

REPORT  
OF THE  
DIRECTOR OF THE HOSPITAL  
TO THE  
CORPORATION OF THE  
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REPORT

OF

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Changes in the Staff. It is a source of gratification that the number of men desiring to join the staff of the Hospital is constantly increasing and that the training of the men desiring even temporary appointments is of high level. There is now a demand on the part of well trained men for voluntary assistantships. While it has not been the policy of the Institute to admit voluntary workers, the training of certain men applying has been so good that in certain instances it has been thought advisable by the Board of Scientific Directors to grant such privileges, especially in those cases where men have agreed to remain the entire year. Last year such a privilege was granted to Dr Ernest Stillman, previously Assistant Resident Pathologist at the Presbyterian Hospital. He has worked on the Epidemiology of Pneumonia. During the summer of 1915 and 1916 privilege to work in the hospital was granted to Dr J.T. Halsey, Professor of Pharmacology in Tulane University. He has worked on subjects related to heart-block. During the coming winter privilege to work in the hospital has been granted to Dr Francis G. Black of Harvard University and Peter Bent Brigham Hospital, Boston, to work on problems connected with infectious diseases and to Dr Samuel A. Levine of Harvard University and the Peter Bent Brigham Hospital, Boston, to work on problems in connection with heart disease. It is believed that in the future this training of certain men in the special new methods employed in the hospital may be a highly efficient means for bringing the methods into more widespread and effective use.

During the year the Hospital has lost the services of one of the most promising of its younger men, Dr Franklin C. McLean, who

has been appointed Professor of Internal Medicine and Head of Union Medical College, the new medical school to be organized by the China Medical Board in Pekin.

Dr A.R. Dochez, who for two years has very capably served as Resident Physician of the Hospital, was at the June meeting of the Board of Scientific Directors made an Associate Member of the Institute. He no longer will live in the hospital and he will be succeeded as Resident Physician by Dr H.T. Chickering, who for three years has acted as Assistant Resident Physician. Other changes in the staff will be found in the Manager's Report.

Changes in the Hospital owing to need for increased laboratory space, and proposed changes to accomodate patients.

At the April meeting of the Board of Scientific Directors the Director of the Hospital made certain suggestions and recommendations bearing on immediate and future hospital needs. Changes to satisfy a number of these needs have already been made, either in the way proposed or by ways which, after further consideration, have seemed more advantageous.

At the meeting the Director pointed out that since its organisation the activities of the hospital had increased to such an extent that there was an immediate need for increased laboratory space. To meet this need slight changes have been made on the West end of the sixth floor of the hospital which was originally intended as a ward floor. Also by building a bridge over the Isolation Building the third floor of the original laboratory building has been brought into immediate connection with the hospital and has permitted the use of this floor by members of the hospital staff who, in order to carry on advantageously laboratory work in connection with the care of patients should have their laboratories very accessible from the wards.

Improvements in facilities for X-ray work in the hospital were much needed, especially for the study of the action of X-rays on cancer. There is therefore

being installed on this floor a new X-ray department which will now be first-class in all respects. On this floor also are rooms in which experimental work on dogs may be carried on by Dr Allen and Dr Cohn. Much of the work of these physicians requires experiments on dogs and it is not thought advisable that these animals be brought into the hospital proper. Another room for operating on dogs is also provided which can be used by other members of the staff who only occasionally need such facilities.

Additional Room for Patients. The addition of the work on treatment of cancer will probably slightly increase the number of patients in the hospital. Also with the increased development of other activities in the hospital, some thought is being given to possible expansion. If, later, this should be thought advisable by the members of the Corporation and if resources be available, the experience of the hospital indicates that any future need will best be met by providing additional single rooms. In a very complex mixed service such as we have, consisting of both men and women, it has been found difficult to separate patients suffering from various diseases without overcrowding certain wards and leaving other wards containing few patients. Such separation in certain cases seems very important. For instance, it is very important not to treat pneumonia patients in the wards containing patients with heart diseases. It has not seemed wise to place diabetic patients, who are not acutely ill, and whose mental state is of considerable importance, in wards containing acutely sick pneumonia patients.

