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Kyes, Preston

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Lawrence Litchfield, M.D.

Pittsburgh, Pa.

January 23rd, 1919

President,

University of Chicago,

Chicago, Ill.

My dear sir:

While chief of the Medical Service of the Base Hospital at Camp Grant, Ill., I was in a position to appreciate the debt which the patients of that hospital owed to the University of Chicago and to Dr. Preston Kyes, for the scientific and humanitarian spirit which made possible the development of an efficient antipneumococcus serum and for the personal devotion and fearless self-sacrifice of Dr. Kyes, who as a volunteer, worked side by side with the regular medical officers in the most dangerous wards throughout the epidemic.

It is fair to assume that of the three hundred cases to whom we were able to give the serum, at least fifty lives were saved that would otherwise have been lost. In other words the mortality in the cases treated by Dr. Kyes' serum was about 16%, while the mortality in identically the same class of cases treated without Dr. Kyes' serum varied between 34 and 40% possibly higher.

Many of my fellow officers were personally impressed by these facts and on November 10th, 1918, I dictated an expression of our appreciation which in due time was forwarded to the official channels.

In case this unanimous expression of the officers of the medical service at Camp Grant who had the opportunity of seeing the effect of Dr. Kyes' antipneumococcic serum, has not reached its destination
Laurence McCall
Honorary Adjunct Professor

January 29, 1959

President
University of Chicago
Chicago, Ill.

Mr. President:

With great regret I hereby resign my office and, with the approval of the Board of Directors of the University of Chicago, cancel my appointment as a member of the Board of Directors of the University of Chicago.

I have been told by the University of Chicago that the Board of Directors has been in the process of reviewing the position of the past president of the University of Chicago and that it is considering the future of the University of Chicago and the University of Chicago Press. I have had the opportunity to express my views on these matters, and I am confident that the University of Chicago will continue to be a leader in the world of higher education.

I am grateful for the opportunity to have served as a member of the Board of Directors of the University of Chicago, and I wish the University every success in the future.

Sincerely yours,

Laurence McCall
I wish herewith to make sure that the Officers of the University of Chicago are assured that Dr. Kyes' work was most efficient and most highly appreciated by the Medical Officers and the patients at the Base Hospital at Camp Grant.

Yours most respectfully,

Lawrence Litchfield

Jenkins Arcade Building
I am permitted to make some slight changes in the University of
Harvard's plans for the Memorial Hall. I have made these changes
without consulting the executive committee of the Memorial
Foundation and the building committee of the

Harvard University.

With very great respect,

Lawrence H. S. F. Yerke

Assistant Architect
November 3, 1919

Dear Dr. Capps:

Thank you very much for yours of October 30 giving your experience with the Kyes serum. It is the careful and scientific statement I should have expected from you.

We are interested in the matter, believing it to be, of course, experimental, but believing that thus far it has given sufficient encouragement to be worth continuing until final results are reached.

Very truly yours,

Dr. Joseph A. Capps,
People's Gas Bldg,
Chicago, Ill.
November 8, 1979

Dear Mr. Gardner:

Thank you very much for your note of October 30. It is nice to have such a friendly letter from you. I hope that we can continue our correspondence and have more exchange from your side.

We are interested in the market pattern for your firm and would like to go over our experiments and suggestions pertaining to our firm's growth and potential expansion. If you have any specific ideas, I would appreciate your feedback.

Yours sincerely,

[Signature]

Dr. Joseph A. Gardner
Community Gas Pikes
Office, Ill.
November 11, 1919

President H. P. Judson,
University of Chicago,
Chicago, Ill.

Dear President Judson:

In reference to your letter of October 28, which just reaches me, I would repeat that in my opinion there is no evidence to warrant spending any money for the purpose announced. I am quite sure that this is the opinion also of persons here and elsewhere competent to judge fairly of the merits of this case. In any event the present arrangement, which has lasted for quite a little time, continues to be as undesirable as ever both from the point of view of its effects here at home and on our standing among scientific men.

Yours very respectfully,

[Signature]

L. Heiksen
Dear President Johnson:

In reference to your letter of October 28, which just reached me, I want to report that in my opinion there is no evidence to warrant expenditure any money for the purpose announced. I am duly aware of the importance and the scientific and economic value of the laboratory work of the University of Chicago. However, I am not sure if the research undertaken now will be productive of results of practical value. In any event the present equipment cannot be expected to have a large influence on the subject of cancer in the near future.

In view of the attitude now taken by the Government on the point of view it is important that we formulate some scientific men who are ready to devote a little time, can be engaged for some practical work.

Yours very respectfully,

[Signature]
THE TREATMENT OF LOBAR PNEUMONIA WITH AN ANTI-PNEUMOCOCCUS SERUM

PRESTON KYES

(Laboratory of Preventive Medicine, University of Chicago)

Reprinted from
The Journal of Medical Research, Volume XXXVIII, No. 3

BOSTON
MASSACHUSETTS
U.S.A.
THE TREATMENT OF LOBAR PNEUMONIA WITH AN ANTI-
PNEUMOCOCCUS SERUM.*

PRESTON KYES,

(Laboratory of Preventive Medicine, University of Chicago.)

The production of an anti-pneumococcus serum of therapeu-
tic value in lobar pneumonia has been an item of almost
continuous attempt since the first determination of the
etiology of that disease.

Apart from more general influences, this attempt has been
stimulated by two particular considerations. The first of
these is the fact that lower animals may be readily immu-
nized to the pneumococcus, with the production of specific
antibodies appearing in the blood stream. The second con-
sideration involves the fact that in recovery from the disease
as it occurs in man the critical reactions indicate that a favor-
able termination is due to the establishment of an active
immunity on the part of the host.

These two facts, mainly, have induced the hope that con-
ditions might be found under which an immune serum
produced by animal inoculation could be employed to confer
upon man sufficient passive immunity to distinctly reinforce
the active immune processes occurring in the course of the
disease, and thus decisively increase the host resistance.

The evaluation of the results thus far obtained is extremely
difficult. The work of such qualified investigators as Wash-
bourn, Eyre, Pane, Neufeld, and Cole, now covering an epoch
of nearly three decades, cannot be critically reviewed with-
out a realization that from time to time certain immune sera
have been produced which, in the best opinion of these
workers, exerted a somewhat favorable influence in lobar
pneumonia. Unfortunately, however, the definiteness with

* Received for publication June 21, 1915.

(493)
which conclusions may be drawn in many of the contributions is limited by the relatively small number of cases observed under the same conditions, or by the lack of a sufficiently large number of control cases to guarantee a trustworthy basis of actual comparison as to death rate. Accrediting the full claims of the various workers, however, it must frankly be admitted that no anti-pneumococcus serum has thus far been produced which has survived the test of general use and gained a consensus of opinion as to its positive merit in the treatment of lobar pneumonia.

The present paper is a report of one hundred and fifteen cases of acute lobar pneumonia, treated with an anti-pneumococcus serum, and a comparison of the mortality among these cases with the mortality in five hundred and thirty-eight similar cases of pneumonia occurring in the same institution during the same period, but not so treated.

The validity of any conclusions drawn from such a comparison so far depends upon the initial similarity of the cases included in the compared groups that I wish to state in some detail the conditions under which the cases to be reported were observed. The total six hundred and fifty-three cases under consideration were admitted to the Cook County Hospital in the winter months of 1916-1917. The hospital is essentially the public charity hospital of the city of Chicago and is served by the city police ambulance system. Patients brought to this hospital are distributed to the various wards through a central admission office by a specially designated staff. The pneumonia cases, as others, were by this system allotted in rotation to eight similar services without discrimination. In seven of these services no pneumonia patients received the serum treatment, whereas in one service the anti-pneumococcus serum was administered as a routine to all lobar pneumonia cases. There was, therefore, no biased allotment of cases to a given ward and no selection of favorable cases within the ward where the serum treatment was employed.

To eliminate personal prejudice, the sponsor of the serum did not in any instance participate in the diagnosis, but approached the cases only after their designation as acute lobar pneumonia by both the resident and attending physicians.

While realizing that final conclusions as to the value of any therapeutic agent must rest upon the consensus of opinion of many observers working under various conditions and over a considerable period of time, I nevertheless consider that the tests here reported were conducted with such controls and were of such extent as to constitute reliable evidence.

Production of serum. — The anti-pneumococcus serum employed was similar to that described by me in 1911. It was produced by injecting massive doses of virulent pneumococci into the domestic fowl. Inasmuch as pneumococci, no matter how virulent for other species, do not occasion disease in fowls, these animals were selected for the production of the immune serum with the idea that the large doses of antigen permitted in the susceptible host would give a favorable yield of antibody. This proved to be the case. The method, moreover, is one which has a wide application in all instances where a strictly antibacterial serum is desired.

(Pathogenicity and antigenic power have been extensively confused in attempts to obtain antibacterial sera, and laborious methods have been too often employed in the combination of a virulent organism and a highly susceptible host. That the production of disease by a bacterial antigen is no essential concomitant to antibody production has been too little considered.)

The pneumococci used for the injection of the fowls were obtained from the blood stream or the lung of individuals suffering from acute lobar pneumonia. They were grown upon blood agar slanted in flasks, the area of surface growth in each flask equalling that of twenty of the usual test-tube slants. The organisms were washed from the surface of the
cultures, when forty-eight hours old, with sterile salt solution and the resulting suspension used for injection. The stock cultures were transferred every fourth day to fresh blood agar and were from time to time passed through mice and rabbits, the virulence not being allowed to drop below the point at which a single inoculation produced death in rabbits. The number and the variety of strains of pneumococci employed for inoculation differed among the several groups of fowls and will be referred to later.

