An Address

ON

THE RELATION OF MEDICAL MEN TO
OFFICIAL AND PUBLIC BODIES.*Delivered before the North Cumberland Division of the Border
Counties Branch, May 26th, 1905.*BY RODERICK MACLAREN, M.D.,
Consulting Surgeon, Cumberland Infirmary.

LAST year we discussed the relations of medical men to each other; this year I purpose introducing by the following remarks a similar discussion on their relation to the community at large as represented by various bodies, such as the sanitary authorities, courts, army, etc.

Any one who enters the medical profession takes on himself certain unwritten responsibilities, which he is bound to recognize, and to which he must conform. His education and special knowledge place on him the burden of making the saving of life, the relief of suffering, or the restoration of health, the primary objects of his life apart from considerations of personal ease or pecuniary profit. Though it is not impossible to harmonize individual prosperity with duty, it must ever be remembered that it is an altogether peculiar and stringent obligation which we have assumed in making the practice of medicine and surgery our life's work. At the same time, be it said that this relation to the community does not entitle it, either collectively or individually, to deprive us of our just rights or to call on us to perform duties without due remuneration when the means for such exists. We give the public the right to expect sundry acts from us, for we alone have the knowledge and skill requisite for the work, but on no account can we admit that this exonerates it from performing its equitable and bounden duty to us. If we refuse to do our utmost to give the sick and suffering the full benefit of all we know, we do wrong, and are deservedly liable to the censure of public opinion; but having done our best those who would seek to deprive us of the due acknowledgement of the time spent in the service, of the labour expended in acquiring knowledge and experience and of the cost of an education of a special and technical kind, are equally blameworthy. My first effort will be to endeavour to elucidate and disentangle the various complications of our relations with official bodies.

MEDICAL OFFICERS OF HEALTH.

Perhaps the most frequent contact of medical men with official life is in the department of public health, either as medical officers of health, or as having to report to them. Can we say that the existing state of matters is quite satisfactory? Thanks to the common sense and judicious action of medical officers, friction is not of frequent occurrence, but many men feel that the general practitioner as a principal medical officer of health is an anomaly, that he might have a most useful rôle to fill as a deputy or local health officer, but that he cannot be the sole adviser of his board without occasional or even frequent conflict between duty and interest. A complete fulfilment of the work of his office may readily bring him into disagreement with private patients and friends. It is asking a great deal from human nature to expect it always to prefer the public weal to private interest. The weak man may fail to face a disagreeable task; the strong man is tempted to overstrain his authority lest he be suspected of favouritism. In either case a biased state of mind ensues, detrimental to the best interests of the community. It is also alleged that medical men hesitate to give information readily and freely to one who is their competitor in the struggle for existence; information which would be readily imparted to an absolutely independent medical officer of health. I have certainly often observed the readiness with which practitioners co-operate with the medical officer who is debarred from practice. In the presence of infectious disease or of insanitary conditions their first thought is to get him in and the second to help him to the utmost of their ability, whereas with a practising medical officer there is apt to be a reluctance and reticence born of suspicion. It might, therefore, be well that we should to the best of our ability promote the formation of sanitary districts of such importance and size as to employ medical officers of health who are independent of practice.

The usual terms of appointment at present are from year to year; there is no necessary fixity of tenure. At the expiry of the period of appointment a board need not renew it or give a reason for declining to do so, thus placing the medical officer of health at the mercy of a body many of whose members may be personally interested in having his work inefficiently performed. This is a highly unsatisfactory condition, which a Bill promoted by the Association is directed to remedy.

But taking matters as they at present exist, two things seem to call for some consideration. The relation of the practitioner to notification and the attitude of the health officer to the patient and practitioner.