It has also been found advisable to keep patients on whom very accurate chemical or metabolic studies are being made in single rooms. Moreover, the demand on the part of persons of the better classes for admission to the hospital has grown, and it is found that in many ways these are the best patients for study, as they are more ready to cooperate in the studies being made. These patients also require separate rooms.

It would seem, then, that the first extension of hospital facilities should provide for additional single rooms. This can probably best be done by using the second floor, now occupied by nurses, for this purpose. In the original planning and construction of the hospital this floor was built with this possibility in mind, and this floor could be used for this purpose with comparatively slight change.

Nurses Home. Such a use of this floor would, of course, necessitate making provision for the nurses elsewhere. The nurses quarters are already overcrowded. In very accurate work and complex studies, such as are made in the hospital, the number of nurses required is large, much larger than may be thought necessary by those who have only had experience in the ordinary general hospital. The nurses are needed, not only in caring for the immediate needs of the patients, but they are employed very largely in assisting in making observations and in assisting in the technical procedures carried out. The provision for a Nurses' Home, therefore, would release from the hospital buildings a number of rooms which apparently can very soon be profitably used for hospital purposes.

#### Report of Scientific Work

The work has largely been a continuation and extension of that done in the preceding year. The only new class of patients admitted has consisted of those suffering from cancer.

Acute Lobar Pneumonia The work on this disease has gradually resolved itself into investigating modes of specific therapy, first that<sup>of</sup> making use of known immunity reaction, and second that<sup>of</sup> employing drugs which have a specific action on the infecting organisms. In attempting to apply the known principles of immunity progress is theoretically possible in two ways. First, it is possible that the patient himself may be stimulated to himself produce the immune substances, upon

which natural recovery in pneumonia undoubtedly depends, faster and in larger amount than he would do unaided. While numerous experiments have been made along these lines up to the present it has been impossible to obtain promising results. The other method has been to supply him with those immune substances which are contained in the serum of animals artificially immunized. This latter method has been the one which has given the most promising results. As previously stated, this form of therapy is only possible if, in every case, the type of infecting organism can be rapidly and accurately determined. This the previous work in the hospital has made possible. The results of serum treatment have so far been successful only in the infections due to pneumococci of Type I. Here, however, further experience has confirmed our previous conclusions, and made it quite evident that serum is of very great value in this type of infection.

While the extent of our statistical data is as yet not large, we now feel that we have sufficient to urge that all cases of Type I infection be treated with the appropriate serum. Up to July 1, 1916, 396 cases of pneumonia have been treated in this hospital, of which 106 were treated during the year 1915-16. Of these 396 cases, 113 were due to Pneumococcus Type I, 104 were due to Pneumococcus Type II, 37 were due to Pneumococcus (mucosus) Type III, 74 were due to Pneumococci of Type IV; in 48 cases the type of pneumococcus causing the infection was not determined (occurring mainly before methods for determining types had been devised) and 20 cases were diagnosed as acute lobar pneumonia in which the infecting organism was Friedlander's bacillus, Influenza bacillus, streptococcus or staphylococcus, or combinations of these. It is evident that about one third of all cases were due to Pneumococcus Type I. Of these cases due to this type of pneumococcus 72 were treated with immune serum. Of these 72, six died, a mortality rate of a little over 8%. Of the six that died, moreover, one died on the 16th day, after recovery from the pneumonia from pulmonary embolism, one died on the 54th day following the pneumonia from a

general streptococcus infection with empyema and multiple abscesses, three were treated only on the day of death, and only one was treated for two days, the fifth and sixth. It is evident that in at least two of the fatal cases (those first mentioned) no specific treatment could have been of service.