As stated above, the living virulent pneumococci were injected in massive doses, and this without distress to the recipients. The initial dose in most instances was a surface growth equal to that of two hundred and forty test-tube slants. The average subsequent doses were approximately four hundred test-tube slants each. The bacterial injections were made intraperitoneally, Berry and Melick having shown that pneumococci so injected enter the blood stream in three hours. As a routine the fowls were injected every other week, the duration of the total period of inoculation varying with the several groups from four months to two years.

Serum was obtained by bleeding the fowls once in two weeks, the week of bleeding alternating with that of injection. In a few groups bleedings were commenced following the sixth injection, but the bulk of the serum employed in the clinical tests was taken from the fowls having received not fewer than eight nor more than thirty inoculations. The blood was drawn by incising the leg vein and from twenty to forty cubic centimeters obtained from each fowl at a bleeding. The blood corpuscles were removed by centrifugation and the serum, diluted one-half with .85 per cent NaCl, was filtered through Berkefeld candles.

The sera obtained by the procedure possess a high content of antibodies specific for pneumococci. This is displayed in their agglutinating and lytic power, their bactericidal properties, and in their therapeutic action upon infected animals. Certain experimental evidence of this I have given elsewhere, and further details will appear in a subsequent communication concerning the standardization of this and similar sera by in vitro tests. At this time, however, I wish to give brief notice of two points established by test-tube experiments. First, that the content of agglutinins of an anti-pneumococcus serum is not an index of its therapeutic value. Second, that a univalent agglutinating fowl serum when of high titer agglutinates also heterologous strains of pneumococci, the difference between various strains being quantitative rather than qualitative. With a serum which agglutinated its homologous organism in a dilution of one to one hundred thousand, I have tested seventy-seven strains of pneumococci, obtaining a positive agglutination in all instances. Differences did appear as to the concentration of serum required to provoke the reaction, and indeed nine strains were agglutinated only in a concentration above one to twenty. A majority of the strains, however, were agglutinated by the serum diluted one to five hundred. This action of a powerful univalent serum in agglutinating pneumococci in general, raises a question as to the interpretation of positive and negative results obtained with relatively weak sera often employed in classifying pneumococci. The question is: are those pneumococci which do not agglutinate with a weak serum different fundamentally from those which do agglutinate, or are the only differences quantitative ones? Would the weak sera, if stronger, agglutinate all strains of true pneumococci? The results which I have given above would indicate that such might be the case.

On the other hand, it is of course well established, and quite apart from any particular classification, that various strains of pneumococci do display distinct differences at a given time and also that a given strain displays quite as distinct differences at various times. In producing each lot of serum, therefore, I have inoculated a great variety of strains, including four of Pneumococcus mucosus. The resulting polyvalent sera were those used in a great majority of the cases here reported, but in fifteen cases a univalent serum was employed.
Clinical use of serum. — In its clinical use the serum was administered intravenously in average doses of two and one-half cubic centimeters. The injections were made very slowly and the serum always warmed to body temperature. A majority of the cases received one injection daily, but not infrequently two injections were given the same day. As a routine the injections were continued until the temperature remained below one hundred degrees. The number of injections employed in a given case ranged from one to twelve. The average number of injections was three.

In a disease such as lobar pneumonia, where abrupt changes in symptoms not infrequently occur in the natural course of the disease and coincident with recovery, the only safe criterion by which to judge the action of a therapeutic procedure is a distinct change in death rate, demonstrated in a large number of parallel cases. Modifications of symptoms in a given direction may if constant constitute corroborating circumstantial evidence, but as such must be held of very secondary value as proof and are not introduced in this paper.

Of the five hundred and thirty-eight cases not treated with the anti-pneumococci serum, two hundred and forty-four cases died — the death rate being 45.3 per cent.

Of the one hundred and fifteen similar cases treated with the serum, twenty-four died — the death rate being 20.8 per cent.

In the ward in which the serum was employed the death rate during the six weeks prior to the introduction of the serum treatment was 55 per cent. During the six weeks subsequent to the withdrawal of the serum treatment, the death rate was 51 per cent.

The above statistics show that among those cases treated with the anti-pneumococcus serum the death rate was less than one-half the rate obtaining among the similar cases not so treated, be they cases occurring in other wards during the same period, or in the same ward at other periods of the same year. This is the essential proof which I have to offer that the anti-pneumococcus serum in question is of distinct value in the treatment of acute lobar pneumonia in man.

[All of the one hundred and fifteen cases treated with the serum were in the service of Dr. Joseph A. Capps. To him I am indebted for excellent objective criticism and a sustained scientific interest in the problems involved.

The more intimate clinical care of the patients was performed by Dr. Frances P. Cepelka, Dr. Richard E. Werlick, Dr. Robert W. Keston, and Dr. Milton E. Rose, serving as house physicians.]

REFERENCES.
2. Berry and Melick. Journal of Immunology, 1916, 1, 47.
3. L.c.

Antipneumococcus Serum (Kyes') in the Treatment of Pneumonia

BY

ALFRED W. GRAY, M.D., MAJOR, M.C., U.S.A.
MILWAUKEE, WISCONSIN

FROM THE
AMERICAN JOURNAL OF THE MEDICAL SCIENCES
June, 1920, No. 6, vol. clix, p. 885
ANTIPNEUMOCOCCUS SERUM (KYES') IN THE TREATMENT OF PNEUMONIA.

BY ALFRED W. GRAY, M.D., MAJOR, M.C., U.S.A.,
MILWAUKEE, WISCONSIN.

In 1911, Kyes announced that he had succeeded in producing an antipneumococcus serum with high antibody content by a new method. The novelty lay in using an unsusceptible host, the ordinary barnyard fowl, which circumstance allowed the use of unusually large numbers of virulent living pneumococci as antigen. It was, of course, a well-known fact in immunology that pathogenic antigen was not necessary for the production of specific antibodies, but this knowledge had not been applied in the production of antibacterial sera.

The above announcement was made after laboratory experiments, both in vitro and in vivo, had demonstrated high antibody content in the serum and its protective action in laboratory animals, as detailed by the investigator in his original paper. The next step was to determine its therapeutic value in man.

Extensive therapeutic testing is the final proof of the value of any curative serum. This truism applies with equal force to antitoxin and to antibacterial sera. In the case of the former, however, there is the additional certainty that one is dealing with a definitely standardized product, checked against known lethal doses of toxin, and this certainty is felt by the investigator both during the experimental work in the laboratory and in subsequent therapeutic testing. With a standardized product it is to be expected that definite results can be repeated. In the case of antibacterial sera, on the other hand, no accurate method of biological standardization has been devised. Protection against living organisms of varying virulence, rather than against known lethal doses of toxin, carries less conviction during the laboratory stage of investigation and makes therapeutic testing of even greater relative importance. The present report is made in this spirit. It is proper to state also that Kyes has not allowed control of production of the serum to pass from his hands pending

1 Read at the meeting of the Tristate District Medical Society (Wisconsin, Illinois and Iowa), Rockford, Ill., September 5, 1919.
such therapeutic testing, and that he still considers the serum in the experimental stage.

In 1918 Kyes published the results of the use of his serum in the treatment of 115 cases of lobar pneumonia, controlled by a series of 538 cases, in which serum was not used, but otherwise treated under the same conditions, and during the same period of time. The mortality in the serum-treated cases was 20.8 per cent; in the control cases, 45.3 per cent.

The next therapeutic test to which the serum was put in any large number of cases was at the Base Hospital, Camp Grant, III. An account of its use in the treatment of 322 cases between October 1, 1917, and September 20, 1918, has been published recently. The death-rate was 7.7 per cent. While there were no control cases it was evident to the clinicians administering the serum that it had marked therapeutic value. In addition the series gave valuable data concerning dosage and methods of administration and other clinical phenomena, and afforded opportunity to improve the serum further on the basis of therapeutic use. With the present report the above constituted a complete record of the use of the serum in pneumococcus pneumonia at this Base Hospital. Mention may be made also, for sake of completeness, of five recoveries from pneumococcus meningitis during the epidemic following combined intranasal and intravenous administration of the serum.

The present publication carries the record on from September 20, 1918, to May 1, 1919. It is properly divided into the epidemic period, during which it was possible to compare results in cases treated with and without the serum, and the period from the close of the epidemic until May 1, 1919, during which all cases received serum treatment.

There was very little question at Camp Grant as to the character of the infection with which we were dealing during the epidemic. The preponderating organism obtained by swab culture from the nose and throat, and by culture from the sputum, during the stage of so-called influenza, was determined after a very few days to be an organism of unusual virulence, conforming in all laboratory characteristics to the pneumococcus. The Pfeiffer bacillus was found in only a negligible number of cases. Pneumococci were obtained in pure culture, or prepurulent, from the heart blood and organs of cases dead from pneumonia and from other forms of pneumococcus disease in a large proportion of the 198 autopsies done during the epidemic period. It seemed to us that no doubt

5 It could arise as to the causative organism either in the cases of so-called influenza or of pneumonia, and that in the virulence of the organism was to be found sufficient explanation of the type of pneumonia resulting. It was presumed, therefore, that treatment with serum would demonstrate therapeutic efficiency.

Since it is proposed to compare the mortality-rates in two groups of cases, those treated with and those treated without serum, the conditions under which the serum was administered should be the same. There was no preparation for control comparison. The serum had been used routinely in the hospital and the propriety of withholding an agent of presumed therapeutic value from any cases for purposes of comparison was considered doubtful under the circumstances. But when it became apparent that there would shortly be more cases of pneumonia than serum could be furnished for, it was decided to restrict its use to cases in a single ward for cases of administration until more serum should become available. Its use was extended later to a second ward. Cases were admitted to these wards as fast as vacancies occurred, either directly from the receiving office or by transfer from so-called influenza wards by other individuals than those interested in or responsible for the treatment. There was therefore no possibility of selection of favorable cases. These wards were equipped in no essential way differently from the other pneumonia wards in the hospital. The serum was withheld from cases in these wards. Finally, all deaths in the serum-treated group, except six that were determined at autopsy to have been due to streptococcus pneumonia, were charged against the serum, in spite of complications or accompanying diseases which might have contributed to or have actually caused death, and regardless of the length of the time between serum treatment and the time of death. Four cases admitted between September 26 and 30 died in November; two admitted September 26 died in December; one admitted September 30 died the following February.

