In the course of the past five years, by the application of these methods, I have investigated considerably over a hundred cases of chronic infection by the bacillus of influenza. Chronic infections of this kind are very much more common than is generally supposed. The only point I wish to dwell upon in regard to these cases is that of the evidence they furnish regarding the pathogenic character of this bacillus, which apparently is still in doubt on the part of many who are able to give publicity to their views. In nearly all of these cases therapeutic immunization has been carried out. The focal and general reactions produced, and the successful therapeutic results that have been obtained, are consistent only with the view that the bacillus from which the vaccines were prepared was the chief cause of the catarrhal conditions from which the patients were suffering. Correct therapeutic doses commonly caused distinct focal reactions; overdoses were followed by the development of symptoms simulating those of influenza. A continuation of correct therapeutic doses over a period of from six to ten weeks almost uniformly resulted in complete recovery from the malady. If the bacillus of influenza had not been the chief cause of the ailment these results could not have been obtained.

In acute influenza, therapeutic immunization acts, in my experience, with equal success. A dose of 0.02 mg., repeated after twenty-four hours, generally causes the temperature to fall to normal within forty-eight hours. With ordinary vaccines there is apt to be a good deal of reactive disturbance from twelve to twenty-four hours after the first dose. For these and other reasons it is of advantage to use sensitized vaccines in acute cases. For the purposes of the preparation of these sensitized vaccines, two sheep are kept immunized against *Bacillus influenzae* at the laboratory of the Scottish asylums. The administration of a sensitized vaccine is followed by comparatively little reactive disturbance.

The most convincing evidence of the causal relationship of Pfeiffer's bacillus to influenza can be obtained from the phenomena that may be observed in the carrying out of protective inoculation. I made a number of these inoculations at the time of the summer epidemic; none of the cases contracted influenza. I have recently immunized a much larger number of persons, but the evidence of the protection afforded has, of course, still to be obtained. I give, at intervals of from two to three days, successive doses of about 0.03 mg., 0.06 mg., and 0.12 mg., or two doses of 0.04 mg. and 0.12 mg. The smaller doses are given first in order to create a certain degree of tolerance of the toxin before the full dose required for complete protection is injected, and to provide against the possibility of hypersensitiveness, which occurs in all persons who are suffering from a chronic infection by the bacillus. After each of these doses most persons within twelve to twenty-four hours experience in mild degree the symptoms of influenza. If the dose of 0.12 mg. is given at once, severe disturbances are generally experienced. Any one who likes can have a controlled attack of influenza. If any sceptic will submit to the test, I believe I can convince him, by means of an injection of a full dose of the killed culture, that the bacillus of Pfeiffer is the cause of influenza.

It is very important that it should be understood that under existing conditions more is required than protective inoculation against the bacillus of influenza. In Scotland, at least, there has been for two months or longer also an epidemic of coryza, dependent upon infection by a special type of *Micrococcus catarrhalis*. Acute infection by this micrococcus generally causes, in addition to "cold in the head," severe headache, aching throughout the body, and some rise of temperature, especially at night. Correct therapeutic immunization is capable of cutting short the attack in forty-eight hours. Beyond question, any one suffering from this form of coryza is very specially prone to be attacked by the influenza bacillus. Most cases of acute influenza that I have recently investigated have been infected also by this special type of *Micrococcus catarrhalis*. When I am asked to protect against the bacillus of influenza I explain the importance of this other form of infection that is prevalent, with the result that all of the cases are given the double inoculation. The dose of this micrococcus is the same as that of the bacillus of influenza. In ordinary course it would have been about four times larger, but experience has shown that this type

of *Micrococcus catarrhalis* produces much greater irritation at the place of injection than the ordinary strains, already notorious for their unpleasant local effect.