When it is considered that the mortality in the untreated cases due to Type I infection, judging from the cases here before serum treatment was undertaken and also from the cases observed in other hospitals, is from 25 to 30 per cent, it is evident that the low mortality observed, 8 per cent, is decidedly encouraging, even quite convincing. The importance of this form of treatment is evident when we consider the great frequency of this form of infection. In 1915 probably 1800 deaths in New York City were due to Acute Lobar Pneumonia of Type I alone. This is as many as all the deaths from typhoid fever, measles, scarlet fever, whooping cough and cerebro-spinal meningitis combined, and almost as many as all the deaths occurring in the present epidemic of poliomyelitis.

In the previous annual report it has been stated that it has been impossible to produce an immune serum active against Type III pneumococci. Our experiments were only conducted with small animals, however. Since these were negative, no attempts were made with horses. During the past winter, however, the State Board of Health, under Dr Wadsworth's direction, notwithstanding our negative results, proceeded to immunize a horse to Type III pneumococci and sent us some of the serum. To our surprise the serum was found to have some agglutinating power and also slight protective power for mice. While this serum is, as compared with Type I serum, extremely weak and therefore not suited for therapeutic purposes, nevertheless its production does have much theoretical importance. We have repeated this work with horses and have produced a similar serum. This serum has been tested by Dr Avery on all the Type III strains available, and the results indicate that all Type III pneumococci are immunologically identical.

It is not yet certain why it should be possible to produce an effective serum against pneumococci of Type I and only one of much less value against pneumococci of Type II, and one of very slight value against pneumococci of Type III. These differences apparently bear some relationship to the possession of capsules by organisms of the various types, those of Type III having very large capsules, those of Type II moderate sized capsules, and those of Type I smaller capsules. Studies are being conducted to determine the nature of the capsular substance, and its relative antigenic activity, in the hope that light may be shed on this important and perplexing problem.

The second method of specific therapy, namely, the use of drugs having specific action on the pneumococcus, has also been investigated, employing the drug ethylhydrocuprein, or "optechin" which was prepared by Professor Morgenroth in Germany. In our last report, the results obtained in the preliminary investigations of this drug by Dr. Moore were given. During the past winter studies concerning the action of this drug on patients suffering from pneumonia were made. Previous experiments had showed that this drug is bactericidal for pneumococci in the test tube, even in dilutions as great as 1 : 5,000,000 and Moore showed that this action was exerted equally on all types of pneumococci. It has also been shown that when this drug is administered to animals or patients the serum also acquires bactericidal properties.

The drug has been employed in the treatment of a considerable number of patients in Germany and England but the reports concerning its efficacy are conflicting. No standard dosage, however, has been employed, and it would seem that dosage is very important, since in animals considerable amounts must be given to cure, but if very little more than these amounts be administered, poisoning results. In other words, the curative dose is very close to the



toxic dose. In man the toxic effects are mainly seen in the effects on the eye and ear; partial or total blindness has occurred in a considerable number of the treated cases. While this so far has apparently not been permanent, blindness lasting for a week to ten days, as in one of our cases, is a very serious drawback to the use of the drug. It has seemed that by studying the bactericidal power of the blood of the patients to whom the drug was administered much could be learned concerning proper dosage, the probable ideal condition being obtained when a bactericidal power is obtained in the shortest time and when this is maintained constant without fluctuation. The latter is especially important since it has been shown that if the bacteria be exposed to a concentration of the drug not sufficient to kill, they quickly become resistant to the drug and very much higher concentrations are required than was originally the case. Drs. Moore and Chesney have therefore made an exhaustive study of the bactericidal power of the blood of patients after the administration of optochin in varying doses and administered in various ways. Without going into the details of their study, it may be stated that the optimum results are obtained when an initial large dose of the drug is given, and this is followed by repeated small doses given every two hours, day and night. In regulating the size of the dose, the weight of the patient is of very great importance, and they have found that the patients should receive 0.024 gm. per kilogram of patient's weight, per 24 hours. They have thus made it possible to properly test the action of the drug in patients and it is planned to do this fairly extensively during the coming winter in case a supply of the drug can be obtained. At present it is made only in Germany and we are having great difficulty in obtaining a sufficient supply. Last winter the number of cases properly treated was not large, only 25. These were mostly cases of

to II and III in which the mortality is high. In these few treated cases the mortality was 16 per cent, which, while not a brilliant result, is not discouraging.