Another circumstance especially unfavorable to the serum record should be explained. On October 1 it was decided to rearrange cases in three contiguous wards, transferring all acutely sick cases in Wards 12 and 13 to Ward 11, putting cases of apparently good prognosis into Ward 12, and convalescent cases into Ward 13. Ward 11 thereafter was to be the receiving ward for the first of three, from which patients were to progress as they improved. This was to protect patients moderately sick and conscious of their surroundings from the sight and sound of the dying. The same plan was put into operation in another group of wards a few days later, where the serum, which had now become available in larger quantity, was being used. It was proposed to extend the plan to the entire hospital, but the epidemic soon became so overwhelming that it was not carried further. Carried on in these two groups of wards without any thought of its effect on the serum record, for the serum
was given to all cases admitted and transferred to these receiving wards irrespective of the stage of the disease, it is fair to state that the mortality was especially high among these transferred cases. However, these statements are not made as a basis for altering the death-rate of the serum-treated cases, and no figures have been compiled to show what might have been the death-rate if the serum had been administered to all cases on diagnosis. They are made to emphasize the fact that the circumstances were in no way made favorable for the serum-treated cases.

During the epidemic period 234 cases of pneumococcus pneumonia were treated with the serum. The number of deaths in this group was 39, a death-rate of 16.7 per cent. During the same period a total of 2064 diagnoses of pneumonia were made in the hospital. There was a total of 1088 deaths. The death-rate was approximately 52.7 per cent, but the total number of diagnoses and the total number of deaths include serum-treated cases and streptococcus cases, which must be subtracted for the purposes of this comparison.

Hirsch and McKinney, in a paper previously referred to, detailed the bacteriology found at 198 autopsies during the epidemic. Streptococci were found in a small percentage. It was apparent that clinical differentiation between streptococci and pneumococcus pneumonia had been largely impossible during the epidemic, partly because of the type of the epidemic diseases and partly because the necessary laboratory investigation for such a large number of individual cases was clearly out of the question. The total number of diagnoses of pneumococcus pneumonia recorded in the hospital, therefore, included a certain number of streptococcus cases. But since six deaths are cut out of the list of serum-treated cases because it was determined at autopsy that streptococci were the invading organisms, it becomes necessary to estimate a fair reduction in deaths among cases not treated with serum, few of these cases having come to autopsy. Using the same proportion as obtained in the serum-treated cases it is estimated that 140 deaths due to streptococcus pneumonia occurred among the cases not treated with serum. With the figures thus obtained the mortality in these cases, as detailed in the accompanying tabulation, is figured to have been 53.6 per cent.

The comparison I wish to submit, therefore, is a mortality of 16.7 per cent in 234 serum-treated cases of pneumococcus pneumonia, with a mortality of 53.6 per cent in 1684 similar cases treated in other respects by the same methods except that they received no serum. In other words the death-rate in the serum-treated cases was somewhat less than one-third that in the cases compared.

The serum was administered intravenously in all cases. Shortly before the epidemic the dose was increased from 2 c.c. once or twice daily to 5 to 10 c.c. twice daily, and this larger dosage was maintained during the epidemic. In a few cases as much as 30 c.c. was given daily. Commonly a total of 60 to 90 c.c. was given in cases that recovered.

As to the clinical phenomena following use of the serum little more can be said than is told in the reduction of mortality. No marked changes were regularly seen after serum administration that were not seen in individual cases not treated with serum. It was the feeling of the writer, therefore, that any attempt to tabulate symptomatic changes in the serum-treated cases for comparison with control cases would bring personal impressions into the record to such an extent that any conclusions arrived at would be open to question. Reduction of mortality, however, is a definite phenomenon. Therapeutic value of any treatment must finally be judged by this end-result.

The modus operandi of the serum is, of course, of great interest but except for the fact that the serum is antibacterial any statement would be purely hypothetical. As to the so-called foreign protein reaction it should be stated that in only approximately 5 per cent of cases was there any appreciable reaction following the serum used during the epidemic. This non-specific reaction cannot, therefore, be considered a factor in the reduction of mortality.

Following the epidemic, cases of pneumonia were atypical. Streptococcus pneumonia was much more common than during the epidemic. But pneumococcus pneumonia itself was also atypical, conforming in symptomatology neither to lobar pneumonia nor to the epidemic bronchopneumonic type, though the appearance of the lungs at autopsy was more clearly that of the latter. There was evidence that the organism was dropping in virulence (unpublished observation of E. P. Hirsch). Finally, in March and April, 1919, lobar pneumonia began to reappear. During the period, therefore, from the close of the epidemic to May, 1919, when this record closes, there was a continually changing picture of disease in the pneumonia wards. It was difficult to establish a clinical standard of differentiation of streptococcus from pneumococcus cases.

But while this period was in many ways an unsatisfactory one in which to attempt to evaluate the therapeutic effect of the serum not only because of lack of controls but also because of the facts above set forth, it is believed that the final compilation of pneumococcus cases was accurate and that the low mortality is credited properly to the serum. There were 5 deaths among 118 serum-treated pneumococcus cases, a death-rate of 4.3 per cent.

The record of the use of Kyes's antipneumococcus serum at Camp Greene can now be summed up. 322 cases of pneumonia were treated between October 1, 1917, and September 20, 1918, with a death-rate of 7.7 per cent.; these were cases of typical lobar pneumonia. 234 cases of epidemic pneumococcus-broncho-pneumonia were
THE AMERICAN JOURNAL OF THE MEDICAL SCIENCES

GEORGE MORRIS PIERSOL, M.D., Editor
JOHN H. MUSSET, JR., M.D., Assistant Editor

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THE AMERICAN JOURNAL OF THE MEDICAL SCIENCES, founded in 1829, has long been recognized as the leading medical journal of the English-speaking race. From the first it sought the epoch-making papers, and becoming recognized as their medium, it has, in turn, been sought by those who have had discoveries or real advances in the art and science of medicine to announce in its Department of Original Articles. During 1920 The American Journal will still further develop a feature that has proved most useful and popular, namely, a series of Special Articles, written by rearrangement with men of the highest authority, and covering present-day topics. The conferences with these eminent men are not only to add to the volume of the Journal, but to produce papers for the Bulletin of the American Medical Association. These are the first of a series of articles, written by men of the highest authority, and covering present-day topics of the greatest importance and interest. These articles are designed to be clinical and practical, and to present important advances and the latest knowledge clearly and concisely, with particular reference to application in daily life. The Department of Book Reviews will continue to comprise critical and discriminating estimates of important new books, as well as brief notices of books of less importance and of new editions. The Department of Progress of Medical Science, under the charge of recognized specialists, will continue to summarize the actual advances in the art and science of medicine appearing in the leading medical periodicals of the world.

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2 W. Forty-fifth St.
Pneumococcus Meningitis

TREATMENT BY A SPECIFIC ANTIPNEUMOCOCCUS SERUM

LAWRENCE LITCHFIELD M.D.
PITTSBURGH
PNEUMOCOCCUS MENINGITIS
TREATMENT BY A SPECIFIC ANTIPNEUMOCOCCUS SERUM

LAWRENCE LITCHFIELD, M.D.
PITTSBURGH

In 1917 I reported that out of 134 cases of pneumonia diagnosed by myself and colleagues in western Pennsylvania during the preceding eighteen months, there had been fourteen cases of pneumococcus meningitis, several of which, being Type I, were treated by the intravenous and intraspinal use of the antipneumococcus serum of the Rockefeller Institute, with very interesting results but without any recoveries. Since that time I have become more and more convinced that pneumococcus meningitis occurs much more frequently than has been supposed and far more frequently than it is recognized. Liebermeister has stated that in 25 per cent. of the cases of pneumonia there is a distinct suppurative inflammation in the membranes of the spinal cord, even though their gross appearance be unchanged.

Evidence of meningeal irritation is often observed during the course of a pneumococcus infection, and these phenomena are too often treated as unimportant—as mere incidents of the general toxemia or as meningismus. But there are no signs or symptoms by which these warnings can be set aside as due merely to a so-called meningismus, by which is meant that there is no actual pathologic condition of the meninges; nor can a positive diagnosis of meningitis be made from the clinical signs and symptoms alone. A lumbar puncture should be made, with microscopic and cultural examination of the fluid obtained, in all

cases which present a suspicion of meningeal irritation, and the eye grounds should be examined daily for evidence of choked disk. Lumbar puncture should be done and the eye grounds examined also in all cases of coma in which meningitis is possible, as in coma developing during a pneumonia, empyema, otitis media or sinusitis, for the reason that signs of meningeal irritation, such as abnormal or exaggerated reflexes, disappear if the coma is sufficiently profound. In rare cases, even after all these methods have been employed, we may still be in doubt. Clear, normal cerebrospinal fluid may be obtained by lumbar puncture although there is purulent inflammation of the meninges localized at higher levels. However, it is the rarest exception for cases showing signs and symptoms of meningeal irritation not to present positive laboratory findings on lumbar puncture.