I regret that I feel obliged to criticize adversely the recommendations of the War Office Conference of October 14th, which were published in the BRITISH MEDICAL JOURNAL of October 26th. If the errors contained in these conclusions are not recognized now, I challenge their future comparison with the orthodox teaching as it will stand, say, two years hence. It is not properly recognized that the dosage for therapeutic immunization is essentially different from that required for protective inoculation. The doses recommended are, so far as my own experience enables me to judge, strangely wide of the mark. The 30 million dose of *Bacillus influenzae*, given as the initial one, works out at about 0.005 mg. This is a small therapeutic dose, and neither it nor the second dose of double the amount can be expected to afford any valuable degree of protection against infection. The introduction of pneumococcus and streptococcus protective inoculation is a mistake. These bacteria are not commonly spread from one person to another like the bacillus of influenza. It is quite different, however, in regard to *Micrococcus catarrhalis*, protection against which is omitted in these recommendations. The coryza caused by this organism is extremely infectious, and those who have acquired it are, beyond a doubt, specially prone to be attacked by *Bacillus influenzae*. Therefore it is hardly less important to protect people against this micrococcus than against the bacillus. The doses recommended are also open to criticism. The initial dose of 100 million pneumococci and the second of 200 million represent about 0.03 mg. and 0.06 mg. In my experience, if the patient happens to be suffering from a chronic infection by the corresponding type of pneumococcus, these doses will cause rather violent focal reactions. Regarding their value for protective inoculation I cannot speak. The doses of 40 million and 80 million streptococci (presumably *pyogenes* and *anginosus*) represent about 0.01 mg. and 0.02 mg. These, in my experience at least, are merely small therapeutic doses. Protective inoculation should be directed exclusively against attack from *Bacillus influenzae* and *Micrococcus catarrhalis*. It is a different matter when we have to carry out therapeutic immunization in a case of influenza. It is then of proved advantage to add to the suitable dose of *Bacillus influenzae* (0.01 to 0.04 mg.), small doses of a polyvalent pneumococcus vaccine (0.01 to 0.02 mg.) and of *Streptococcus pyogenes* (0.01 to 0.02 mg.), as well as of *Micrococcus catarrhalis* (0.03 to 0.06 mg.). If possible, the vaccines should be sensitized ones.

REFERENCE.

¹ Journ. of Mental Science, January, 1917.

BLOOD AGGLUTININS IN MENINGOCOCCAL ATTACKS.

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(Report to the Medical Research Committee.)

A STUDY of the agglutinative action of human serum during an acute attack by meningococci involves the consideration of many factors.

If it be granted, for purposes of argument, that the available technique is beyond criticism, there is still a possibility that the reactive combinations evoked by the acting antigens of living, or lysed, cocci may differ from those which follow the injection of organisms killed by heat or other coagulative measures. The emulsions of cocci prepared for the quantitative estimation of agglutinins may also be placed in the category of variants. Owing to inconstancy of amino-acid nutrients or vitaminic stimuli, or a failure to produce artificially the conditions under which the meningococci proliferate during infection, the cultures may exhibit variations in vigour, of growth or extent of autolysis. It has already been remarked by Gordon, Ainley Walker, Hewitt, and Gibson, that the specificity of the agglutinins induced by the injection of killed meningococci is more or less dependent upon the species of animal used for the purpose.¹ That is to say,

while the antisera obtained from horses, rabbits, or man, all yield general agglutinins, they contain cross-agglutinins for individual strains or types.

Within certain limits, however, the contents of the animal immune sera are sufficiently well defined to permit of a preliminary differentiation between pathogenic and apathogenic cocci.² A statement of this kind must not, of course, be pushed too far, for from the practical standpoint it involves a necessity of erring on the side of precaution by the inclusion of doubtful positives among the definite ones.

The possibility of eliminating this margin of error is an incentive to investigate more closely the bases of the agglutinations and absorptions upon which our epidemiological recommendations are built. Perhaps it may become necessary to devise other methods, and to design some more definite problems for the functional capacities of the pathogenic and saprophytic organisms. There is at least the hope that the determination of the products they form from certain precise compounds may shed some light upon their standard of virulence.³

The acute stages of epidemic cerebro-spinal meningitis offer valuable opportunities for continued observation of the antigenic powers of the several types of meningococci. The prescribed routine of lumbar puncture, blood culture, nasopharyngeal swab, and urinary examination, brings an abundance of material at an early moment of the attack. The frequent lumbar punctures permit almost daily isolations of the infecting micro-organism. If the simultaneous collection of a few cubic centimetres of median basilic blood was adopted, the subsequent estimation of the agglutinin content in a number of cases would add considerably to our knowledge of the continuance and subsidence of the agglutinins during the course of the disease and the convalescence therefrom. It might also add to our information concerning the types and persistence of the cocci in the nasopharynx, and shed more light upon the conditions following inoculation and those associated with the determination of the "carrier" stage.

