clear that the great advances in the future of pathology must be looked for not so much in this direction as in research on the causes and processes of disease; and we may hope that through them will be founded more rational and scientific treatment, and a gradual change in the empirical methods which have so long ruled. Solidism and Homeopathy have ceased to attract, and we are now between the two, in the borderland between incontestable, chemical and pathological changes. Hitherto we have regarded pathology as advanced physiology, and morbid process as a modification of the processes of healthy nutrition, into the wide field of the causes of the morbidi process and taint, some of them at least, seem to lie outside physiology—that is to say, outside the range of the natural phenomena and the modifications of them that we are now largely concerned. Thus, a new field has been added to pathological investigation—a field of profound importance, and of the extent of which we can form no guess. Further, the property of certain diseases to give immunity against themselves, referred to by our late President in his interesting and to the Pathological Section of the British Medical Association at Bournemouth, is relative with interest, and seems to have a wide range of influence. It is the illustration, in one way, in which this conception has appeared remarkable that vaccination, in a way, may be seen as the use of this kind of illustration should since long have stood alone, though certainly it is more remarkable than that its protection against small-pox should have been doubled by reasonable and observant persons, or that it should be supposed that so great a good should be concealed, or, as has been said, concealed. It is to a similar immunity, conferring mutual influence, however wrought, that we must attribute not only the non-reoccurrence of certain maladies in the same person, but also the spontaneous subsidence of many diseases in the person or part affected by them. Even a common cold commencing in the nostrils does not always there, but seeks its quarter to the throat, thence to the bronchi, and passes away, and leaves usually a temporary immunity from the like seizure. A spot of ringworm or of puerperal sepsis, where it has begun and spread, to pastures new, like the fairy rings upon the grass. Is it in these and the like cases micro-organisms generate products which are poisonous to themselves or is it that they exhaust the pubaum on which they thrive, and thereby quell the system or the locality? Is it in some such immunity-giving property that the secret of the insufficiency of irritants lies? Some effect of this kind, caused by the absorption of the altered proteids in a blister, is hinted at by Dr. Landor Brunton in his masterly address at Bournemouth; and, forasmuch as observation respecting the effects of remedies is not a little dominated by theoretical view, will not the use of counter-irritants, which has notably diminished in my time, receive new impulses if it is supported by fresh ideas as to their modus operandi based upon researches into the nature and spread of disease? At the recent meeting of the British Association at Cardiff, the President, in his highly scientific and remarkable address, speaks of the improvements made in the spectroscopy and the achievements of spectroscopic astronomy as worthy to be regarded as the scientific epic of the present century. May we not put in a strong claim for the achievements in bacteriological research, with the discovery of the various micro-organisms and their phenomena as the sources of many diseases, together with that of the defensive proteids which seem capable of being derived from them, as being not only the corner-stone of modern physiology of spectroscope, but as being of far greater importance, insomuch as they have direct relation to the future welfare of mankind. We do not claim for pathology the highest place on the hill of physical science, but it is in such a way as to take cognizance of all those subtle agencies, magnetic, chemical, electrical, and others, with which influence for evil or for good the delicate workings of the most complex of existences, as well as the effects of those influences and the changes which result from them? Perhaps in no other branch of science has greater advance been made than in this during the last twenty years. Never before has so promising a light been cast upon medical science; and this Society is to be congratulated on the intention to endeavour to walk in it and turn it to account.

In order to increase the brilliancy and make the most of this light, and throw its bright beams into practical directions, it is necessary that this Society should especially encourage and draw into it the younger members of the profession, by whom the work of pathology, especially in the wider sphere upon which we are now entering, must be chiefly carried on, more particularly in this country, where science is left so much to take care of itself, or, which is far worse, is sometimes impeded by misguided opinion and ill-founded sentimentalism, where income has greater demands upon it than elsewhere, and where the res angustia (for this especially affects the medical profession, into which not many men of wealth enter) compels most of its votaries, after the earlier years of life have passed, to follow the more lucrative and in some other respects more attractive path of ordinary practical work. It is in early life that the impulses in new directions are strongest and the mind is most accessible to new impressions, and the nerve-cell rooms of the brain most easily weave new thoughts. Many of the younger members of the profession are now occupied in investigations bearing upon this great subject; and this Society will welcome the results of their researches, which may here be laid upon the anvil of discussion and, while yet plastic, be hammerd, if need be, into better form. This society, in the present day, when the need of speedy publication is the fitting stimulus for that longer period of refining time and thought which was possible to our forefathers; and often does one see reason. The papers which have not been subjected to it before being submitted to the wider bar of public opinion. It is upon the other offices of the Society that I must in great measure rely for the assistance which I know will be kindly given; but I will do my best to attend the meetings, and fulfill the responsible and honourable duty which you have imposed upon me.