Pneumococcus meningitis may develop during the course of lobar pneumonia or bronchopneumonia. It may develop after the usual onset suggestive of a pneumonia without the development at any time of any definite signs of pulmonary consolidation. Or, the meningitis may develop during convalescence from pulmonary pneumococcus infection and run a subacute course of several weeks' duration before the usual fatal termination. Meningitis may develop by extension from a pneumococcus infection of the frontal, sphenoid, or mastoid sinuses or even directly from the middle ear. Cases of recovery from proved pneumococcus meningitis have occurred very rarely. This is borne out by the following citations:

Elser: We have no record of recovery in which the diagnosis of pneumococcal meningitis was positively established.3

Councilman: Where the pneumococcus or streptococcus was found, none of these cases recovered.4

Osler: All of our patients die.5 The meningitis of pneumonia is almost always fatal.6

Stevens: Meningitis due to pneumococcal infection may be primary or associated with pneumococcal infection elsewhere. Symptoms are severe and the result fatal.7

Latham and Torrens: Meningitis in the course of a pneumonic septicemia is rapidly fatal.8

Lloyd: The prognosis is unfavorable.9

Pye-Smith and Beddard: Meningitis as a complication of lobar pneumonia is usually purulent and uniformly fatal.10

Bovard: Such complications as meningitis are always fatal.11

Delafield: Pneumonia-acute meningitis is a very infrequent complication but a very fatal one.12

Hall: Pneumococcal meningitis is practically always fatal.13

Babcock: Meningitis is a very serious complication of pneumonia and usually proves fatal in from two to four days.14

Whatever may be the route by which the lungs are invaded in pneumococcus infection, whether by extension through the bronchial tree or by distribution from the blood stream, a blood stream invasion with a widespread distribution of the pneumococci throughout the body is the rule very early in the disease. This being the case, it only remains for certain local conditions, as yet unknown, to be favorable, and there develops a supplicative meningitis, mediastinitis, pleuritis, periarteritis, arthritis, bursitis, otitis, myositis, mastoiditis, thrombophlebitis, sinusitis, conjunctivitis or other complications.

During the fulminant onset of the epidemic of pneumonia at Camp Grant in the fall of 1918, the necropathies of Captain Harris furnished abundant evidence for the conception of pneumococcal infection just given, the presence of pneumococci in the cerebrospinal fluid being repeatedly demonstrated when there was no clinical or histologic evidence of meningitis. We cannot say that these patients would have developed pneumococcal meningitis if they had lived long enough, but we know that at least one prerequisite was present. In my opinion the presence of pneumococci in the cerebrospinal fluid is an indication for the intra-

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6. Osler: The Principles and Practice of Medicine, p. 97.
7. Osler: The Principles and Practice of Medicine, p. 97.
spinal use of a bactericidal antipneumococcus serum such as the Kyes serum; but the presence of bacteria alone, without evidence in the cerebrospinal fluid of an inflammatory process, even though accompanied by signs and symptoms of meningeal irritation, does not prove that there is or ever will be a meningitis, although it makes such a development highly probable.

The results obtained by Capps at the Cook County Hospital during the winter of 1916-1917, and at the base hospital at Camp Grant during the winter of 1917-1918 in the treatment of pneumonia with the antipneumococcus serum of Dr. Preston Kyes, made me very anxious to try this serum in cases of pneumococcus meningitis. Through the courtesy of the University of Chicago and the enthusiastic cooperation of Dr. Kyes, an abundance of serum was placed at my disposal; the recent epidemic furnished the cases.

The epidemic of influenza, so called, began at Camp Grant, September 19. In three or four days the victims of influenza began to develop pneumonia. October 11, my morning report showed 1,508 cases of pneumonia in the hospital. During the eight or nine weeks we had over 10,000 cases of influenza with about 2,700 cases of pneumonia. The medical officers were asked to report at once any cases showing signs of meningial irritation. Nearly a month after the onset of the epidemic, cases of pneumococcus meningitis began to appear.

The number of cases of meningitis in proportion to the number of cases of pneumonia was much smaller than I should have expected. The small number of cases of meningitis, as well as their rather late appearance, may have been due to the unusual virulence of the pneumonia at the onset, which carried off many of the patients before meningitis had had time to develop, just as pneumococcus empyema develops very rarely in rapidly fatal cases of pneumonia, and in this epidemic did not appear until late, after the virulence of the invading pneumococci seemed to be diminished.

We had the opportunity of treating ten cases of typical pneumococcus meningitis with the Kyes serum. The clinical diagnoses in all of these cases were verified by consultants, and the etiology was established in each case by abundant laboratory findings. Of the ten patients, five died and five recovered. As far as the meningitis was concerned, there was no difference clinically between the condition of the patients who recovered and the condition of those that died. Some of the patients with the most intense symptoms of meningitis recovered. Some of the milder cases ended fatally owing to extensive involvement of other organs, as shown by necropsies. The treatment was the same in all cases.

REPORT OF CASES

For the sake of brevity only the briefs of the successful cases are here given:

Case 1.—P. O., aged 24, colored, whose occupation was that of laborer, admitted to the hospital Oct. 3, 1918, had had measles, mumps, malaria, pneumonia and typhoid fever—all in childhood. On examination there were restricted breath sounds in the left lower lobe and a few rales. The abdomen was flat; the liver had no enlargement; the spleen was negative, the reflexes were negative, and the nervous and osseous systems were negative.

The present trouble began three days before admission to the hospital, with chills and fever, pain in the back, sore throat, headache, constipation and violent paroxysms of coughing.

Lobar pneumonia was diagnosed, October 15, in the right lower lobe. There was no herpes.

October 22, the condition was good. There was still some consolidation in the right lower lobe with fine rales.

October 27, the patient complained of pain in the chest and the lumbar region. The temperature rose to 103; the pulse was 88 with signs and symptoms of meningitis.

October 28, 10 c.c. of spinal fluid were withdrawn and 10 c.c. of Kyes serum were given intraperitoneally. The spinal fluid was clear; the white cell count was 720 per cubic millimeter. Sugar and globulin were negative. Direct smear and culture were negative. Blood count revealed 28,800 leukocytes.

October 29, the spinal fluid showed a white cell count of 1,810 per cubic millimeter. Globulin and sugar test were negative. Direct smear disclosed a few organisms, morphologically pneumococcus. Culture revealed a pneumococcus.

Kyes serum was given daily intravenously and intraperitoneally from October 28 to November 24.

October 31, the patient still had opisthotonos, ankle clonus, Babinski reflex and fixed pupils.

November 26, his condition was practically normal, without evidence of any sequelae.

December 1, his eye grounds and reflexes were all normal except for rather marked general cutaneous hyperesthesias.

**Case 2.**—E. B., aged 22, colored, whose occupation was that of farmer, was admitted to the hospital Oct. 11, 1918. The family history was good. The patient had had measles, whooping cough, malaria and pneumonia in childhood. The present illness began October 10, with a severe headache, chills and fever. The following day herpes developed on the lips.

October 16, signs and symptoms of meningitis were confirmed by spinal puncture. Kykes serum was given intraspinally and intravenously, from 5 to 10 c.c. at a dose. There was septic type of temperature, ranging from 101 to 104; then, from 97 to 103, gradually reaching normal about November 1. The pulse varied between 85 and 100 until October 20, after which it ranged between 60 and 85; after November 1, it was practically normal. October 21, the Kernig sign and the Babinski reflex were present and there was rigidity of the neck. October 22, there was a severe chill. October 23, acute bilateral tonsillitis appeared. October 26, there was delirium and opisthotonus. Laboratory reports, October 22, were that the spinal fluid was very turbid and the cell count 4,200.

Direct smear gave a pneumococcus. Cultures were negative.

October 26, the fluid was turbid, white cell count 2,850, sugar negative, globulin positive, direct smear pneumococcus, culture negative.

October 29, a culture from the cerebrospinal fluid was reported positive for the pneumococcus. This patient received Kykes antipneumococcus serum from October 16 to October 29, intravenously and intraspinally, receiving in all 105 c.c.

December 1, his eye grounds and reflexes were normal, and his general condition was excellent. There was no evidence of sequelae.

**Case 3.**—W. E. F., aged 32, white, whose occupation was that of cook, was admitted to the hospital, Oct. 13, 1918. The patient’s mother died in 1914, from cancer of the breast. The family history was otherwise negative. The previous personal history was good. The heart and lungs were normal.

The genito-urinary system was negative. The special senses were normal. The present illness began, October 10, with a severe cold in the head, accompanied by headache, backache, flushed face, weakness and vomiting. The vomitus was blood-streaked. The temperature on admission was 102; pulse, 88; respiration, 28. There were râles at the base of both lungs. The reflexes were normal. The patient became delirious at once. October 15 the headache was still severe. Pneumonia with pleurisy was diagnosed in the right lower lobe.

October 21, the neck was stiff, the pupils were contracted and fixed, and the patient was semicomatose. The temperature was 100; respiration, 32. The laboratory report on the cerebrospinal fluid was white cell count 40 per cubic millimeter.

Direct smear gave a few gram-positive, lance-shaped diplococci. A culture revealed pneumococcus in pure culture. On the 26th, the spinal fluid was slightly cloudy, the white cell count was 180; sugar was positive, and globulin negative. Direct smear and culture were both negative.

From October 21 to the 26th, the temperature ranged from 100 to 103; the pulse for the most part, 50 to 100; respiration, from 30 to 40. There was gradual improvement until temperature, pulse and respiration became normal after November 1. Kykes antipneumococcus serum was injected intraspinally, October 21, 23 and 26. A direct improvement was noted, both mental and physical, after October 23.

Four doses of 5 c.c. each were given intraspinally and 5 c.c. of the same serum were given intravenously, once or twice daily, during the course of the pneumonia.

December 1, the eye grounds and reflexes were normal, the general condition was excellent, and there was no evidence of sequelae.

**Case 4.**—M. O., aged 22, colored, whose occupation was that of farmer, was admitted to the hospital, Oct. 27, 1918. The father had died from tuberculosis. The personal history was negative except for frequent tonsillitis. The present trouble began October 23, with chill, sore throat, stiff neck, aching all over, cough and some delirium, swollen tonsils, and follicular exudate. The heart and lungs were negative. Later, there was consolidation of the left lower lobe. The genito-urinary system was negative. The special senses were normal. The spleen was not palpable. The skin reflexes were normal.