In this laboratory it has become a practice to make frequent isolations and agglutinations throughout the course of each case. This has been made possible by the co-operation and scientific care of Drs. B. A. I. Peters and R. E. Thomas of the Ham Green Isolation Hospital, and the interest of the house-physicians of our local institutions. For purposes of comparison with the work of other cerebro-spinal fever laboratories, the procedures of the Central Cerebro-spinal Fever Laboratory have been followed. The primary and secondary subcultures have been grown on pea-flour tryptic agar medium adjusted to an amino content of 25-7 formaldehyde figure with 0.5 per cent. addition of ascitic fluid. The emulsions have been prepared according to Gordon's suggestions, and when type coccal suspensions were needed those issued under the direction of Major Hine have been employed.

The work now in progress has not sufficed for the drawing of conclusions or the making of hypotheses. It will be at once recognized that a large number of cases are necessary for adequate data. Several points of interest have, however, arisen which contain suggestions for further lines of inquiry and offer some explanation of certain "carrier" questions now under discussion. For this reason it may prove useful to state some of the findings, in the hope that they may be considered worthy of criticism or confirmation.

In the early days of the epidemic a case occurred which was meningococcal fever according to clinical signs, but negative on several occasions from the standpoint of lumbar puncture. A rough attempt to determine the content of the blood resulted in the agglutination of some mixed strains. It was considered worth while to extend the observation to definite bacteriological cases, and when the standard types and sera were issued by the Central Laboratory the daily isolations of spinal and nasopharyngeal cocci were undertaken and the agglutination titres of the patient's blood determined.

In Table I the findings are summarized. To save space the end titres only are stated, and as there was not any result with Type IV coccus in the later cases this too is omitted.

It will be noted that in four cases the standard type cocci were agglutinated, and in four cases they were not affected in the early stages, although in two of the latter agglutination was obtained on subsequent days.

TABLE I.—*The Agglutinins developed with Different Types of Meningococcus.*

	Day of Disease.	End Titre of Patient's Serum on—			
		Stock Cocci.			Own Coccus Isolated Same Day.
TYPE I.		I.	II.	III.	
Case G.: Aged 29; death 35 days.	6	250	25	250	25
	7	250	0	25	250
	9	500	0	25	750
	11	500	0	0	500
	12	500	0	0	500
	15	500	0	500	750
	17	500	0	500	50
	20	125	0	500	50
	22	250	0	750	125
	23	250	0	500	500
	26	125	0	500	50
Case D.: Aged 2; recovery 30 days.	10	0	0	0	10
	16	0	0	0	50
	19	0	0	0	25
TYPE II.					
Case B.: Aged 21; death 20 days.	2	0	0	0	10
	3	0	0	0	500
	4	0	125	0	—
	5	0	250	0	500
	7	0	125	0	500
	9	0	250	0	—
	10	0	0	0	500
	17	25	0	0	25
	19	0	0	0	50
	20	0	0	0	25
Case A.: Aged 21; death 20 days.	1	0	0	0	50
	7	0	500	500	1,250
	14	0	250	250	0
	20	0	0	0	0
Case C.: Aged 13 mths.; death 30 days.	4	0	0	0	250
	6	0	0	0	250
	7	0	500	0	1,250
	15	0	125	0	1,250
	16	0	125	0	1,500
Case E.: Aged 27; death 4 days.	3 a.m.	0	0	0	25
	p.m.	0	0	0	25
	4 a.m.	0	0	0	0
	p.m.	0	0	0	0
Case P.: Aged 26; recovery 70 days.	33	0	50	0	50
	50	0	50	0	250
	52	0	250	0	250
	64	0	500	125	500
TYPE III.					
Case D.: Aged 32; death 7 days.	3	0	250	0	250
	4	0	250	0	250

After the initial agglutination, the end titre varied considerably, both for the case coccus and for the type standard suspension. This variation was not uniform. In some cases cross agglutinations were the rule. In others the changed titre was one of intensity only. The general impression was gained that the blood changes evinced a closely adaptative mechanism to alterations in the antigenic properties of the case coccus.

It was thought that these presumed adaptations might

be confirmed, or discounted, by submitting the type and case cocci day by day to the same sample of immune serum and comparing the results with the titre of the patient's blood for the type and case cocci, supplementing these findings by estimations of the titre of the patient's blood for case cocci obtained on previous days. For this purpose the spinal cocci were isolated on the same batch of media, emulsified, and killed at 63° C. for thirty minutes and standardized and used after standing for twenty-four hours. The results are stated in Table II.

TABLE II.—Comparison of Agglutinations with Polyvalent Serum and Patient's Daily Serums.

(All three patients belonged to Type II. Cases A and B died in 20 days, Case C in 30.)