In regard to notification, we should in the public interest stretch to the utmost our confidential relation to our clients. It is worth while for the community to allow us freely to inform the guardians of their health that foci of disease exist which can on the one hand become centres of wide-spread devastation, or, on the other hand, be limited to a small area by suitable precautions. To those of us who were brought up with a strong and stern sense of the confidential nature of our work, the obligation to place our private information at the disposal of a public authority went somewhat against the grain. But there is no doubt that the public at large by the very act of agreeing to notification has absolved us from our vow of reticence. I say, therefore, let us loyally support the efforts of our health officials to limit disease, not only by observing the legal obligation to report every case, but by using our influence to extend notification to every disease for which a good case can be made out, and by doing all we can to get our patients to aid the authorities in their efforts to limit the spread of infection.

On the other hand, the practitioner has the right to expect that the publication of the existence of infectious disease is limited to what is required for the public good. No wanton injury, to feelings or to business should be inflicted by stating publicly such details as enable individual cases to be identified. At least, until the law gives powers of compulsory isolation and compensation. Medical men should not be made the agents for inflicting injury on their patients by loss of occupation or by such other disabilities as the presence of infectious disease often entails.

It is a question often asked, Should a medical officer of health personally visit individuals reported to be suffering from infectious disease? Not as a rule, and never without giving the ordinary medical attendant the opportunity of meeting him. It may, under some circumstances, become the duty of the medical officer of health to personally verify a diagnosis; for it is notorious that the difficulties are often very great, and that certainty is not always easy to attain; on the other hand, there is no doubt that practitioners have existed who possessed such facility in the diagnosis of infectious disease as to suggest the advisability of checking their conclusions. So we must not seek to deprive a careful official of the means of getting his data from direct observation. He, on his side, should scrupulously avoid anything which may shake the faith of the patient in his attendant. An injury may be caused not only by a direct statement of doubt but equally by a careless word or action, so that all that is done should be cautious and deliberate. The practitioner should never decline such a meeting, alike in the interest of his patient and of good fellowship. It should be conducted with the formality and courtesy of an ordinary consultation.

MEDICAL EVIDENCE.

The ethics of giving evidence before the courts is a wide subject on which much might be written but with doubtful profit. While it may be of immense importance, occasionally and to individuals, that medical evidence is properly given, yet in the life of the community it is to be recognized that its occurrence is infrequent, and only rarely is it of vital importance. The great mass of medical men never require to appear in the witness-box in any serious case. The conditions of evidence-giving have improved of late years, and the attempt by the Bar to take advantage of nervousness or inexperience is now infrequent. A medical witness should recognize that he has generally this great superiority over counsel—that he is familiar with his subject as one of daily thought, while the barrister usually only knows it as he gets it up for the case at issue. I may give you an instance of this which happened long ago. In a rather rudely vigorous cross-examination the question was put, "Did not the pectoral muscle sustain a very serious injury?" The answer was, "Will you please tell me whether it is the major or the minor pectoral muscle you are asking about?" Counsel had come to the end

of his knowledge, and was afraid of showing ignorance and of venturing into the unknown. He turned off the subject with a "Well, perhaps it does not matter," and sat down.

The medical man who desires to make a good appearance should write out what he intends to say. He should also carefully read up everything he can which has any bearing on his case. If he does these two things and is scrupulously fair he has nothing to fear. It is not likely that any effort will be made, to depreciate his knowledge, skill or impartiality, and if made, the endeavour means disaster to the makers.

The position and duty of a medical man is very different in criminal and civil cases. It is incumbent on every man to come forward and tell his story regardless of inconvenience or loss if he knows anything which will convict the guilty or exonerate the innocent. But this may not be so in a civil case. The position a possible witness takes up is much more a matter between him and his conscience. He may feel that his evidence is essential to prevent injustice, and consequently that he is bound to appear; or, on the other hand, it may seem to him that what he has to say, however convenient, is not essential, and he may act accordingly and only appear on his own terms.