November 14, there was diagnosis of meningitis. The Kernig sign still remained on the left side, the neck was stiff, and there was a suggestion of the Brudzinski sign. There was no Babinski or Oppenheim reflex; the patellar reflexes were sluggish. The abdominal reflexes of the left upper and lower quadrants and the left cremasteric were absent. Lumbar puncture revealed the cerebrospinal fluid to be under moderate pressure.

November 17, the spinal fluid gave a white cell count of 1,800; sugar was negative, and globulin was positive. Direct smear revealed numerous gram-positive diplococci; culture gave a pneumococcus. November 26, the white cell count was 6,400; sugar was positive, and globulin was positive. Direct smear was negative.

November 28, the cell count was 3,800; sugar was positive; globulin was positive; smear and culture were both negative.

The temperature ran a septic course, from 100 to 103; pulse, 88 to 108; respiration, 20 to 26, for this period of about two weeks. This patient was desperately ill and received 15 c.c. of Kykes serum intraspinally twice daily at first and later twice daily, with 5 c.c. intravenously twice and later once daily. He received in all 453 c.c. On several days he received three
intraspinal injections within twenty-four hours on account of the severity of the meningeal symptoms.

Lenocytosis varied between 16,000 and 18,000, but only four counts were made and those between October 20 and November 15.

December 2, the eye grounds and reflexes were normal. The patient's general condition was excellent. There was no evidence of sequelae. Temperature, pulse and respiration were normal. The patient ate and slept well.

Case 5.—N. J. S., aged 25, white, whose occupation was that of farmer, was admitted to the hospital, Dec. 5, 1918. The family history was negative. The personal history gave the usual diseases of childhood. The patient had had "clinical influenza" in October and pneumonia a year previous to the present attack. There was no venereal history. The onset was accompanied by sore throat and headache. December 6, headache being so severe the previous night as to prevent sleep. The examination on the date of admission to the hospital was negative, except that the tonsils were injected and probably slightly swollen. The patient walked to the hospital. December 11, the patient still complained of severe headache, mostly frontal; was rational and answered all questions promptly. On examination, the subcostal muscles were stiff and the head slightly retracted. Tendon reflexes were exaggerated and marked Kernig and Babinski signs were present; the abdominal muscles were rigid, and general hyperesthesia was marked. Fifty c.c. of spinal fluid were withdrawn and 30 c.c. of antineumococcus serum were introduced intraspinaly. The spinal fluid gave a cell count of 5,400 per cubic millimeter; sugar was negative, and there was a slight increase of globulin. Direct smear gave a few gram-positive, lancet-shaped diplococci, morphologically pneumococci. Culture was negative after forty-eight hours.

December 11, after laboratory report was made on the morphology of the bacteria in the spinal fluid, 60 c.c. of spinal fluid were withdrawn and 20 c.c. of Kyes serum were introduced intraspinaly and 5 c.c. intravenously. From this time until Dec. 28, the patient was continually delirious. Neck rigidity continued, with retraction of head until Dec. 17, when relaxation began to be evident. Severe headache was usually complained of during this period, and the reflexes continued to be exaggerated. The temperature ranged between 100 and 103, with slight morning remissions, until December 17, when decided remissions down to 99 began to occur, with afternoon rises to 102. The pulse ran between 60 and 80, and respiration, though often stertorous, was not affected in frequency. From December 17 until the 28th, symptoms gradually disappeared, until on the latter date the patient was fairly rational and was able to state on being questioned that he had no recollection of what had occurred up to that time; that he remembered nothing of the intraspinal injections. Laboratory reports on examinations of spinal fluids withdrawn when intraspinal medication was given revealed: December 13, cell count 16,000 per cubic millimeter; sugar was negative and globulin was positive. Direct smear gave gram-positive, lancet-shaped diplococci, morphologically pneumococci; culture was negative. December 16, the cell count was 4,000 per cubic millimeter; sugar was negative, and globulin showed a large increase. Direct smear disclosed many gram-positive diplococci, many of which were intracellular; culture revealed pneumococci. December 19, direct smear showed a few gram-positive diplococci, morphologically pneumococci, but culture was again negative.

After the first intraspinal injection of 30 c.c. of antineumococcus serum, on December 11, 20 c.c. of Kyes antineumococcus serum were injected intraspinaly twice daily until December 17; 5 c.c. were also given intravenously twice daily. December 18 and 19, 20 c.c. of serum were given intraspinaly and 5 c.c. intravenously, both once daily, after which serum administration was discontinued, though the patient continued to have a slightly increased temperature between 99 and 100 until December 28, when it reached normal and remained so. Muscle rigidity and exaggerated reflexes have gradually been disappearing until at the present time (January 31) all such symptoms have virtually disappeared, and the patient can be said to have made a complete recovery. He has been up and about the ward for the last two weeks. December 15, ophthalmic examination showed a moderate swelling of the disks. December 26, there was a slight enlargement of veins but no tortuosity. There was a very slight swelling of the disks. It should be noted that no pulmonary involvement occurred in this case."

All of these patients were treated in the open air, with the usual routine of digitalis and, when necessary, salines, morphin, bromid, atropin, epinephrin and caffeine.

The fragmentary and incomplete character of these case histories is due to the stress of work in the hospital during this epidemic. As far as they go, however, they are absolutely dependable.

The laboratory work was done under the able direction of Capt. E. F. Hirsch, in charge of the pathologic service of the base hospital.

5111 Jenkins Arcade Building.

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Antipneumococcus Serum (Kyes) in the Treatment of Lobar Pneumonia

JOHN H. McCLELLAN, M.D.
CHICAGO

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FIVE HUNDRED AND THIRTY-FIVE NORTH DEARBORN STREET
CHICAGO
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JOHN H. McCLELLAN, M.D.
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Antipneumococcus Serum (Kyes) in the Treatment of Lobar Pneumonia

John H. McClellan, M.D.
Chicago

The relative good fortune of Camp Grant in respect to epidemics from which many of the southern camps were severe sufferers during the winter of 1917-1918 made possible a more detailed clinical study of the cases of lobar pneumonia admitted to the base hospital during this period than could have been attempted under other conditions. The present paper was originally written with this idea in mind. When sent to France for final revision, the manuscript was lost and publication has been delayed. In view of the numerous reports from other camps dealing with the same subject, published during the past year, much of the original material of this article has become of little interest. The paper has therefore been abridged by the elimination of all discussion of bronchopneumonia and empyemas of streptococcic origin, and has been rewritten from the point of view of serum therapy. The figures have also been changed to include all cases in which the same method of treatment was employed, from May 1 to September 21, during which period Capt. Edwin F. Hirsch was in charge of the pneumonia wards.

The report includes only such cases as were beyond a reasonable doubt frank pneumococcus lobar pneumonia. There were 322 such cases which came under observation at the base hospital at Camp Grant, Rockford, III., from Oct. 1, 1917, to Sept. 21, 1918. No case was reported as lobar pneumonia nor is here included, which did not show definite lobar consolidation as evidenced by tubular breathing, increased tactile fremitus, bronchophony and flatness. This criterion of diagnosis was followed to eliminate those instances
of respiratory infection of short duration and often due to pneumococcus, which simulate lobar pneumonia in that there is a sudden onset with high fever and severe prostration but in which, within twenty-four or forty-eight hours, recovery is rapid and in which at no time distinct consolidation occurs.

An early diagnosis, although frequently difficult, was made on the first or second day following the onset in approximately two thirds of the cases. Hyperresonance with distant breath sounds and slight voice changes occurred not infrequently on the first day. The changes in tactile fremitus and bronchophony were, on the whole, the most reliable and constant physical signs in the establishment of early lobar involvement.

**Bacteriologic Examination of the Sputum**

In all cases the bacteriologic examination of the sputum included the grouping of the pneumococci found therein according to the four so-called types. When the organisms could be identified as belonging to one of the first three types, the determination was of value in confirming the physical signs indicating pneumococcal lobar pneumonia. Unfortunately, however, two thirds of the organisms classified by means of mouse inoculation and the Avery method fell into Group IV, which in itself is a heterogeneous composite of such strains as do not fall into the first three groups and which offers no sharp distinction between certain pneumococci and certain streptococci. In a great majority of the cases, therefore, the sputum examination added no explicit early evidence as to whether the lung involvement was essentially a pneumococcal lobar pneumonia or a streptococcal bronchopneumonia, and was of corresponding slight clinical aid. The typing was continued systematically throughout the series, however, and Table 1 gives the occurrence of the organisms in terms of the four so-called types.

**Table 1—Relative Incidence of Types of Pneumonia**

<table>
<thead>
<tr>
<th>Group</th>
<th>I</th>
<th>II</th>
<th>III</th>
<th>IV</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Cases</td>
<td>43</td>
<td>36</td>
<td>18</td>
<td>199</td>
<td>305*</td>
</tr>
<tr>
<td>Percentage of cases</td>
<td>11.8</td>
<td>12.7</td>
<td>4.1</td>
<td>65.2</td>
<td>100</td>
</tr>
</tbody>
</table>

* This total does not include eleven additional cases not typed.

**Leukocyte Counts**

The daily leukocyte counts were made in all cases during the acute course of the disease, and were of some prognostic value. In general, the leukocytosis ranged between 15,000 and 30,000, but in twenty cases the initial counts were below 10,000. Of these cases, seven terminated fatally early in the attack, two others developed empyema and one a purulent pericarditis. The highest leukocytosis observed was in a case with a late crisis on the thirteenth day. In this case, the leukocytosis advanced from 30,000 to 67,000 during the ninth day. Modification of the leukocytosis by the immune serum treatment will be referred to later.