Epidemiology. - The study of this subject has been continued by Dr Ernest Hillman, whose results mainly confirm those given in our last annual report. Dr. Hillman has examined the saliva of 398 normal individuals; in 172 instances pneumococci were present. In 4 of these positive cases, pneumococci of Type I were obtained, and 3 of these gave a history of close association with a case of lobar pneumonia, two of them known to be due to Type I organisms. In 4 instances organisms of Type II were obtained and 3 of these also gave a history of close association with pneumonia patient; in all 3 of them the patient was known to be infected with Type I organisms. Pneumococci of Type III were found in normal mouths 44 times and in most cases no close association with pneumonia cases could be traced. So far as could be determined those Type III organisms differed in no way (immunologically or otherwise) from those found in disease. This anomalous fact, that pneumococci of the most virulent type may occur in healthy mouths without giving rise to disease, cannot be explained. Atypical Type II pneumococci were found 26 times and Type IV organisms 110 times. The length of time during which a convalescent may harbor the infecting organism was also studied, and it was found that organisms of the infecting type may persist for a long time, in one case even 85 days. These facts all have an important bearing on problems connected with prevention and it is believed that later practical use may be made of them.

Preparation of Antipneumococcus Serum. The work entailed in the preparation of antipneumococcus serum has grown to a considerable extent and now requires a considerable part of the time of one man. With better facilities however, offered by a new animal house, and with the improvements devised in the preparation of the serum to be mentioned below, it is thought that the labor and expenses involved may be materially reduced. During the present summer Dr Moore has been actively engaged

in the preparation of serum so that we now have a considerable supply on hand. In addition, several of the state Boards of Health are preparing the serum so that it is believed that during the coming season a large number of patients suffering from Type I infection, both in this Hospital and elsewhere, can be treated by this method.

The method of producing immune serum by using dead instead of living culture and injecting every day on alternate weeks, instead of only one day a week as formerly done, has now been tried in horses and found to be very successful, just as our previous experiments had shown it to be in small animals. This method is now being used, and by it horses can be made immune in six to eight weeks instead of in 4 to 6 months as was formerly the case. So far it has been impossible to produce any more active serum than was previously done, though efforts along this line are still being persisted in.

It has not yet been possible to employ the concentrated serum as prepared by the method of Gay and Chickering on any considerable number of cases. It has been tried in 9 cases of Type II with apparent good results (all the patients recovered), but the number of cases is still too small for any conclusions to be drawn. It is planned during the coming winter to continue its use, <sup>in</sup> combining it with optochin.

A number of other studies concerning pneumonia and pneumococcus infections have been carried on, which however at present have theoretical rather than practical interest. Such studies are those reported by Miss Stryker on Variations in the Pneumococcus induced by Growth in Immune Serum. The Latent Period on the Growth of Bacteria, by Dr Chesney, Antiblastic Immunity by Dr Doches, Studies by Dr Avery on the Growth of Pneumococci in Bile. Experimental and clinical studies on the agglutination curves of sera after the administration of immune serum are being made in the hope of obtaining better indications for proper dosage.

#### Diabetes:

Over seventy cases of diabetes have now been under treatment at the Hospital of the Rockefeller Institute. The methods of treatment that have been recom-

ended by Dr Allen have now also received wide employment elsewhere. The experience here and the general opinion of those who have had experience elsewhere is that a very definite and marked improvement has been made in the method of treating this disease. The Journal of "American Medicine" has this year presented to Dr Allen a gold medal which is given annually to "the physician who has made the most notable contribution to medical science".

