

Type IV. The following table shows the frequency with which these types were encountered and their virulence:

Type	Incidence per cent.	Mortality per cent.
Type I	33	25
Type II	31	32
Type III	12	45
Type IV	24	16

The Rockefeller workers were able to produce a serum efficacious only for Type I infections, and in these infections the mortality has been reduced to 10 per cent. The serum must be given intravenously in doses of 90 to 100 c.cm., repeated every eight hours until there is a satisfactory fall of temperature and improvement in the symptoms. In infections due to Types II, III, and IV no benefit followed administration of serum prepared against these strains.

Dr. Eastwood's review of the researches of other workers brings out certain facts of considerable importance. Thus it has been found by employing the absorption tests that serological relationship exists amongst strains which are usually regarded as antigenically distinct, and that prolonged culture in homologous serum may modify profoundly the agglutinability of different strains; these changes in the serological reactions are accompanied by loss of virulence and reduction of antigenic capacity. That there may be little relationship between agglutination titre and protective power in a serum is another fact emphasized by many workers.

Although the Rockefeller investigators were only able to produce a protracted serum against Type I infections, other workers employing different methods claim to have produced antipneumococcus serum protective against all strains. An entirely new departure in serum therapy has been made by Preston Kyes, who appears to have cured human pneumonia by the injection of serum from fowls immunized with massive doses of pneumococci. Truche has described a method for preparing a polyvalent antipneumococcal serum by inoculating horses with an antigen treated with alcohol and ether. The apparent diversity of antigenic structure amongst strains of pneumococci presents difficulties which have not yet completely been overcome, but there is an indication that ways out of these difficulties may be found, and the benefits of serum treatment secured for all forms of pneumococcus infection.

The second paper is by Dr. Frederick Griffith on "Types of pneumococci obtained from cases of lobar pneumonia." In order that workers in different parts of the world may be able to compare the results of their investigations into the prevalence of types of pneumococci in different countries and at different seasons it is necessary that some uniform method be adopted for the isolation of the organism, the preparation of the agglutinating serum, and the carrying out of the test. Dr. Griffith makes the following suggestions towards the formulation of a uniform diagnostic test. Since much confusion has already arisen from the comparison of results obtained by fundamentally different methods, he recommends that a standard method should be based on that of the Rockefeller Institute, the results of which have been confirmed in many countries. He considers it preferable that the pneumococcus should be isolated by the intraperitoneal injection of a mouse and the recovery of the organism from the heart's blood rather than by direct plating on laboratory media, one reason being that more than one type of pneumococcus may occur at the same time in the sputum, and the predominant virulent type, which will multiply in the mouse, is most likely to be the cause of disease in the human being. His experience indicates the value of the following technical details:

1. The suspensions used for agglutination should be whole broth cultures, since they give the sharpest results.
2. Agglutinating serums should be prepared in the rabbit, since this animal yields the most specific serums.
3. Strains used for immunization should be maintained in virulence and should therefore not be subcultivated for long periods on solid media.

In a series of 150 cases of lobar pneumonia, taken mainly from the London area, Dr. Griffith finds that the American Types I, II, and III occur in about the same proportion as in the United States, and he agrees that these types are serologically distinct. There remain, however, a large number of strains which differ from these three types and present many varieties amongst themselves. These unclassified strains are placed in Type IV, and it is interesting to note that these organisms are responsible for cases of pneumonia somewhat more frequently in this country than in America. In carrying

out protection tests in mice the test culture should be administered intraperitoneally to ensure accuracy of dosage; such protection tests confirm the serological independence of the types of pneumococci. Protective serums act equally well, whether inoculated subcutaneously or intraperitoneally, and whether the test culture is injected immediately after the serum or after an interval of eighteen hours. The mode of action of antipneumococcal serum is still unknown, since it has been shown by absorption tests that there is no firm union between antigen and antibody and no apparent neutralization of the protective properties.

The third report is by Dr. Eastwood on "The significance of serological differences amongst pneumococci." Here are passed in review all the current general ideas about antigens and antibodies, these being considered from both the chemical and physical points of view. In Dr. Eastwood's opinion the "mosaic pattern" theory, or theory of multiple antigenic components, as an explanation of the nature of antibodies and their relation to antigens, has been pushed a great deal too far. Though of value in explaining the behaviour of other groups of bacteria showing some serological relationship, it is definitely an encumbrance when applied to the four groups of pneumococci which in their serological reactions appear to be so independent. It may be that the common antigenic element probably present in all strains of pneumococci is masked in each group by the acquirement of some secondary factor which prevents the characteristic response to the common antigenic element. There is always the possibility, also, that the pneumococcus may be changed in the living body from one type to another, for the persistence of type in prolonged subculture does not show that mutation cannot occur in the living body. The practical question involved is whether or not it will be possible to produce antipneumococcal serum for strains other than those belonging to Group I, and on this subject Dr. Eastwood expresses himself as follows:

"I think the study of serological differences amongst pneumococci has not led to any final conclusions such as would justify the opinion that no serum will be therapeutically efficacious unless it contains an antibody corresponding to the antigen which is peculiar to the infecting strain."

Influenza.

The fourth report, by Dr. W. M. Scott, deals with the distribution and serological characters of influenza bacilli and embodies the results of a study which has extended over the four years 1918-21, of which the main conclusions are:

1. Influenza bacilli have been recovered from the normal nasopharynx in over 30 per cent. of persons examined.
2. Influenza bacilli have been found in the sputum or lung in about 60 per cent. of cases of lobar pneumonia, in 83 per cent. of cases of simple bronchopneumonia and bronchitis, and, during the epidemic of January, 1922, in 65 per cent. of cases of influenza and influenza pneumonia.
3. Agglutination tests have revealed great diversity in serological types, but certain common antigenic characters occur in a proportion of the different strains.
4. There is no satisfactory evidence of special serological types being associated with disease nor with epidemic prevalence of influenza.
5. The serological diversity of influenza bacilli cannot be used as an argument either in favour of or against their etiological relationship to influenza.

ROYAL MEDICAL BENEVOLENT FUND.

At the meeting of the Committee held on Tuesday, July 11th, 1922, 23 cases were considered and £273 voted to 20 applicants. The following are a few of the cases relieved:

Widow, aged 40, of L.R.C.P. and S.Edin. who died from pneumonia in February last. She is left with two boys, aged 9 and 6 years. From February she has earned £99s. from fees for teaching piano and singing, and has received £25 10s. from investments. When the estate is realized applicant expects an income of £150 to £200 a year. She asks for assistance towards the education and keep of the two boys. Voted £2, and the case referred to the Royal Medical Benevolent Fund Guild.

Widow, aged 68, of L.R.C.P. and S.Edin. who died in 1893. She suffers from ill health and failing eyesight. She has no income now, and is living with a widowed daughter who has to maintain herself and her two children. Voted £18 in twelve instalments.

Daughter, aged 61, of M.D.Edin. Had to give up dressmaking business owing to ill health and want of money. Applicant's eyesight is bad and she can only work two or three hours at a time. Voted £18 in twelve instalments.

Daughter, aged 42, of L.R.C.P.Lond. who died in 1901. She has phthisis. At present she is a lady help at a small salary as she is not strong enough to do much work. Voted £18 in three instalments.

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