Approximately two thirds of the cases gave a history of sudden onset with a chill, and in five of these epistaxis occurred and in four vomiting. The history of a "cold" existing for from one to two weeks prior to hospital admission was given in approximately one third of all cases.

Almost without exception the cases at admission displayed a high fever, from 104 to 106 F., and an almost constant symptom was pleurisy, associated with severe respiratory distress. In twenty-one cases there was referred abdominal pain characteristic of diaphragmatic involvement, and in six cases the pain was referred also to the neck.

Herpes on the lips and face occurred in one third of the cases, and jaundice was distinct in fourteen cases, five of which terminated fatally. Cerebral symptoms were present in 12 per cent. of all cases, varying from the characteristic delirium to definite meningismus, the latter leading in three cases to a bacterial diagnosis by lumbar puncture.

**Use of the Kyes Serum**

In the treatment of all cases, systematic use was made of a polyvalent antipneumococcus serum prepared at the University of Chicago by Dr. Preston Kyes and described by him elsewhere. In view of the results obtained by the previous use of this serum in 115 cases of pneumonia in a civil hospital, Major Joseph A. Capps, chief of the medical service, introduced the use of the serum as a routine procedure at
Camp Grant, Oct. 1, 1917, and the results obtained were such as to indicate its continued use. It must be borne in mind, of course, that clinical evidence as to the efficiency of any therapeutic reagent is at best indefinite and must be accumulated in great amount and under varied conditions before final conclusions may be drawn. However, in this fairly large series of cases, the serum appeared to modify the course of the disease in several particulars with such constancy that it is the conclusion of those observing its use that the low death rate resulting should be interpreted as being in a considerable measure due to the therapeutic efficiency of the serum. In its action, the serum appears distinctly to reduce the toxemia, to reduce the general level of the temperature and especially that of the pulse. In most instances the leukocytosis is successively increased by injection of the serum; but this is not without exception. The impression is gained that in the large number of cases displaying a crisis on or before the fourth day, the sudden change bears a direct time relation to the injection of the serum.

The serum was employed for the most part intravenously, the usual dose being 2.5 c.c. once or twice daily. The total number of doses given varied from one to twelve with individual patients, in the average case from three to five injections being given.

A disadvantage attending the serum as first obtained was that on intravenous injection it provoked a marked temperature reaction accompanied by a chill of greater or less severity. The first twenty-five cases of this series were treated by serum which regularly produced this result, and the question naturally arose as to how great a part the foreign protein reaction might play in the apparent therapeutic effect of the serum. To avoid this reaction, intramuscular injections of relatively large doses were resorted to for a time as a substitute for the intravenous injection. Later, however, the serum was furnished in a form which allowed its intravenous use without this disadvantage, and this avenue of introduction was then established as a routine.

Of the 322 cases under consideration, twenty-five terminated fatally, the death rate being 7.7 per cent. In two of the fatal cases, extensive preexisting chronic pulmonary tuberculosis was detected at necropsy, in one case general syphilitic arteriosclerosis and myocarditis were revealed, and in one case tonsillectomy had been performed two days before the onset of the pneumonia and three days prior to death.

Table 2 gives the death rate obtained in the cases grouped according to the type of pneumococcus as determined by the sputum.

<table>
<thead>
<tr>
<th>Group</th>
<th>I</th>
<th>II</th>
<th>III</th>
<th>IV</th>
<th>Not Typed</th>
<th>Total Series</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cases</td>
<td></td>
<td>48</td>
<td>50</td>
<td>18</td>
<td>109</td>
<td>232</td>
</tr>
<tr>
<td>Deaths</td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>13</td>
<td>0</td>
<td>23</td>
</tr>
<tr>
<td>Mortality, per cent.</td>
<td>9.3</td>
<td>14.2</td>
<td>0</td>
<td>6.5</td>
<td>0</td>
<td>7.7</td>
</tr>
</tbody>
</table>

CONCLUSION

The low mortality in this extensive series of cases, together with the favorable modification of clinical symptoms by the serum, as stated above, would seem to indicate the extension of its use in pneumococcus lobar pneumonia.

122 South Michigan Avenue.
WILTON, MAINE.....October 13, 1921.

Pres. Harry Pratt Judson,
University of Chicago,
Chicago, Ill.

Dear Sir:

Last spring I wrote to you requesting you to send to President Sills of Bowdoin an opinion of the work of Dr. Preston Keyes of the University of Chicago, a request to which you kindly complied.

I have just now had an experience in my own family which has brought home very forcibly to me the value of his work.

My wife was critically sick with pneumonia and two treatments of the anti-pneumonia serum which he has developed, proved sufficient to bring her temperature to normal and start her on the road to recovery.

The serum was furnished from the laboratory of the University of Chicago without charge and I wish to thank the University most sincerely for their service, the value of which to me is beyond the power of expression.

Very respectfully yours,

Willard S. Bass.
Wilton Mine, October 15, 1943

Dear Sir,

I am writing to express my appreciation for the work you did at the University of Chicago and to convey my gratitude to you for your kindness and assistance during my stay there.

I have just now read an article by my wife, which appeared in the New York Times. She mentions our stay in the U.S. and the work you did for the bomb. She writes:

"The work we did was of the utmost importance. We were able to develop a new material that was used in the construction of the bomb."  

I wish to express my appreciation for your work on the bomb. I have always been impressed by your dedication and the results of your work.

Very truly yours,

[Signature]

W. E. McMillan
WILTON, MAINE October 13, 1921.

October 10, 1921.

Pres. Harry Pratt Judson,
University of Chicago,
Chicago, Ill.

My dear Mr. Bass:-

Dear Sir:

Your favor of the 10th instant is received. I am very much gratified to hear that the serum was so successful. While the University does not profess to distribute the serum to the public, many cases have had an experience in my own family which has brought home very forcibly to me the value of the profession in general, because it has not been tested at all points, in the meantime if it can be administered under the direction of the professor it will in many cases be extremely useful.

The serum was furnished free by the laboratory of the University of Chicago without charge and I wish to thank the University most sincerely for their service, the value of which to me is beyond the power of expression.

Very truly yours,

Willard S. Bass,
Wilton, Maine.

HPJ:CB
October 30, 1919.

Mr. Harry Pratt Judson,
President of the University of Chicago,
Chicago, Illinois.

My dear Mr. Judson:

I received your letter of the 28th in which you ask about my experience with the Kyes serum.

The Kyes serum was used at Camp Grant during the season of 1917 and 1918 under my general supervision as chief of Medical Service. The treatments were administered and the patients immediately cared for by Dr. J. H. McClellan whose careful clinical records on pneumonia patients were a matter of favorable comment by all visitors from the Surgeon General's office. During the period of my service, there were some 322 cases with a mortality of 7.7 per cent. The absolute value of mortality statistics in a given camp or hospital, of course, is of only relative value. Even comparisons of statistics in a hospital in one location with a hospital in another location during the same season are to be made with great conservatism. However, it may be simply stated that the mortality of the cases treated at Grant during this period was quite low. I think the next lowest record in a similar hospital, was at Camp Dodge with a mortality of 94 per cent.

The serum produced quite uniformly certain results in the pneumonia patients. The day following the injection the patient usually had a lower temperature, breathed more easily, and was clearer mentally. Often-times a delirious patient would become quite rational. In every way the degree of toxemia seemed to be diminished. The repeated injections enabled a patient to go through the course of pneumonia with milder symptoms than patients untreated.

Whether resolution of the consolidated lung was hastened or not by the serum is
October 20, 1917

The Secretary of the Interior,

Department of the Interior of California,

October 20, 1917

Dear Sir:

I am writing to express my appreciation of the services rendered by your department in the matter of the survey of the border between Mexico and the United States, which was requested by this government.

I am informed that the survey was completed in a satisfactory manner, and that the results have been accepted by both governments.

I wish to express my appreciation of the cooperation given by your department in this matter, and to assure you of the fullest cooperation of this government in any future surveys that may be necessary.

Very truly yours,

[Signature]

[Name]
Mr. Harry Pratt Judson

a question that cannot yet be settled.

It is worth recording that all of the men who were responsible for the use of the serum including Major McClellan and after my incumbency, Major Gray of Milwaukee and Major Litchfield of Pittsburg, were quite favorably impressed with the serum.

This experience at Camp Grant was necessarily different from that at the County Hospital in the preceding year where it was possible to treat all of the pneumonia patients in one service and to have the control of the large number of cases in other services under no specific treatment. The Grant cases were not directly controlled by untreated patients because there we were more interested in trying to save lives than we were in compiling statistics.

At Camp Grant one noticeable change was made in the serum by Dr. Kyes that I consider of great importance. Namely, the removal of the substance which produced a marked reaction of chill and fever. The beneficial effect of the serum after this substance was removed was not in any way diminished, as it seemed to me, by its removal. The avoidance of the reaction gets rid of the chief objection to the use of an intravenous injection of the serum.

Without desiring in any way to exaggerate the virtue of the serum, I feel that it is well worth trying on a more extensive scale under the observation of experienced clinicians who are interested only in getting at the facts.

Sincerely yours,

Joseph A. Capps.

Dr. McClellan made a special report on the Camp Grant cases treated by the Kyes serum in the

*Journal of the Army, Vol. 72, p. 1884 (June 28, 1919)*
Department of Anatomy, University of Chicago, October 30th, 1919

My dear Mr. Judson:

I am sending you herewith a brief summary of the results obtained so far in the therapeutic tests of Dr. Kyes Anti-pneumococcus serum. You will note that the tests have now been carried on over a period of three years, one year at Cook County Hospital, and two years at Camp Grant, Rockford, Illinois. Two series of cases, namely, that at Cook County Hospital, and that of the epidemic period at Camp Grant were adequately controlled by the mortality rate of parallel cases occurring coincidently in the same hospitals but not receiving the serum treatment. The other two series cover periods when the serum was administered to every patient suffering from pneumococcus lobar pneumonia.