In criminal cases the law requires a witness to attend when summoned, and prescribes the fees he shall be paid. In a civil case also a man may be required to attend on subpoena whether he wishes or not, and he cannot recover more than the taxing-master allows; but if he is unwilling he need not say a word as to what evidence he will give till he is in the witness box, and rarely will counsel risk the unknown evidence of an unwilling witness. The medical man should make up his mind what remuneration he is entitled to; how much will compensate him for loss of time, for dislocation of work and, if he is an expert, for his special knowledge, and he should have an undertaking in writing from the solicitor that these fees will be paid. This he should do before he says a word as to what testimony he can give. It seems a usual practice, even with the best class of solicitors, to avoid this if they can, but the medical man is liable to fare badly unless he gets a binding agreement. In fixing his fees the medical witness should take as his basis the time he will be required to spend and the loss he is likely to incur by giving up other remunerative work. He should not be influenced by the importance of what he has to say; to do so would be equivalent to selling his evidence.

Most medical men come in contact with the coroner some time in their lives. They may become an important factor in the administration of justice owing to the possession of special knowledge and having special opportunities of observation. Doctors are called to testify not merely to what any one with attentive ears and observant eyes may hear and see, but in addition they are expected to give the court the guidance of the professional knowledge which they have acquired and of deductions which scientific training alone enables them to make. My experience of coroners leads me to believe that they are almost invariably considerate and courteous, and that they do their best to spare witnesses inconvenience and waste of time. I have, however, encountered a feeling on the part of medical men that some have shown an unwillingness to hold inquests as often as the public interest demanded. Medical practitioners have no special right to criticize coroners, no right beyond that of any other member of the community. If a coroner does not properly fulfil his duty he is amenable to public opinion, to criticism, and if occasion sanctions it of being reported to the Lord Chancellor. In the matter of holding inquests he (the coroner) is the proper person to decide. Not only so, but he should judge what evidence is necessary. The object of his inquiry is to elucidate the cause of death. If that can be done without medical testimony the object of the inquiry is gained and we have no *locus standi* for asserting that medical evidence should be called, unless some statement is made which unjustly bears on any one of us. It is natural and indeed it is expected of the coroner that he does not waste public money in the carrying out of his work, and we must not quarrel with him if he takes means to put this expectation into practice. No doubt a doctor may think it a hardship that he is not summoned when perhaps the court fee is the only remuneration which will ever come to him for attending to some emergency, say a fatal accident or suicide. But two different things must not be confused and it must be steadily kept in mind that the coroner's court is for the purpose of ascertaining the cause of death by the simplest method available.

In reporting cases to the coroner, or in answering questions put by the coroner's officer, a prudent reticence is advisable.

It is well to state facts freely, but to be very chary about expressing opinions or drawing deductions, and specially to avoid being led into making statements beyond absolute knowledge. Men are sometimes induced to state a probable cause in cases of sudden death without verifying it by a *post-mortem* examination. Though the coroner's court does not exist for the purpose of furthering pathological investigation, the determination of the cause of death being for legal, not for medical purposes, and though we freely admit that medical evidence may be quite unnecessary when the cause of death is obvious and undoubted; yet a great many cases are made the subject of coroners' inquiry in which the circumstances are quite consistent with "natural causes," and equally with something else. The cause, then, should not be inferred or deduced. It should be ascertained accurately, and with all the aids which science can give, a complete investigation of all the vital organs being the first stage. I do not think it can be too strongly stated that slipshod evidence and conclusions drawn from incomplete data are most dangerous and prejudicial to the public interest. In all cases of this kind it should be courteously represented to a coroner that we cannot know what is the condition of the vital organs without a proper examination of them. The issues involved may be of a serious kind, and accuracy above all things should be a characteristic of all we say and do. It is not uncommon to have it put to a medical man, Is some inferred cause of death possible? Are the symptoms or appearances consistent with death from natural causes—say, heart disease or apoplexy? I would urge on you very great caution in answering: inferences may be wrong; crime or culpable negligence may be overlooked, which a proper examination would have made apparent. Offhand answers to such inquiries may be made to carry a weight and authority to which they are not in the least entitled. A jury is very apt to suppose that the statement has been made that death was due to disease, whereas all the medical witness has said was that it might have been; there was no medical proof to the contrary.

WORKMEN'S COMPENSATION ACT.