	Day of Disease.	Polyvalent Serum on Coccus Isolated each Day. End Titre.	Patient's Blood on Coccus Isolated each Day. End Titre.	Additional Agglutinations.
CASE A.	1	12	50	
	7	125	1,250	Blood agglutinated 1st day coccus 750; on 17th day agglutinated 1st day coccus 25, and 7th day coccus 0.
CASE B.	2	50	0	
	5	250	500	Blood agglutinated 2nd day coccus 250.
	7	250	500	Blood agglutinated 2nd day coccus 125, and 5th 125.
	10	250	500	Blood agglutinated 2nd day coccus 25.
	18	125	25	Blood agglutinated 2nd day coccus 25.
	20	25	50	Blood agglutinated 2nd day coccus 10.
CASE C.	4	500	250	
	6	500	250	
	15	500	1,250	
	16	500	1,500	

Polyvalent Serum on Stock Type Cocci:

Type I ...	500	Type III ...	50
Type II ..	50	Type IV ...	750

In Case C it will be observed that the polyvalent serum agglutinated the case coccus to the same extent on each occasion, although the titre of the patient's serum increased on the fifteenth day. In Case A the coccus appeared to become more agglutinable in both the polyvalent and the case serum, although the increase in the latter is the more marked. In Case B the agglutinability of the coccus varied considerably with the stable serum and with the case serum. When the cocci isolated upon previous days were subjected to the action of the serum for the day, the values were altered. These results suggest the probability of some variation on the part of the coccus with regard to the stable serum, other things being unaltered. A somewhat similar change might account for the similar behaviour towards the case serum.

Blood Agglutinins and Nasopharyngeal Cocci.

The action of the blood on nasopharyngeal cocci is a matter of more than passing interest. Were it thoroughly worked out, it might be of assistance in some knotty problems. The degree of virulence inherent in the meningococci present in the nasopharynxes of temporary and permanent carriers is difficult to determine. The primary cultures are, on the whole, less agglutinable than the subcultures. Even with the latter there is sometimes irregularity with serums from rabbits and horses. Some workers hesitate to make definite diagnoses from the findings. Hence there are a number of men undergoing segregation more from the standpoint of precaution than of precise diagnosis. The transient carrier harbours the meningococcus for a few days or a week. The temporary carrier becomes free after a month or so; earlier, perhaps, if the general metabolism is increased by outdoor exercise and change of altitude. The permanent carrier does not create conditions inimical to the coccus. Whether the reason lies in the flora or in the secretions is not yet

finally settled. Gordon indicts the streptococci as an inhibitory factor,⁴ but Vines states that in only a relatively small percentage of swabs is a pure culture of meningococcus obtained, and that if swabs are taken immediately after a meal the nasopharynx itself contains particles of food infected with salivary organisms.⁵ This has been my experience also. Gordon finds that nasal mucus does not inhibit the meningococcus.⁴ Are there other secretions, and is the disappearance of the coccus from the pharynx during the attack due to these? Flack obtained nasopharyngeal cocci from three cases in which the cerebrospinal fluid did not yield any meningococci, and found that the patient's blood agglutinated these up to 1 in 40 on the fifth day and 1 in 100 on the tenth day.⁶ He does not state whether polyvalent serum had been injected, but a careful study of the cases under review puts the possibility of any quantitative influence of the injected serum quite out of count.⁷ In two cases we were enabled to grow the nasopharyngeal coccus on successive occasions, and to submit it to the action of the patient's serum.

CASE I.—Type II Coccus.

The coccus was obtained from the nasopharynx on the third, fifth, eleventh, and eighteenth days. Polyvalent serum yielded a titre of 1 in 500 on each day. The patient's blood on the third day gave a titre of 1 in 50. With this same coccus the blood on the seventh day agglutinated to 1 in 125, but the blood obtained on the tenth and twelfth days gave negative results. The cocci grown on the fifth, eleventh, and eighteenth days, although well agglutinated by the standard serum, were not agglutinated by the blood removed on the same days. The coccus was therefore agglutinable by specific serum to the same extent, but the blood had lost its powers. At the time the blood failed to agglutinate the nasopharyngeal coccus it also failed to agglutinate a standard emulsion of Type II, and commenced to show cross agglutinations, apparently associated with the changing antigens of the spinal coccus. The question therefore arose as to the possibility of the prolonged duration of the coccus in the nasopharynx being due to the decreased action of the serum, and whether it is a general rule that the escape of tissue fluids plays a part in the disappearance of the coccus from the nasopharynx.

CASE II.—Type II Coccus.