RECENT EXPERIENCES IN
The Treatment of Tuberculosis (With Special Reference to Pulmonary Consumption) by Koch's Method.

By PROFESSOR P. EHRlich, M.D., Berlin.

A Paper read before the International Congress of Hygiene and Demography, held in London. Abstracted by THOMAS WHITESIDE HIME, B.A., M.D., Bradford.

[That the question of the merits of tuberculin was introduced at the Congress of Hygiene and Demography held in London last August must be regarded as an error of judgment, for therapeutic attempts were properly excluded from the programme of such a congress, but that, having been introduced, it should be treated as it was, must be pronounced a gross blunder. This will not appear too severe a censure when it is explained that just twenty minutes were assigned to the consideration of this most important and interesting subject—one gentleman being allowed ten minutes to speak in the affirmative, and another ten minutes to speak against it! Professor Ehrlich could not attempt to read the whole of the important paper he had prepared in ten minutes, and as he spoke in German a good many of his hearers probably did not understand the abstract summarised of it which he gave. As he had been working with Koch and must know his latest opinions and experience with tuberculosis, I thought it very undesirable that his paper should not see the light until the publication of the Proceedings of the Congress (perhaps months hence), and then only in a foreign language. The readers of THE LANCASTER have here a full abstract of the paper, which cannot fail to interest them and revive attention in those who have been led to neglect this necessary discovery of Koch. The necessity for the
administration of small doses of tuberculin, and for its long-continued use, are points on which I expressed a strong opinion in the Lancet at the beginning of this year, and Langhans's and Koch's favorable results with that method quite correspond with my own. — T. W. HEMI.

Up to the present time therapeutics, the most important branch in clinical medicine, has grown from the purely empirical. Observation of the beneficial effect of certain substances on animals or men has been the origin of their employment for therapeutic purposes. This may be illustrated by old history of quinine, opium, and mercury. It is only in more recent times that a change has taken place, and since the health of the nation has become a national duty, this field of research has been greatly influenced by the more accurate investigation of the natural antitroph properties of the alkaloids. By this it has been established that the greater number of these substances, though endowed with such different properties, one molecule is common—the same, that of pyridine—and that various collateral groups, to which I refer to in detail, which affect the same organ in a different manner and by which a given disease may be cured by a series of minute doses of the right compound. This is the true end of scientific therapeutics to attack the cause of the disease directly and destroy it. Although the possibility of this in some cases has been proved, it is the fact in cases of recurrent fever and syphilis, still we possess no specific against the majority of infectious diseases. It was not pharmacological which occupied the physician's mind, not the desired goal, but the general discoveries of Pasteur and Koch as to living causes of disease, which cannot be discussed in the present paper. After Koch's great development of tuberculosis science, he devoted his whole energies to the discovery of the means of resisting it. He found little success with the great number of organic and inorganic agents. It was the study of the biology of bacilli and the analysis of the natural processes which led Koch to find the specific products of the vital activity of the bacilli, the only means of neutralizing successfully with tuberculosis. The spirit of research which led Koch to find in the specific products of the vital activity of the bacilli the only means of neutralizing successfully with tuberculosis had established the first step in the ideal of a rational mode of treating disease in accordance with strictly systematic scientific principles, and we have an excellent example of such a method in the standard in the further development of the art and science of medicine.