The Workmen's Compensation Act, 1897, has placed a certain number of medical men in a new relation to the administration of justice. This Act put a number of selected medical referees at the disposal of adjudicators. The clause is: "The Secretary of State may appoint legally-qualified medical practitioners for the purpose of this Act, and any committee, arbitrator, or judge may, subject to regulations made by the Secretary of State and the Treasury, appoint any such practitioner to report on any matter which seems material to any question arising in the arbitration; and the expense of any such medical practitioner shall, subject to Treasury regulations, be paid out of money to be provided by Parliament." It was thought that a great number of highly technical questions would arise in the administration of the Act, and that the assistance of men of special knowledge would be a great help when testimony was conflicting. The Secretaries of State have put in force the powers granted to them, and appointed to every part of the country one or more medical referees. The course usually followed is to submit notes of the evidence in the case to be reported on to one of these, to require him to personally examine the claimant, and then answer certain questions which have been formulated for his decision. These answers form the basis on which the medical questions of the case are settled. The position is one of great responsibility. It necessitates the cultivation of the judicial frame of mind in an eminent degree, for not only is the report outside criticism, but it is practically final. The litigated cases under this Act in which medical questions have arisen have turned out to be fewer than was anticipated, but the principle of special skilled help towards a judicial decision has worked well, and may yet be usefully extended to other cases into which intricate or conflicting medical testimony enters. A similar method has long been in force in nautical cases where a skilled assessor assists the man of law. Judges of the High Court have the power to obtain skilled advice if they see fit, but it seems to be a privilege rarely exercised. If properly safeguarded against prejudice, it might have a most useful place in a judicial system. Who is so likely to detect and expose specious fallacies, unjustifiable deductions, or actual misstatements in matters medical as a perfectly independent medical assessor, skilled in his work and with no interest to study save the doing of justice?

It is sometimes treated as a reproach to medical men that they give conflicting evidence, and the misdirected proverb,

"When doctors differ who shall decide?" is levelled against them. If they are honest and are thinking men they must differ sometimes. Neither powers of observation nor capacity for deduction being granted in equal measure to all men, it is consequently absolutely unreasonable to expect uniformity of view either in regard to what has been seen or in the interpretation of it. Efforts have been made to bring about the utopian condition of having medical evidence presented as a unanimous whole. They are about as likely to succeed as the abolition of war and the universal and perpetual reign of peace. I have been present at a conference with such an object, and what remained prominently in my mind was the absolute futility of it; nobody changed his opinions, and finally it was agreed that each one should present the view which seemed to him right. The result showed that this was the best course which could have been followed. A unanimous arrangement would have lacked independence, weight, and responsibility. It is not likely that evidence which was the result of an agreement among witnesses would find much favour or perhaps mercy with Bench or Bar. Indeed, the tendency would be to discredit medical evidence generally.

The question of confidential communications being privileged calls for a little consideration. It does not seem probable that any good would result from an alteration of present practice. The British Courts do not allow in the witness-box any privilege of secrecy, and if those who administer justice think that this is best for the public good we must acquiesce. It is to be remembered that very seldom is a witness pressed to reveal what he thinks it his duty to conceal; and also that if a witness has been reasonably reticent it is seldom that such knowledge exists as to enable counsel to press for any violation of professional secrecy. He must have some indication of the existence of compromising facts communicated in confidence before he can press for their revelation. Only a strong sense of duty calls for a voluntary revelation of professional secrets. Duties are of unequal stringency, and the greater may overpower the less—for instance, no one should allow an innocent man to be convicted because an obligation to secrecy stands in the way of revealing facts or statements which would exonerate him. But except from some such dominant motive, nothing justifies the revelation of what is told to us in confidence.

POOR-LAW MEDICAL SERVICE.