The coccus was grown from nasopharyngeal swabs on the first and seventh days. It was agglutinated by a standard serum up to 1 in 125 on both occasions. The blood serum of the patient obtained on the first day gave a titre of 1 in 250 with the first day coccus; the blood of the seventh day gave a titre of 1 in 1,250 with the seventh day coccus. After this day the coccus disappeared from the nasopharynx. The blood of the seventh day agglutinated the first day coccus to 1 in 250 only, although it had agglutinated the seventh day coccus up to 1 in 1,250.

Remarks.

It is perhaps unnecessary to repeat that these findings do not permit of the advancement of any hypotheses. They are detailed merely as a contribution inviting consideration and extension. For our own part we have felt that the customary technique calls for adjustments, and we are devoting time to this side of the question.

Since these observations were concluded Fildes and Baker have published the results of the estimations of the blood agglutinins in twelve cases.² For the coccal suspension they employed a standard stock emulsion of the type belonging to the case but not the strain isolated from the spinal fluid of the patient. Their findings may be tabulated as follows:

Meningococcus, Type I	...	5 cases.	Two slightly positive.
Meningococcus, Type II	...	4 "	All negative.
Meningococcus, Type IV	...	3 "	All negative.

The examination in each case was made on one day only, namely:

Third and fourth days	...	2 cases.	Negative.
Tenth day	...	1 case.	Negative.
Sixteenth and seventeenth days.	...	6 cases.	Two weakly positive.
Twenty-first day	...	1 case.	Negative.
Thirty-sixth day	...	2 cases.	Negative.

They consider that these results indicate that blood agglutination as a matter of diagnosis in meningococcal attacks is valueless. Perhaps if the strains of meningococci obtained from each case had been compared with the stock cocci the figures would have gained fuller support. Also, if the serums had been examined more than once, the percentage of positives might have increased. With the more extended use of the method they may probably be inclined to modify their decision. From the standpoint

of diagnosis only, the routine estimations of the agglutinin content of the blood have here been found of such value as to justify a recommendation for their continuance.

The question of blood agglutinins opens up the whole question of the dependence which should be placed upon the agglutinability of meningococci with regard to the pathogenic properties. Vines draws attention to the fact that agglutinability varies in primary and subcultures and wonders whether it is possible to define a border line between pathogenicity and apathogenicity by using the agglutination test as a criterion.⁵ In the present changing condition of our knowledge of the problem I am firmly convinced that no single one of the criteria in vogue suffices to determine whether Gram-negative cocci are pathogenic or not. The whole evidence obtained from the morphological, cultural, and serological observations demands review in every instance.

REFERENCES.

- ¹ Ainley Walker: *Journ. Hygiene*, July and October, 1918. ² Fildes and Baker: *Medical Research Reports*, No. 17, p. 69. ³ Sasaki and co-workers: *Acta Scholae*, Med. Univ. Kioto, 1917, vol. i, Fasc. 4; and 1918, vol. ii, Fasc. 2; and *Journ. Biol. Chem.*, 1917, vol. 32. ⁴ Gordon: *Medical Research Reports*, No. 3, p. 111. ⁵ Vines: *Journ. Path. and Bact.*, 1918, vol. 22, pp. 72-3. ⁶ Flack: *Medical Research Reports*, No. 3, p. 41. ⁷ Walker Hall and Peters: *Journ. R.A.M.C.*, October, 1916, p. 22.

NITROUS OXIDE AND OXYGEN IN COMBINATION WITH ETHER OR C.E. MIXTURE FOR NOSE AND THROAT OPERATIONS.

BY

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In November, 1917, I read a paper before the Medical Society of London on "The use of nitrous oxide and oxygen with regulated rebreathing in military surgery," and in that paper I went into detail with regard to the actual administration, and gave my results up to that date. Since then I have had further opportunities of enlarging my experience of this method in civilian surgery, and have developed a technique for the administration of nitrous oxide and oxygen in combination with ether or C.E. mixture for nose and throat operations.

In working out the details of this method I have had the cordial co-operation of Captain Douglas Harmer, the senior surgeon to the Throat Department of St. Bartholomew's Hospital, and we have now arrived at a stage at which we are both confident that the results we obtain are infinitely better than we ever got before with the older methods.

There are three points that stand out as a result of our work:

1. The exceedingly small amount of C.E. mixture that is required.
2. The enormous difference in the patient's well-being after the operation, as compared with the older methods.
3. The excellence of the anaesthesia.