During the past year Dr Allen has devoted a large part of his time to experimental studies on dogs. The patients have been under the immediate care of Dr Stillman and Dr Fitz. During the early part of the year Dr Stillman gave much time to the organization of the diet kitchen and clinical laboratory, and to so organizing and developing the method of treatment that it can be carried out in a routine manner. Dr Stillman was much aided in the work by Miss Cleland who has had charge of the diet kitchen. She has shown a very special adaptability to this kind of work and has made this department a model that is being very largely imitated throughout the country. The methods used in the dietetic treatment of diabetes have been demonstrated during the past year to a very large number of physicians who have come here for the purpose of learning.

Dr Fitz, in addition to the care and treatment of patients, has been engaged in studying the kidney functions in cases of diabetes and in an investigation of the question of oedema of salt metabolism in this disease. The results obtained are now ready for publication. Much time has been devoted by Drs. Allen, Stillman and Fitz to the preparation of a monograph dealing with the treatment of diabetes and giving the complete clinical experience obtained here. This monograph is nearing completion and it is hoped will be a most valuable and authoritative contribution to the subject.

Dr Palmer has carried on a series of studies concerning the concentration of sugar in the tissues of normal and diabetic animals. This study is now completed.

Dr Allen has also co-operated with Dr DuBois of the Russell Sage Foundation in a calorimetric study of metabolism in fasting and non-fasting diabetic patients.

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The results have shown an increased metabolism in diabetic persons as contrasted with non-diabetics, and also that the metabolism of diabetic persons is considerably decreased during the fasting treatment, thus establishing one of the hypotheses on which the treatment was based.

During the entire year Dr Allen has continued his study of diabetes in the partially depancreatized dogs and during the past half year has investigated especially the production of lipemia, acidosis and coma in dogs. He has succeeded in imitating absolutely all the features of the disease as it is seen in man. The nature of diabetic lipemia in man has been unknown. It has long been observed that the blood of some diabetic patients may be creamy in character and contain as high as 20 per cent fat. This condition is never found in human pathology outside of diabetes. There have been two theories, one that this fat is derived from the fat of the food, and the other that it is derived from broken-down cells, but neither of these theories has had much evidence to support it, and there has been no explanation as to why such an enormous excess of circulating fat should be heaped up. Dr Allen has shown that this conditions may regularly be reproduced in diabetic dogs. The necessary conditions are that the dog have good digestive power, a severe diabetes, and receive a fat rich diet. It has not been seen in Minowski's and Sandmeyer's forms of diabetes because such dogs have poor digestion for fat. Dr Allen's experiments show that the fat of the blood is derived from the food fat. "Disturbances in fat function" stand in direct relation to other diabetic phenomena. Dogs with acidosis do not necessarily have lipemia; this is like the rule with human patients; but all dogs with lipemia have acidosis.

Acidosis can regularly be produced in diabetic dogs by fat feeding. It also occurs when fat dogs, by properly conducted experiment, are rendered glycosuric. These dogs show low  $CO_2$  capacity of the blood and excess of ketone bodies in the urine. In proportion to weight dogs excrete less acetone bodies than man, but the concentration is similar. When the acidosis is increased markedly, coma supervenes.

with the same program of symptoms as seen in man, namely, malaise and prostration with decreasing  $\text{CO}_2$  in the blood, terminating in coma with very low  $\text{CO}_2$ . It is easy to keep the  $\text{CO}_2$  up to the normal height by means of bicarbonate and other alkalies but the benefit is very transitory. No dogs have been saved by the use of alkalies.

It has been possible to produce acidosis which clears up on fasting and acidosis which progresses and proves fatal on fasting, just as occur in human patients.

#### Heart Disease.

The studies concerning heart disease have been carried on by Dr Cohn with the assistance of Dr Jamieson until February, when Dr Jamieson left to join the Canadian Military Medical Force.

A large part of the work of this and preceding years has consisted in a clinical and experimental study of digitalis, the most important drug we possess in the treatment of heart disease. The plan has been to study each year the effect of this drug in a special type of selected cases. During the past year the patients studied were mainly those suffering from auricular fibrillation and oedema. The study of the action of digitalis in acute infections with fever (especially pneumonia) has been continued and extended. As a result of the clinical and experimental studies the use of this drug in pneumonia has been made much more rational and therefore effective.