In the work of Poor-law medical officers there are a few small ethical questions. We must hold that the sick poor are entitled, as human beings who have reached the depths of misfortune, to our best care and anything that we can do for them to promote recovery or soothe departure; but they are not entitled to all the refinements and luxuries of those whose life's course has run in more pleasant lines. For instance, in regard to consultations, if the attendant feels that such is desirable he should by all means have it. It can always be attained in some way. No consultant would refuse a reasonable request even if no fee be forthcoming. But the recipient of Poor-law relief is not entitled to ask for a consultation, even if friends offer to provide the fee; for it means trouble and expenditure of time for the attendant medical officer. He may, out of good will, consent, but there is no duty in the matter. On the other hand, the pauper is not the bound slave of the medical officer. He may refuse operation, he may decline treatment, or carry out some favourite one of his own if he pleases. He is only exercising the rights of "a free-born Englishman." The medical officer should see him all the same for official purposes, and professionally attend him if he changes his mind.

The relations of medical officers and guardians have of recent years undergone a satisfactory change, dating from the time when half the medical salaries became chargeable to the Imperial funds. This gave the Local Government Board a controlling influence on these appointments, for removal from office was subject to an appeal to it. The result has been that differences between Boards and their medical officers have become rare, and the service can be described as a contented and efficient one.

ARMY MEDICAL SERVICE.

Those who enter the Army Medical Service have to undertake twofold duties: They are the advisers of the military authorities on health matters in general, they are also executive officers in directing and carrying out sanitation and in the care of the sick. It would be an ideal state of matters if every commanding officer had such a knowledge of health matters as to fully understand the bearings of a professional

report. There is no more necessity for him to be a skilled sanitarian than a first-class artilleryman; but if he is to be a successful soldier he should know the effects of artillery fire and understand what a specialist in guns tells him. So if he is to keep his men in fit condition he should understand how their surroundings may be expected to affect their health, and he must be trained to make the best use of expert advice. The army medical officer, in his official relation, must not claim ultimate authority; his function is to advise and instruct. It would not be to the public advantage that his position should go beyond this. However important his duties may be, they are undoubtedly secondary to those of the combatant. Both the peace and war duties of this department are of exceedingly great value to the efficiency of the force, but they occupy a less important place in the working of this great organization than strategy, tactics, discipline, drill, and feeding. The medical officer must consequently not expect to be appraised equally with the controllers of these. Importance and consideration bear a direct relation to the necessity and responsibility of the work performed. Sometimes the prevention of disease in the army and the care of the wounded are written about as if they were the objects for which the whole military service existed. More frequently, I am free to say, by those not in the army than by those who are. No such line of statement will bear examination. It may be the duty of a good general to undertake operations which involve the sacrifice of a portion of his force to disease if the object he has in view cannot be otherwise accomplished, just as he necessarily loses men in taking a position from the enemy. If a strictly medical view of such circumstances were held to be paramount, the men would be spared but the object would not be attained. The army career offers any man who is content to order his life within these limits a field of wide usefulness and a pleasant life. The department seems now content with its conditions, though there have been times (not very long ago) when dissatisfaction was universal, and when men did not offer themselves in sufficient numbers to fill the requirements of the service. It is not, however, a field for the ambitious man, still less for the man whose sense of personal independence is strong. The attainable position is narrow for a capable ambitious man and any one whose energies tend to carry him out of a stereotyped groove is apt to be much in conflict. The whole life tends to make a medical man jealous in maintaining his rights and facile in seeing infringements of them. I have known some whose knowledge of the regulations was great and that of their anatomy small. Much of their work seemed to consist in seeing that nobody encroached on their rights.

The army medical officer should expect to be governor of the hospital and all in it, in all matters of discipline and control; but in the relation of the hospital to the force in general he must be under the combatant. For instance, the placing of hospitals must be considered by a commanding officer, for sometimes the plans of medical arrangements may tell a tale which he is studiously anxious to conceal. A projected attack has been disclosed by the preparations for attending to the wounded, and a retreat by sending the sick and wounded in a certain direction. To this state of matters and to all that follows from it the medical officer should conform his mind and actions. He will have the satisfaction of knowing that he performs duties of the greatest value to his country, and which his country appreciates.