It is to be especially noted that the so-called foreign protein reaction, namely a rise of temperature with rigor, that followed the administration of the serum in the early cases, was eliminated in the later series by the use of an improved method of preparing the serum.

To these cases of lobar pneumonia should be added eleven cases of meningitis, due to the pneumococcus, with five recoveries, reported from Camp Grant by Major Lawrence Litchfield M.C.; a most remarkable result in a disease which is almost uniformly fatal.

The laboratory is now proceeding with experiments designed to perfect further the serum and to establish an adequate method for its standardization. It is also carrying on investigations on the
I am enclosing your transcription of the German text. It is to be especially noted that the go-calling letter is a copy of the English version with minor changes. The German translation of the letter is included at the end. The letter serves as an important starting point for the investigation.
production by similar methods of sera directed against other organisms.

The production of the antipneumococcus serum is also being continued on an enlarged scale.

I remain,

very sincerely yours,

R.R. Beusley
production of similar methods of data collection and analysis.

The production of the extraneous data seems to me
to continue on an exploring scale.

I remain
very sincerely yours,

[Signature]
Report of Therapeutic Tests of Kyes Antipneumococcus Serum

<table>
<thead>
<tr>
<th>Series</th>
<th>Cases treated with serum</th>
<th>Controls</th>
<th>Death Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cook County Series- Season 1916-1917</td>
<td>115</td>
<td>584</td>
<td>20.8%</td>
</tr>
<tr>
<td>Pre-epidemic series, Camp Grant(1917-1918)</td>
<td>322</td>
<td></td>
<td>7.7%</td>
</tr>
<tr>
<td>Epidemic period, Camp Grant(Autumn 1918)</td>
<td>234</td>
<td>1684</td>
<td>16.7%</td>
</tr>
<tr>
<td>Post-epidemic period, Camp Grant(1918-1919)</td>
<td>118</td>
<td></td>
<td>4.3%</td>
</tr>
</tbody>
</table>

In the pre- and post epidemic series at Camp Grant the serum was routine treatment for all cases of pneumococcus lobar pneumonia. Hence there were no untreated cases for comparison as controls.

R.R. Bensley
Dept. of Anatomy.
Report of Tweenability Testing of case 401-1-101 and 401-1-102

Case 401-1-101

1. Case treated with serum
2. Control

Pre-epidemic serum, Camp Grant (1916-1917)

1. Case treated with serum
2. Control

Post-epidemic period, Camp Grant (1918-1919)

1. Case treated with serum
2. Control

We recommend treatment for any cases of bromococcosis. Proper precautions should be taken to prevent the spread of the disease.
November 1, 1919

Dear Mr. Bensley:

Thank you very much for your report of the thirtieth of October on the matter of the scrump. Very truly yours,

Mr. R. R. Bensley,
Faculty Exchange.
November 7, 1970

Dear Mr. President:

Thank you very much for your report of the inauguration of October on the matter of the

very early morning

Mr. R. President

pector’s bandage.
President Harry Pratt Judson,
The University of Chicago.

My dear Mr. Judson:

I am placing in your hands certain minutes concerning the anti-pneumococcus serum produced in the Laboratory of Preventive Medicine.

The serum was first prepared on a limited experimental scale. During the pneumonic epidemics of the war period, the production was intensified. At the present time, the serum is produced on a scale sufficient to afford clinical tests and to gradually accumulate an emergency reserve.

I am distributing the serum for clinical use. It is my policy to file all applications but, at present, to make actual distribution only to those physicians who have had a considerable
previous experience with the serum under controlled conditions and with whom I can keep in personal contact. Among such physicians are: McClellan, Cappe and Bruejacker (Illinois); Gray (Wisconsin); Clough (S. Dakota); Warren (New England) and Hitchfield (Pennsylvania).

In addition to my own articles, Mrs. McClellan, Hitchfield and Gray have publications relative to the efficiency of the serum in the treatment of pneumococcal infections.

I am now pleased to state that the serum is of demonstrated value in the treatment of lobar pneumonia and pneumococcal meningitis.

Under separate cover I am sending reprints of the articles referred to above.

Cardially and very respectfully,

[Signature]
To the President, University of Chicago:

My dear Mr. Judson:

In an interview last week you requested me to communicate to you the relative amount of money spent in 1919-20, in the general activities of the laboratory of preventive medicine and the more special activity of pneumonic serum production.

The total charges for that year were $8,300.

Of this amount approximately $5,000, were for the general activities of the laboratory and $3,300 for serum production. You will remember that this classification of the expenses was requested with a view to entering the cost of the general activities in the departmental budget, and charging the serum production to a general fund.

Yours cordially,

Preston King
January 12, 1922.

My dear President Judson:

Referring to Dr. Kyes' letter of January 8 with respect to the appropriations for Preventive Medicine:

During the last two years the amounts paid, and the distribution thereof have been as follows:

<table>
<thead>
<tr>
<th>Year</th>
<th>Instruction</th>
<th>Laboratory Expenses</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1919-20</td>
<td>$1,800.</td>
<td>$6,561.99</td>
<td>$8,361.99</td>
</tr>
<tr>
<td>1920-21</td>
<td>$2,000.</td>
<td>$6,035.32</td>
<td>$8,035.32</td>
</tr>
</tbody>
</table>

I am asking Dr. Kyes to inform you if the foregoing information in any way modifies the distribution presented in his letter of January 8, which I am returning to you herewith.

Yours very truly,

President Harry Pratt Judson,
Harper Library.
January 15, 1933

To the Manager:

In regard to the recent letter of January 9, with reference to the application for transfer of personnel, I would like to point out the importance of proper procedures. As you can see from the following table, the current status is as follows:

<table>
<thead>
<tr>
<th>Date</th>
<th>Department</th>
<th>Transfer Requests</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/12/33</td>
<td>Marketing</td>
<td>628.75</td>
</tr>
<tr>
<td>1/14/33</td>
<td>Sales</td>
<td>800.00</td>
</tr>
<tr>
<td>1/15/33</td>
<td>Finance</td>
<td>0.00</td>
</tr>
</tbody>
</table>

I am aware of the need to ensure that the personnel file is updated. I suggest a meeting to discuss the current procedures and make any necessary adjustments.

Yours truly,

[Signature]
RECEIVED AT

1023 E. 63rd St., Phone Hyde Park 4321

A92CH MJ 48 BLUE

ELKHART IND 230P JAN 12 1922

PRESIDENT JUDSON

U OF C CHICAGO ILL

ON TWENTIETH CENTURY FOR NEW YORK MY SON AT WASHINGTON SQUARE

HOSPITAL THERE WITH DOUBLE PNEUMONIA IF ANY SPECIAL DOCTOR IN

NEW YORK BEST EQUIPPED ON SERUM TREATMENTS KINDLY HAVE SECRETARY

WIRE ME CARE BANKERS TRUST COMPANY HAVE IMPRESSION SERUM RATHER

ABANDONED BUT RISK TROUBLING YOU TO BE FULLY ADVISED

C R HOLDEN

413P
RECEIVED AT 1603 E. 53rd St. Phone Midway 4321
A120CH MB 51

AD NEW YORK NY 5P JAN 13 1922

DR HARRY FRATT JUDSON 125
1146 EAST 53 ST CHICAGO ILL

REPLYING TO TELEGRAM CONCERNING MR HOLDEN ILL OF PNEUMONIA HIS PHYSICIAN
DR BROOKS INFORMS ME HE IS DOING WELL TEMPERATURE BEING NORMAL FOR PAST
THIRTY SIX HOURS STOP DR CECIL COMPETENT BACTERIOLOGIST EXAMINING SPUTUM
FOUND PNEUMOCOCCUS TYPE FOUR FOR WHICH THERE IS NO SPECIFIC TREATMENT STOP

DR BROOKS IS COMPETENT PHYSICIAN

SIMON FLEXNAR

416P
My dear Mr. President:

On my return yesterday I found your very thoughtful note of the 24th.

While my son's illness was of a peculiarly explosive virulent type, the crisis was passed on the afternoon before I arrived in New York.

I very keenly appreciate the fact that Dr. Cecil had called at the hospital even before I had arrived myself. Dr. Brooks and Dr. Higgs of New York, eminently capable physicians, both confirmed the opinion of Dr. Cecil, and at the same time found that Henry had so far so successfully passed the crisis that there was no occasion for resorting to a serum treatment.

I note with great interest your suggestion that Dr. Kyes' serum may be applicable to type four of pneumonia, especially in view of the general trend of the literature on the subject, in which I invested to some extent while in New York, and in view of the attitude of the New York physicians, it would seem that the present course in New York in pneumonia cases should be a very pertinent time to open a communication on the subject of further investigation of Dr. Kyes' serum.

I very much appreciate your great assistance, and regret that I should have interrupted you with attention to it while you were on so important and so hurried a trip.

Sincerely yours,

Dr. Harry Pratt Judson,
University of Chicago,
56th St. & Ellis Ave.,
Chicago.

January 31, 1923
February 3rd, 1922

President Harry Grant Judson:
University of Chicago.

My dear Mr. Judson:

I am returning two telegrams and the letter relative to the Holden incident. I am pleased that you gave me the opportunity of seeing them and also, of course, that the son recovered so promptly.

It is true that the "typing" is falling from favor and in my opinion, justly so. It is not true that specific antineumococcus treatment is limited to any one type of pneumococcus infection, unless one is relying entirely upon the Cole serum.

Very cordially,

Preston Hayes.
deg. William D.}

You have all the facts. I was a

sent back to Chicago to check

the financial records. I found

that there were no discrepancies.

The company was in good

shape financially.

All signatures were valid.

I recommend that we proceed
to purchase the new plant.

