had known cases of scarlet fever, and suspected to be of that character by the parents, who, however, complacently dubbed the illness as “only measles,” comforting

themselves that, consequently, there would be no notification, no calls by sanitary inspector, no disinfection, “no bother” at all. He had always said—and his experiences since the new Regulations came into force confirmed his belief—that notification in itself would prove a great educative force, that it would make the general public at once more fully realise the seriousness of the disease, and, by its consequent measures, the necessity for care in isolation and treatment, and the desirability of having proper medical attendance. Moreover, notification also gives us special opportunities of educating the public about the disease and its dangers at a time when they are necessarily interested in the subject by reason of the attack upon their own homes.

Since the Regulations came into force he had received a total of 422 notifications of measles in the first two calendar months, of which over 64 per cent. were from medical practitioners and over 30 per cent. from householders, and the testimony of his two school nurses, and of one health visitor who had been set aside entirely for the visitation of measles cases during those two months, was that they had met with very few cases which had not been so notified. It was highly satisfactory that medical practitioners had been called in to such a large proportion of the cases.

He thought it a very unfortunate thing that, after all these years, measles and German measles should at last have been made notifiable just on the eve of preparation of annual reports, and in war time, in a time when medical officers of health were handicapped by shortage of staff and other additional burdens. Therefore, he expressed the sincere hope that the question of the continuance of compulsory notification would not be tested under the present difficulties. He pleaded for the utmost effort to make the system successful nevertheless, and pointed out that our present efforts would teach us many lessons which would enable us more successfully to grapple with future epidemics under the Regulations. Whilst, therefore, he sympathised with recent protests in our Journal (PUBLIC HEALTH) as to bringing in compulsory notification under war conditions, he did not agree with any such protests directed against the notification of measles *per se*. On the contrary, he held that measles justified the expenditure of public money quite as much as scarlet fever, which did not effect anything like as much damage and hindrance to physical development, and he had never been convinced that measures of, and consequent upon, notification of measles in odd towns had been complete and adequately carried out. He could not help feeling that their confessions of failure had been a mistake. Here we have a disease universally acknowledged to be doing much mischief among the young (*e.g.*, the consequent chronic cases of otorrhea alone), and to be an important element in juvenile mortality.

Statistics here, as also with infant mortality generally, should not be regarded as an absolute criterion of success or failure. Our efforts in promoting education, isolation and care *must* have good results, however incalculable. We must not sit down to confessions of failure—rather we must apply ourselves, and with us our nursing staffs and other medical assistance, more vigorously and rigorously to the task of diminishing the prevalence as well as the mortality of such a fell disease. We might almost as well confess to failure in regard to those almost equally elusive diseases, scarlet fever and diphtheria, which thwart our efforts in a hundred ways. And recent experiences have not been discouraging. It is remarkable how, with the studiously careful use of powers of closing classes or other parts of day schools, for five days, in order to check the admission of secondary crops of incipient cases into school (as recommended in the Joint Memo. of the Local Government Board and Board of Education issued September, 1909), and in closing neighbouring Sunday Schools, and also by exhibiting warning notices at the entrance of and within cinema theatres, how greatly retarded had been the progress of the recent epidemic in York (which is just dying out after eight months), how much better therefore we have been enabled to keep pace with the school teachers' and the other notifications, and how numerous schools have escaped altogether. Notification by head teachers is an exceedingly valuable institution, but it is insufficient and is necessarily incomplete—it is voluntary, it is dependent upon second or third hand information, and it does not cover by any means the cases amongst children under or above school age, and those for various reasons not in attendance at school (at least 30 to 35 per cent. of cases).

In conclusion, Dr. Smith agreed with previous speakers as to the confusion arising from the obligation of notification being cast upon two or three alternative persons (doctor, parent, householder, etc.); the need for resuscitating the "epidemic grants" of the old Education codes; the need for some new names for measles and German measles which would impress the public more than the present titles, which were so much the object of banter. (Sir Thomas Grainger Stewart suggested Rubeola for the former and Roseola for the latter). He also had little faith in employing voluntary workers in the visitation of cases of measles, even if tactful ones could be obtained.

DR. W. A. BULLOUGH, Acting M.O.H. for the West Riding, doubted the expediency of health visitors visiting cases of measles in the smaller urban and rural districts contemporaneously with other duties, although this might be feasible in the large cities.

He remarked on the unfortunate name of this disease, and suggested "mottled fever" as an

improvement, as it would no doubt impress the parents with the fact that it was really a serious disease.

In this connection also it was extremely important that sanitary authorities should insist on the same routine regarding isolation and quarantine in respect to measles, as in the case of other infectious diseases, such as scarlet fever, diphtheria, etc. In this way neighbours would be prevented from bringing any susceptible children into close contact with the infectious patient.

Although the County Council, as such, have no executive responsibility in carrying out the measles regulations, yet a scheme was being considered whereby the small urban and rural authorities might be helped. The idea was to establish at Wakefield a reservoir of nurses, and any local authority could apply for the use of one of these nurses, either whole-time or to be shared with contiguous districts where measles happened to be also prevalent.

Dr. Bullough stated that an outside opinion by the local medical officers of health on this point would help the County Council very much in coming to a decision.

DR. H. P. WILTSHIRE said: I am of opinion that good will result from the notification of measles being made compulsory. Epidemics are very serious in colliery districts, where there are an unusually large number of children and many fatalities.

With regard to the responsibility for notification, I think it should be left to the doctor only and not to the parents; reasons: (1) Parents' diagnosis not reliable; (2) waste of M.O.H.'s time in visiting to verify; (3) notification by parents in the past a failure (notification of Births Act and Notification of Phthisis); (4) M.O.H. does not treat cases, and probably doctor has to be called in, in any case.

With regard to control, some form of hospital isolation necessary, especially for the first dozen or so of cases, starting in any particular area. Home isolation useless.

With regard to nursing, which is most important, if complications and fatalities are to be prevented, I suggest that the Central Authority (County Council) should have a staff of nurses whom they could send out to any local authority who may apply for them in times of epidemic, as required.

In course of time measles will, I believe, come to be regarded in the same light as scarlet fever and diphtheria, and the doctor called in to diagnose, treat, and notify the case, which will be far more satisfactory in every way.