The unceasing enthusiasm and the now less unwarranted depression which followed on the announcement of the discovery of tuberculin are in the memory of all. The depression was taken by so many as the final abandonment of anatomopathological observations. The fact is that the work of Virchow and of his followers was not yet fully understood. Virchow's demonstration, which referred mostly to very advanced cases, in no way invalidated the principles of the method of Koch, but at the most could only be directed against its technique and against the employment of in very advanced cases. Undeterred by those fluctuations of feeling which are so common in the history of every great advance in science, a large number of medical men have persevered in their endeavours to utilize the benefits derived from tuberculin, while getting rid of its disadvantages. Koch has established the fact that the essential point in the use of tuberculin is its local effect on all tuberculous tissues. Of the various hypotheses suggested for the explanation of this remarkable phenomenon, the one proposed by Koch himself is still the most probable. It suggests that at every place where there is active tubercle bacilli there exists a certain amount of toxin, and consequently increased action following on the injection of tuberculin is due to the stimulation of the pre-existing and injected toxin. The new theory of Kocher and Westphal is not defensible; it assumes that the active principle in tuberculin is identical with the products of the vital activity of the tubercle bacilli present in the tuberculous tissue; and their opinion, that a new substance, capable of exciting inflammation, is developed from the combination of the two is entirely unsupported by experiments. In attempting to give any explanation of the nature and cause of the local action of tuberculin, it must be borne in mind that it attacks the tissues immediately around the tubercule, and not the tubercule itself. With reference to this point, Liesert seems to have been the first who stated that the cellular exudate results from the method used in the production of tuberculin and that produced by the bacilli in vivo is that the exudate attacks the tubercle from the periphery, the latter being exposed to the influence of the toxins while the tubercule bacilli, whilst the cells of the disposition, the tubercle are in the opposite condition. It is in the latter areas of increased insensibility, such as the cutaneous vessels of the eye or tongue, that tuberculin exercises its activity. It is here that the inflammatory symptoms first occur, the transduction of serum etc. Under these circumstances there is no evidence of an escape, towards the outside, of the metamorphic products which were deposited within the tubercule, and in this way the action of the injected tuberculin is restricted to the region.
The question of the value to be attached to general fever reactions has been more contested, and more particularly has discussion been raised over the fact that in many apparently healthy persons even doses of 1 mg. produced no elevation of temperature. There is no doubt of the existence of local reactions to tuberculin as being those persons in whom there exist small or concealed tuberculous deposits, whose situation (bronchial glands etc.) has so far prevented their discovery. Besides this fact, one of the chief reasons for the failure of reactions to tuberculin is the unsettled state of the question, it is all the more desirable that it should be energetically investigated by veterinarians, who are more familiarly situated with the medical men placing the facts. It can be stated as a definite fact that in the case of apparently healthy cattle, whenever a reaction occurs after an injection of small quantities of tuberculin (0.003 to 0.009) after they have been slaughtered, they have been found without exception to be tuberculous.

The healing properties of tuberculin are generally recognized. Large doses of the same have been given intra-dermally to cure the disease, and have produced a pronounced local reaction, which may be repeated several times a day. According to de la Roche, the quantity of tuberculin may be increased to 3 or 5 deci-milligrams, and the quantity only very cautiously increased.

In the case of patients who are being treated for primary consumption, in the Moabit Hospital (Berlin) and elsewhere, the idea of giving the total amount of tuberculin which has been used in the treatment of consumption has been made more especially being brought completely to an end. Attention must also be directed to the efforts which have quite recently been made to increase the certainty of tuberculin by combining it with suitable drugs. The specific tuberculin needle represents what may be regarded as an almost isolated portion of the tuberculin introduced into the blood. It seems a very small dose of the drug in a very pure condition, which may be used to advantage in the treatment of consumption, by being introduced into the body, and the reaction due to the injection of the tuberculosis bacilli on the reaction of the tuberculin introduced into the body. Many attempts to cure these cases by attempting to utilize the tuberculosis bacilli on the tuberculin introduced into the body and the injection of the tuberculosis bacilli on the reaction of the tuberculin introduced into the body has been made recently at the Moabit Hospital by a combination of injections with the local application of embalms mercuriale, which they deserve particular mention. Of course, essential to a good result, the affected part be kept constantly in close contact with the plaster.