Sincerely yours,

William D.
Dear Professor Tufts,

Yesterday I asked The President to consider the appointment of a technician for the human embryological collection. I did not dwell on the need for this help, forgetting that I was not talking to Dr. Bensley who is conversant with the situation. As this matter is to be referred to you, I wish to tell you something of the work we have begun.

During the past ten years we have collected some 1000 specimens, all of which I have worked over, preserved and catalogued, writing a personal letter of thanks in every case. Except for two years there has been no help except the very unsatisfactory student service for six or eight hours a week. There has been no opportunity to prepare for study the best of the material which, when completed, will make the collection second only to the great collection of the Carnegie Institution, so far as American collections are concerned. So far as the early stages of human development are concerned there is no adequate series if all the available material in the world were gathered together. It is well worth while therefore that more efforts be made to obtain material. The Chicago clinicians have now been educated so that they can cooperate to the best advantage and they have been exceptionally generous in their help.

At the present time the care of the material is taking up almost all of my research time and all I can do it to salt away the precious embryos. With the help of a skilled technician like May Bensley we could make a
Dec 13, 1922

Dear Professor Tyler,

I am the President of the University of Minnesota and have recently been informed of your appointment as the new director of the Agricultural Experiment Station. I am writing to inform you of this appointment and to extend my congratulations on your appointment.

I understand that you have been working closely with the Agricultural Experiment Station and have made significant contributions to its success. I am confident that your leadership will continue to strengthen the Station and contribute to its future success.

Please accept my congratulations on this appointment and let me know if there is anything I can do to assist you in your new role.

Sincerely,

[Signature]

[Name]
series available for study that would be adequate for all work in human embryology from the beginning of the third week of gestation to term. The prospects of obtaining the priceless two weeks' stages are brighter here than even in Baltimore where the Carnegie Collection Laboratory is. Even as it is, workers from other institutions are beginning to come to study our material and we have published on it since 1916.

If we had anyone else available for this position except his own daughter, Dr. Bensley would be urging the need of this appointment but the idea of 'nepos' sticks in his mind and he will take no steps of his own accord.

If there are any other data you need to convince you of the advisability of recommending this appointment I shall be glad of the opportunity of presenting them.

Sincerely yours,

[Signature]
settee available for study that would accommodate for all
work in human psychology from the beginning of the third
week of October to term. The prospects of obtaining the
position two weeks before the beginning of the term are
very remote. It is hoped that we may secure the position
very early in September. We have been working on the
material and we have published them since 1916.

If we had someone else available for this
position except for our daughter, Dr. Bennett would be
writing the need of this appointment and I am of the
opinion that Dr. Bennett would take no steps to find
my successor.

If there are any other gaps in your need
for continuity whom of the specialists of neurology
the appointment I shall be glad of the opportunity of
preparing them.

Sincerely yours,

[Signature]
My dear Mr. Tufts:

The inclosed letter from Dr. Hektoen in his capacity of secretary of the Fenger Memorial Association has to do with the question of the cost of publishing the illustrations in color of Professor Maximow's work on the cultivation of tubercle bacilli in association with living tissue cultures. This work is of the greatest importance and will interest a very wide circle of biologists, pathologists and physicians. In general we avoid the use of colors in illustration as much as possible because of their great cost. In this instance, however, they are quite indispensable, and I should be pleased if the University could supply the necessary funds in toto. Dr. Hektoen's generous offer makes that unnecessary but leaves to me the problem of how to raise the remainder of the fund amounting to $270 - $320. He is not quite definite, you see as yet. We have been accustomed to make small appropriations to assist illustration in the department, but the amount in this instance is, I believe too great for the departmental budget to undertake. Accordingly, I would be grateful if you would consider the possibility of making a special appropriation for this purpose, and would let me know your decision at your earliest convenience, so that I can continue the negotiations with Dr. Hektoen.

I remain,

yours sincerely,

[Signature]

[Handwritten note]: Return to President Benson that the University aid $200.00
Prof. Preston Keyes,
Faculty Exchange.

Dear Mr. Keyes:

When I presented your request for an appropriation
for preventive medicine which involved an increase over
the amount previously put down in the budget (although
as you explained, this amount had been in the past
supplemented from other sources), a question was raised
as to the progress of your work. I do not know how far
you may have published any recent reports since the
article in 1918 in the President's report. If you have
not published any recent reports, could you not outline
the work on which you are now engaged, and especially
give any information available as to the progress of
your work with pneumonia?

Sincerely yours,

James H. Tufts
Dear Professor Kane,

I hope this letter finds you well. I am writing to you regarding a matter that has arisen in the course of my new position at Chicago University. As you are aware, I have been working on improving the sound technology for both home and theater systems. I have been using advanced techniques to optimize the sound quality and to reduce noise. I believe that this work could be very beneficial for your research, and I would be happy to discuss it with you.

I have attached a copy of my latest report, which outlines the progress made so far. If you have any questions or suggestions, please do not hesitate to contact me.

I look forward to hearing from you soon.

Sincerely,

[Signature]
April 15, 1934

Memorandum to the President concerning the work in Preventive Medicine.

Statement by Professor Bensley. It is important to remember in the first place that the work with pneumonia serum is only a small part of the work in preventive medicine; that twenty per cent of the budget is used for serum production. The most important general work now going on is devoted to determination of the cellular site of antibody formation and methods of modifying the same. Also the elaboration of a method for serum diagnosis of human tuberculosis.

The pneumonia serum has been used to date on about 600 controlled cases of pneumonia, and 12 cases of pneumococcal meningitis. It is intended to extend the total to 1000 controlled cases. The death rate has been reduced to less than one half on the 600 cases. 130 cases have been treated this year. Following the epidemics during the war, there have been less than the normal number of cases treated at the Cook County Hospital. The method of control is that all cases of pneumonia received in a certain ward of Cook County Hospital are treated with the serum, even although the cases are moribund when received. The record from this ward has been compared with the records from the rest of the hospital. The serum is efficacious for the treatment of so-called lobar pneumonia. Various complications of cases loosely called pneumonia may include other factors not properly belonging to lobar pneumonia.

The factor of serum which produces the so-called reaction has been determined and a method of eliminating the same has been devised. This is important for other serums as well.

Professor Bensley wished to call special attention to a general investigation and publication of masters and doctors in the field of preventive medicine and to the fellowships (Coman research fellowship and
Barret Research Fellowship) which have been given for work in this field through the influence of Dr. Kyes. It is Professor Bensley's view that the work in Preventive Medicine should be judged with other laboratory work as a work of research which pursues various lines of investigation, some of which prove to be more, others less significant. In his view it has saved more human life than any other investigation going on on the University campus, and is respected in scientific publications.
April 21, 1924

Professor Preston Kyse,
Department of Preventive Medicine,
Faculty Exchange.

My dear Professor Kyse:

On behalf of the President I wish to acknowledge your letter of April 21 with its enclosure from Mr. Henry P. Barrett of Henderson, Kentucky, in which he generously offers the University a gift of $4000 for the maintenance of a research fellowship in Preventive Medicine for two years at $2000 a year.

I note also that Mr. Barrett is especially interested in the line of work which has been conducted by Mr. John C. Rogers in the laboratory and desires that this line of work should be continued for two years at least.

It gives the President great gratification to receive this generous offer from Mr. Barrett and he will present it for official acceptance at the next board meeting, which occurs regularly on May 8th.

Sincerely yours,

T.S

James H. Tufts.
My dear Mr. Barrett:

Professor Preston Kyes has written to me informing me that you have offered to provide $2000 a year for two years for a Research Fellowship in Preventive Medicine.

It is with great gratification that I have learned of this generous offer on your part and I shall be pleased to present it for formal acceptance at the next meeting of the Board of Trustees which falls on May 8th. We believe that the work which is going forward in our laboratories is contributing toward a saving of human life and the improvement of human life in many ways and we welcome your cooperation in this beneficent service. We hope that from time to time you will visit the University and in particular the laboratory of Preventive Medicine and thus keep in touch with the work which you are aiding.

Professor Kyes informs me also that he recommends for the Research Fellow in Preventive Medicine
Mr. John C. Rogers, the appointment to take effect as of April 1, 1924.

With cordial regards, I am,

Sincerely yours,

President.

Mr. Henry P. Barrett,
Henderson, Kentucky.
To the President
of the University.

My dear Mr. Burton:

I enclose a letter from Mr. Henry P. Barret of Henderson, Kentucky in which he offers the University a gift of $4,000 for the maintenance of a Research Fellowship in Preventive Medicine for two years at $2,000 per year. I asked Mr. Barret to make this donation that a particular line of work which has been conducted by Mr. John C. Rogers in this laboratory be continued for two years at least.

I therefore recommend that the gift be officially accepted and that Mr. John C. Rogers be appointed Research Fellow in Preventive Medicine as of April 1, 1924.

Very cordially,

Preston Kyes
The University of Chicago
Office of the Vice-President and Dean of Faculties

April 25, 1924

The President presents the offer of Mr. Henry
P. Barrat of Henderson, Kentucky, of a gift of $4000.00
for the maintenance of a Research Fellowship in Preventive
Medicine for two years at $2000.00 per year.
May 17, 1924

The Auditor,
Faculty Exchange.

Dear Mr. Plimpton:

On the nomination of Professor Keyes, Mr. John C. Rogers is hereby appointed research fellow in Preventive Medicine on the gift of Mr. Henry P. Barret of Henderson, Kentucky, at a stipend of $2000, the appointment to date as of April 1, 1924.

Sincerely yours,

James H. Tufts

T:W
May 20, 1934

Dean Gale,
Faculty Exchange.

Dear Mr. Gale:

In accordance with our conversation, I have written to the donor of the fellowship in Preventive Medicine that Mr. John C. Rogers will be given by your office a fellowship sufficient to cover the tuition fee, so that he may receive the full amount of the research fellowship.

Sincerely yours,