I do not propose to say anything about the naval medical service, for the reason that I have no personal knowledge of its aspirations, needs, or disabilities. And anything I could say from second-hand knowledge would be of little value.

HOSPITAL PHYSICIANS AND SURGEONS.

A large section of the medical profession have undertaken duties of a public nature in the gratuitous treatment of the sick poor in infirmaries, dispensaries, and other such charities. The ethical obligations of such appointments are definite and binding. It is well known that hospital appointments are looked on as the prizes of the profession. The experience, the command of conditions, the good nursing, food and surroundings give opportunities for doing work in a way in which it can rarely be done elsewhere. Everything favours exactitude, a wide survey of disease and treatment of the highest class. The holders of such appointments, in return for these advantages, voluntarily undertake a great trust, and are in honour bound to give to the sick poor the best of their skill and intellect. They are prohibited from seeking for any direct reward. But if they use their opportunities well, and become more valuable to the com-

munity, then comes the return in increased knowledge and reputation. The good a man receives from a hospital appointment depends on himself; it must be looked on as a special opportunity, and the result is in proportion to the holder's ability to use it. But the point I wish to emphasize is this—that, so far as the hospital is concerned, it must not be used as a direct means of gaining practice or fees. To do so under existing conditions would be against the true principles of charity and of fairness to other men. The hospital physician or surgeon must assume that every one whom he sees there is a fit object for gratuitous help, and he must accept all that follows from this. In the large hospitals there is no temptation to transgress, but with small hospitals and in small towns there is often the opportunity of directly increasing private practice among those who use the hospital. The attitude of the holders of honorary appointments to this should be clear and definite. They must have nothing to do with hospital cases as their private patients afterwards. This does not apply, of course, to such as they may have attended before going to hospital, for the fact of being a hospital patient in no way alters a previous relation.

The hospital physician or surgeon does public work for the community at large. He uses buildings, food, medicine, appliances, and resident staff provided by the public. His work, therefore, should be in the public eye. Owing to the conditions of medical work, he should treat his professional brethren as that eye. His practice should be fully open to them, every qualified practitioner should be a welcome visitor with him in his wards and a spectator at his operations, so far as this can be consistently with the safety of his patients. If they come to his hospital for instruction he should do his best to afford it. And he should betimes let others share in the results of his experience.

If a practitioner sends in a case for operation, his recommendation should be taken as proof of the fitness of the patient for hospital treatment. Notice should also be sent to him of the date and time of operation so as to let him attend if he wishes. Such, I take it, is the present position and responsibility of the hospital physician and surgeon. I am inclined to think, however, that a time is approaching when there may be a demand for a readjustment of the relations of the hospital surgeon to the public. Possibly the physician may calmly await, in his position of dignity and honour, a euthanasia due to his gradual supersession by the ever-invading surgeon. But with the latter it is different. Year by year larger demands are made on him. Take our own hospital: Twenty-five years ago the operations numbered 140; last year they amounted to 476. The great advances in surgery in that period have brought within possibilities of remedy by operation whole classes of disease which were formerly considered to be outside the field of surgery. And the end is not yet. Many ailments thought at present to be purely medical will at no distant date be remediable by the surgeon. It seemed at one time that increased safety in operating due to improved technique might result in surgery becoming less specialized, but on the contrary the tendency has been in the opposite direction. To do modern surgery well a man must have an intimate knowledge of the position, consistence, and appearance of all internal organs in health and disease. His knowledge must be such as to avail him for immediate decision. He must be so drilled that he carries out an elaborate technique as a matter of routine and yet with intelligence. Consequently the present tendency seems to be more and more to leave this work in the hands of those who devote themselves to it. Not only so, but to have it done in places (hospitals and homes) organized for the purpose, and less and less in private houses. I have had a rough estimate made of what the hospital surgeon gives annually to the public. I have had the operation tables of five provincial hospitals analysed. They were taken at random, but they represent North, South, East, West, and Midland districts. A value was assigned to each operation—what I take to be the irreducible minimum. This calculation makes each surgeon of these hospitals give to the public operation work of an average value of £630 annually, and each assistant surgeon £270. This is in addition to and independent of what he gives in ward work and in the out-patient departments. In return a hospital surgeon receives a position in which much of the surgery of his district may come to him; he has the opportunity of making a large and valuable experience and he has work of the most intense human interest. But the questions may arise, Is not the price too heavy? Is he not bearing, and in the future likely to