The efficacy of the treatment is the duty of the clinic, to bring it into action against the tuberculin bacillus, by the help of the tuberculin, such substances as are known to exercise an unfavourable influence on it. That the great problem will be successfully solved by this means in a small number of cases. The splenic results obtained by Langenbuch in the treatment of tuberculosis by the combination of tuberculin and other suitable substances, especially from their action on the spleen, are established facts which can be reached for. When is, further, borne in mind that he did not select his cases, but treated a rather unfavourable average class of cases, and that still of ninety-nine cases only 20 per cent. were cured, must be ascertained that these are facts which must excite the wonder and admiration of everyone.

In combating obstructions disease as tuberculosis it is obvious that no auxiliary means of treatment should be neglected, and the general principles laid down by Brodmann and Dietz are already established as being of great importance. When it is further borne in mind that the treatment of tuberculosis is a special science and that it will always be a task of special importance to decide whether in any particular case the use of tuberculin is advisable, it may be said that the diagnosis of the infections is of the greatest importance in the administration of the injections, not daily, but at longer intervals. A further advantage of this method is that the injurious influence of
to be recommended or not. There is certainly no reason for leaving the patients at the initial stage, and excellent results have been obtained in advanced and even latic cases, when the treatment has been carried out in the manner here indicated and for a sufficient time. Unfortunately hospital patients are often compelled by their circumstances to break off their treatment when they have hardly begun to derive benefit from it. Under such circumstances it is not surprising if any benefit derived should go speedily vanish. Hence it must appear desirable, so far as the method of treatment is concerned, that the treatment of advanced cases should only be undertaken when there is the certainty that it can be carried out regularly and for a definite length of time.

As to the therapeutic results so far obtained by the use of tuberculin, friends and foes are entirely divided in active dispute. It is obvious that too much value must not be placed on statistical reports, especially those published at the commencement of Koch's methods, which only give the experience of a few weeks. The mere consideration of the difference in the class of patients which came under treatment immediately after the publica- tion of Koch's method must prove suggestive. Patients in extremely advanced stages of the disease, to whom the new method appeared as a ray of hope, were using the tuberculin method, and almost forced them to attempt dangerous experiments with it. It must further be borne in mind that this was the early sense of the experimenter period; the properties of tuberculin had to be studied, it was a perfectly novel substance, without analogue in the armamentarium of the physician, and neither his professional education nor his experience provided him with any indications as to its use. The whole field on which tuberculin might be useful lay before the physician, and as far as it was explored, and, last, not least, the best method of utilising it had to be ascertained.

The deep despondency as to the efficacy of tuberculin which until a few years ago was chiefly due to the attacks of pathologists, it may be said, has been a great help to Koch's original mode of employing tuberculin against tuberculosis in its inactivity in some cases, the paramount problem. Still more the less it is a source of new despondency which is the main defect that, under the influence of erroneous views as to the significance of appearances in the post-mortem room, the estimation of the value of tuberculin should be made entirely from a negative direction. It has been the common practice to attribute the influence of tuberculin in every unfavourable circumstance which is treated with it, even though the very same are observed in the course of ordinary cases not so treated. On the other hand, it may be stated that out of the 800 cases treated in the pathological clinic of the University of Berlin, not a single case of mortality among the tuberculous has been observed, and complications, such as pneumonia, hydrocephalus, and cystic growths, which occur only rarely, and certainly, if anything, less frequently than in any other kind of treatment.

It should be too frequently repeated that the pathological anatomy of the recovered necropsies which are so constantly referred to as condemnatory of tuberculin refer exclusively to cases treated according to the old method, and hence have as present no actual practical value.

Further, the conclusions on this very subject have been drawn from a relative, limited number of cases, very small as compared with those available for clinical purposes. It may be accepted as an established fact that the secondary pulmonary complications, i.e. the condition which is so important to avoid, are no longer to be anticipated with the method of small doses. It may further be regarded as highly probable that the risk of dissemination of the disease is energetically resisted by this method, the object of which is to secure the encapsulation of the tuberculous matter in a systematic manner.