From the careful study of the heart during pneumonia it was found that almost ten per cent of the cases showed auricular fibrillation or flutter at some time during the course of the disease. It is in these patients especially that the use of digitalis may be helpful. It is of great importance, however, that the digitalis effects be obtained at the proper time. To obtain digitalis effect time is necessary and moreover the amount of drug required in the individual case is more or less an individual matter. But the detection of changes in the electrocardiograph curves previously described it is now possible to know when digitalis effects are being obtained before the toxic (poisonous) effects appear.

From the careful study of 126 cases of pneumonia it has been possible to accurately demonstrate the beneficial effects of this drug.

Experimental studies concerning cardiac hypertrophy in dogs are being conducted. Hypertrophy is being produced by means of muscular exercise and by producing artificial lesions of the valves.

#### Nephritis.

Up to the time Dr McLean left for China he was engaged in a study of the mechanism of urea excretion and urea retention. Study of the numerical laws governing this function has been made in patients with nephritis and those with disturbed circulation due to heart failure. In over 1000 observations these laws were found to be valid. In certain cases it was possible to follow the changes in function occurring during recovery from acute nephritis and also during the period preceding uremia. A similar study of the chloride metabolism was carried on. In patients shortly before death from uremia a sudden fall in the concentration of the sodium chloride in the blood plasma was observed. This fall is associated with increase of H ion concentration of the blood and Hamburger has shown experimentally that such an increase of H ion concentration causes the sodium chloride to increase in the cells and to diminish in the plasma.

These observations led to experiments which were made by Dr McLean and Dr. Van Slyke to test the effect of the introduction of acids bases and salts and non-electrolytes into the circulation on the chloride content of the plasma. It is expected that these studies which were well under way will be completed by Dr McLean after his return to this country.

#### Chemical Laboratory

During the year there has been much activity in the chemical laboratory Dr Van Slyke and his assistants taking part in many of the studies previously mentioned, as well as carrying on independent investigations. Dr Van Slyke, with Mr Cullen

and Dr McLean has continued studies on the fate of protein digestion products. To carry out these studies it became necessary to improve the methods for the quantitative determinations of the proteins of the plasma. Marked improvements in these methods have been made by Mr Cullen. Miss Vinograd has continued the study of proteins of human and cow's milk. The results indicate that the albumins from the two sources are quite different, but that the caseins, so far as could be determined, are identical.

Acidosis. An important part of the work carried on in the chemical laboratory has had to do with the question of acidosis occurring in diabetes and other conditions. The method devised by Dr Van Slyke for determining CO<sub>2</sub> capacity of the blood has proved of great value and its simplicity makes it one of the most important, if not the most valuable of the clinical methods for determining the presence and degree of acidosis. Such a method is of very great importance as a control when fasting is being carried out in diabetic patients. From the study of diabetic patients by Dr Stillman with these methods it has been possible to group the cases into four classes.

1. Cases with little tendency to show acidosis either when fasting or on a diet.
2. Cases with a tendency to acute acidosis on fasting. These cases are few but their occurrence makes it extremely important that patients undergoing fasting be carefully tested from time to time. These cases may seem to be quite mild. Frequently on the second and third attempt to make the urine sugar-free by fasting no acidosis may occur.
3. Cases showing acute acidosis, curable by fasting. Many severe cases with marked acidosis may show this phenomenon. The occurrence of these cases is one of the reasons why fasting is so important in treatment.
4. Cases with chronic acidosis. These are the most difficult cases to treat in the effort to clear up this condition.



The studies on acidosis have led Dr Van Slyke to attempt to find a numerical factor for the acid excretion in the urine which would bear some relationship to the actual alkaline reserve of the blood. An empirical application of the Ambard formula indicates that such a relationship exists.