The technique, briefly, is as follows:

A hypodermic injection of morphine and atropine is given half an hour before the time of operation. I vary the amount of the dose with the nature of the operation and the condition of the patient, and in some cases I add scopolamine to the injection. The largest dose that I use (and this is the routine dose for the military cases) is morphine $\frac{1}{4}$ gr., atropine $\frac{1}{100}$ gr., and scopolamine $\frac{1}{100}$ gr.; whilst for some women, and children of about 15 years of age, the dose is usually morphine $\frac{1}{8}$ gr. and atropine $\frac{1}{200}$ gr., and for small children I omit the hypodermic altogether, or at most give atropine $\frac{1}{200}$ gr.

The patient is then anaesthetized with nitrous oxide and oxygen with rebreathing in the method that I have described in my paper before the Medical Society, and as soon as anaesthesia is obtained, or, to be precise, just before that state is obtained, the nitrous oxide and oxygen is allowed to run through the ether or C.E. mixture until the requisite depth of anaesthesia is obtained; the face-piece is then removed, and the anaesthesia is maintained by running the combination either through the nose or into the mouth. The patient's condition will determine whether the mixture is given throughout the operation; usually it is unnecessary, the C.E. being only required from time to time for a few seconds.

Given in this way, and provided always that the airway is kept open and the breathing is not unduly obstructed by sponges, the anaesthesia will meet the requirements of most operators. Throughout the whole anaesthesia the patient should be pink in colour, there should be no cyanosis whatever, nor should there be any pallor; both of these conditions are signs of overdosage and of a bad administration of the anaesthetic. The former is easily remedied by additional oxygen but the latter is more serious.

It is a remarkable fact that in several of the anaesthetics I have given for the enucleation of tonsils only 1 drachm of C.E. mixture has been used, and with this in combination with the nitrous oxide and oxygen the anaesthesia has been all that was required.

This method as I have described it sounds easy, but I do not advise any one to try it until he has made himself thoroughly acquainted with the various points of nitrous oxide and oxygen anaesthesia with rebreathing for long cases. That I consider necessary as a preliminary training.

Apart from the ordinary throat operations, such as enucleation of tonsils, submucous resection of septum, and the like, I have used this method for bronchoscopies and oesophagoscopies, and have been particularly struck by the ease and quietness of the anaesthesia, and the rapid return to a condition of well-being and comfort after the operation.

The more I see of the anaesthesia produced by nitrous oxide and oxygen with rebreathing in combination with ether or C.E. mixture when necessary, the more am I convinced that whilst the anaesthesia is wholly adequate for the surgeon's needs, and can be prolonged as long as is necessary, so that there is no need for hurry on the part of the operator, the condition of the patient, both during and after the operation, is infinitely better than with ether, chloroform, or mixtures thereof.

To give but one instance. Even if the patient is "sick" after the anaesthetic, he does not have that horrible sickly smell of ether or chloroform hanging about himself and the room for hours and it may be days, but he is rid of his anaesthetic mixture in a few minutes, and is his normal self again.

During the administration of this combination of anaesthetics for nose and throat operations I have observed that—

1. Complete relaxation of the jaw is obtained, even in muscular subjects, and with this goes also the relaxation of the soft palate as well.
2. The swallowing and cough reflexes are easily abolished, and yet are restored almost immediately on withdrawing the anaesthetic.
3. The amount of bleeding appears to be less, both during and after the anaesthetic, than with other methods.
4. The rapid recovery to consciousness after the operation is a point of extreme importance, for one never sees patients lying, after the operation, in that deep unconscious state that so frequently follows the administration of chloroform, but on the contrary they are conscious in a few minutes, have a good colour, and are well.

The number of cases that I can now report as having been anaesthetized with nitrous oxide and oxygen with rebreathing, and with ether or C.E. mixture when necessary is—

Administered by H. E. G. Boyle	...	...	2,032
Administered by Captain Trewby and residents at 1st London General Hospital	...	...	1,165
Total	...	...	3,197

There have been no fatal cases.

I regret that circumstances over which I have no control have prevented me from publishing in detail the particulars of a machine that has been made for me for the administration of this anaesthetic, but I hope in the near future to be able to do so.

On December 10th the Belgian Surgical Society, at its first meeting since July, 1914, elected Professor Depage president. A strong protest was recorded against the infamous manifesto issued in October, 1914, by ninety-three German professors, and a resolution was passed that no intercourse should be held with German scientists until their calumnies, especially those directed against Belgian medical men, have been publicly disavowed.