In conclusion, it is desirable to refer briefly to the therapeutic results so far obtained, the improvement in the general condition, and a considerable increase in weight. An equal degree of improvement in respect of these is quite unknown in the past. Yet it is a great triumph when, after a relatively brief treatment, a patient broken-down with disease is in so short a time restored to his family and to work. It is only to be expected that complete cures, as evidenced by the total disappearance of all objective and subjective symptoms, have not been attained. "Some attention should be paid to the observation of Koch, Stücker, Fürbinger, Guthrie-Leigh, Cantani, Langenbuch, and myself, in the same to the paucity of the cures no definitive decision can be given for years to come. But in all probability, and judging from an experience of three-quarters of a year, there is good reason to believe the cures are permanent. And there is no possible reason why the cases regarded as cured by the tuberculin-treatment should not be considered as much as those which have been treated by other methods—e.g., the hygienist-stapicists as at Göhrener, Falkenstein, &c. The published statistics of such institutions offer very encouraging standards of success in numerous treatments.

Most remarkably gratifying success has been obtained in the treatment of laryngeal tuberculosis, the relatively greater success to the treatment in this form of the disease being no doubt due to the anatomical relations, which admit of a considerably easy removal of infected material. Even if the most brilliant successes reported by the method of Revers, Lenzmann, Michelson, &c.—be entirely disregarded, there remain the reports of such men as Mortiz Schmidt, who obtained two entire cures in a few cases, and those of Grabower, who of forty cases states that thirty have remained perfectly cured during several months, and that fifteen are considerably improved. Such results must be regarded as highly gratifying.

Most remarkable results obtained by laryngologists, even in hopeless cases, are of great value, as proves incontestably that tuberculin can effect complete cures, not only in animals experimented on, but also in man. It is the most important duty of the physician at the present time to investigate the processes by which these results are obtained, and to discover the means by which these rare cases may become the rule. Owing to the extraordinary complexity of the tuberculosis process, it has been extremely difficult to ascertain any cause of success. But when we reflect that the majority of the questions of general therapeutics are still waiting for an answer when we consider the important question—which has already been under discussion for centuries—of the utility of antisyphilitic, which is still being debated, and is still far from being solved, if we bear these and similar facts in mind there will appear no grounds for discontent with the theoretical and practical results obtained in a few months by the tuberculin treatment. The very peculiarity of Koch's discovery will enable the desired goal to be reached all the more quickly; for experimental research is the soil where this has sprung, and it will be possible to test by experiment the various proclaimed according to themselves, and often in so perplexing a manner, to the clinician. Koch has been able to prove that the isolation of tuberculin in a perfectly pure state, free from all unnecessary by-products, for clinical use, is an essential adjunct to extensive experiments on animals. For some time past he has been employing exclusively this pure substance at the Pathological Clinic in Berlin. This substance has been found to produce advantages over the original lymph, which are especially observable in the effects produced on the general condition of the patients and in the absence of unpleasant secondary effects. Local reaction is produced in a typical manner by this pure tuberculin. With relatively larger doses or more rapid increase in their quantity, the tuberculin reactions, the majority of authorities are agreed that under tuberculin-treatment remarkable improvement is obtainable. It shows itself in the favourable turning, the improvement, especially in the diminution or disappearance of the rales, the changes in the sputum, and the ultimate disappearance of basal from it, the cessation of the cough, hectic and night-sweats, which are the improvement in the general condition, and a considerable increase in weight. An equal degree of improvement in respect of these is quite unknown in the past. Yet it is a great triumph when, after a relatively brief treatment, a patient broken-down with disease is in so short a time restored to his family and to work. It is only to be expected that complete cures, as evidenced by the total disappearance of all objective and subjective symptoms, have not been attained. "Some attention should be paid to the observation of Koch, Stücker, Fürbinger, Guthrie-Leigh, Cantani, Langenbuch, and myself, in the same to the paucity of the cures no definitive decision can be given for years to come. But in all probability, and judging from an experience of three-quarters of a year, there is good reason to believe the cures are permanent. And there is no possible reason why the cases regarded as cured by the tuberculin-treatment should not be considered as much as those which have been treated by other methods—e.g., the hygienist-stapicists as at Göhrener, Falkenstein, &c. The published statistics of such institutions offer very encouraging standards of success in numerous treatments.

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Milk in our hospitals.—The members of the Lambeth Board of Guardians have passed a resolution requesting their representatives at the Metropolitan Asylums Board to introduce and support a resolution advocating the substitution of milk for intoxicants at the various hospitals.