All these studies on acidosis have led to improvements in the older methods of blood and urine analysis and to the development of certain methods, such as that for the determination of B-oxybutyric acid in the urine.

Dr Palmer has made certain observations which indicate that during pneumonia considerable amounts of an unknown organic acid are found. He is making an effort to isolate and determine the nature of this substance.

Cancer:

In his last annual report, Dr Flexner described briefly the most interesting results obtained by Dr Murphy in his studies concerning the effect of X-ray treatment of cancer in mice.

These experimental results suggested strongly that resistance to cancer growth is very largely a matter of activity of the lymphatic tissues. The lymphatic tissues can be stimulated to increased activity by mild doses of X-rays and it is probable that the chief beneficial effects from this form of treatment can be obtained by such methods of application as will produce this stimulation. The effect of large therapeutic doses of X-rays in destroying cancer cells by direct application is slight. Therefore, since the X-ray treatment of cancer has been employed mainly with this end in view, using massive doses, it is probable that in many cases not only was no good, but actual harm accomplished. The effect of X-rays in stimulating the lymphatic tissues can readily be determined by estimation of the number of lymphocytes in the circulating blood. Thus we have a ready means for determining proper dosage.

These observations seemed so well established by the experimental studies that the Board of Scientific Directors felt justified in authorizing a clinical trial of the methods proposed. During the past year, therefore, a number of patients

patients suffering from cancer have been admitted to this Hospital for X ray treatment in the manner suggested. A portion of the expense involved in this study is being met by income from the Rutherford Fund.

The studies in patients so far carried out demonstrate that in certain cases at least, it is possible by proper application of X-rays to stimulate the body to increased activity of the lymphatic tissues. It is too soon to draw any conclusions as to the clinical results to be obtained from the form of therapy. The matter is so important, however, and of so much interest that I append the following brief report of Dr. Murphy on the clinical observations so far made.

"The cases so far studied can be roughly divided into three classes. The first, the one we started out with and still intend to make our major study, consists of post-operative breast cancer where the prognosis is bad, either because of infiltration of the large vessels of the axilla or of the chest wall. In other words these are cases in which the surgeon knows he left cancer tissue behind but where there are no large masses to be taken care of. We endeavor to have these individuals admitted as soon after operation as they can be moved. This group follows very closely our experiment on animals. It will require at least two years before we can say anything very definite about the results, if they result favorably. A negative result might be expected earlier. We have eight such cases, seven of which have been under observation for at least six months, two of them for over nine. The latter two cases were ones in which prompt recurrence was expected. They, however, are still in excellent condition and as yet show no sign of a return of the disease. The other cases of this group are also in very good condition and as yet show no recurrence of the disease, but it is much too early to make any positive statement whatever about them.

During the early part of the summer it seemed desirable to test out the limits of our treatment as it is used at present. To do this it was necessary to select cases with gross cancer present, so that the progress could be accurately followed. These cases have consisted of two types, those of small palpable metastasis and those of massive recurrence and metastasis. Of the former type, we have had five cases. With one exception the sizes of the nodules have remained practically stationary, two showing some definite retrogression, and only one has progressed unfavorably.

The third group consists of advanced recurrence. We have had six cases. Two of these, we have been unable to influence in any way - both are women with massive growths in the neck and both were far advanced when we first saw them. They have steadily gone down hill and are at present in a critical condition. Another advanced case of sarcoma of the hip with metastasis in the lung has undoubtedly been temporarily helped. One case of this group

with extensive local recurrence in the chest wall and a large mass in the neck has markedly improved. Fifteen nodules, varying in size from a pea to an almond, have all disappeared. The induration in the neck has also cleared considerably, until there is only one small nodule left, about the size of a walnut. This is far from a cure, as yet, but offers definite encouragement. A fifth case is one of massive recurrence after removal of a prostatic cancer, which was beginning to interfere with urination. This tumor mass has softened and retrogressed considerably and all of the subjective symptoms have disappeared. The sixth case is as yet too recent to report on."

RUFUS COLE