bear in an increased degree, what should be one of the burdens of the community at large? The whole subject is an involved one, and mixed up with the other question: What shall be the future of our charitable hospitals? I do not propose to offer you any suggestions or schemes for changes. The time has not yet come to do more than discuss the subject in its various bearings and relations to broad principles. But I venture to commend it to your earnest consideration.

OBSERVATIONS ON THE OPSONIC POWER OF PEOPLE SUFFERING FROM TUBERCULOSIS.

By R. H. URWICK, M.D.,

Shrewsbury.

(From the Pathological Laboratory, St. Mary's Hospital.)

In order to kill bacteria within an organism it is necessary to employ some substance which enters into destructive combination with the bacteria. There are two possible methods only; the one which has been chiefly used is that of introducing antiseptics into the organism; the other method is to rely upon the action of protective substances produced by the organism, and to attempt to increase the production of such substances by the injection of bacterial vaccines. The former method has been tried without success in the case of tuberculosis; the latter method remains to be tried.

Protective substances are substances which enter into destructive chemical combination with bacteria, and are found in all human blood. As we are considering tuberculosis, we are only concerned with those which enter into combination with the tubercle bacilli, and these, according to Ehrlich's nomenclature, are called tuberculotropic substances. Of such tuberculotropic substances we know two—(1) agglutinins, (2) opsonins.

(1) Agglutinins are substances which enter into chemical combination with tubercle bacilli in such a way as to immobilize and conglomerate them.

(2) Opsonins (*Opsono*, I cater for, I prepare victuals for) are substances which modify tubercle bacilli in a manner which renders them an easy prey for the phagocytes.

The term "opsonin" was first used by Dr. Wright, and the following observations have been made by him and Captain Douglas:

(1) Opsonins are contained in the blood fluids—serum or plasma.

(2) They lose their power when heated to 60 to 65° C. for 10 to 15 minutes.

(3) They exercise their influence by effecting a modification in the bacilli, and not by exerting a direct stimulating effect upon the phagocytes.

The method employed in estimating the opsonins or opsonic power in the blood is that described by Dr. Wright, of which I will give a brief outline.

Equal quantities of the patient's serum, an emulsion of tubercle bacilli, and blood corpuscles (washed in a solution of $\frac{1}{2}$ per cent. sodium citrate in normal salt), are taken in a capillary pipette and incubated together for 20 minutes, after which films are made of the mixture and stained in the ordinary way for tubercle bacilli; the average number of tubercle bacilli ingested by each polynuclear white corpuscle is calculated, and the figure thus obtained is called the phagocytic index.

It has been found that the source of the corpuscles used makes no difference to the result; they can be taken from the patient or from some healthy person, as is shown by the following results, which have been proved several times:

Serum of a healthy person + an emulsion of tubercle bacilli + the

corpuscles of a healthy person give a phagocytic index = x.

Serum of a healthy person + an emulsion of tubercle bacilli + the

corpuscles of a diseased person give a phagocytic index = x.

Serum of a diseased person + an emulsion of tubercle bacilli + the

corpuscles of a healthy person give a phagocytic index = y.

Serum of a diseased person + an emulsion of tubercle bacilli + the

corpuscles of a diseased person give a phagocytic index = y.

So we see that a very inferior position is assigned to the polynuclear white cells in the work of phagocytosis; in fact, their use may be compared to the use of culture media in bactericidal experiments to estimate the number of bacteria which have been destroyed.

Having obtained this phagocytic index, we need some standard for comparison, and at present the phagocytic index of a healthy person is taken and comparison made to that as