hygienic work in Cuba, in Panama, in the Philippines, and in Costa Rica, and for the efforts which they are organizing for a world-wide crusade against ankylostoma disease.

Chemical pathology has widened our knowledge and our resources, and the mystery of immunity has been to some extent illuminated.

The detailed examination of the morphological elements and the chemical characters of the blood and of other body fluids has eventuated in the rewriting of some of our physiology, and the pathological extension of the knowledge thus gained has improved the diagnosis and the treatment of several diseases. Thirty years ago Ord demonstrated to the Congress of that time examples of the disease which he had defined as myxoedema, but which, with surer instinct, Gull had described as a cretinoid state in adults. The gradual evolution of the doctrine of thyroid insufficiency and of its therapeutics is a model of induction; and this important discovery has given a great impetus to the whole study of internal secretions, as well as to the employment of organic extracts, of which the last and most interesting is that of the pituitary body.

The empirical and then the experimental study of small variations in the ordinary diets of adults and children and infants in different social strata and in different countries has been fruitful in many unexpected ways. The great milk problem is still with us, but we have learnt the blunders of our early generalizations. Cleanliness in the milk supply from start to finish has a far more exhaustive meaning than in days gone by. The curious disease beri-beri, which some of us have long thought had parallelisms with scurvy, has been shown, at all events amongst rice-eating people, to depend on the loss of the nutritive material just internal to the pericarp, which the ordinary process of milling removes.

The patient study of chronic alcoholism has opened up a new chapter in nervous diseases. The routine traditional employment of alcohol in disease has happily been largely discredited. The open-air treatment of all forms of tuberculous lesions has had a wide indirect influence, not only on the treatment of other chronic ailments, but on the daily life of the people.

The recognition and radical treatment of oral sepsis due to damage to the gums in consequence of various disorders of the teeth has been followed by remarkable benefit. A strong case has been made out for intestinal stasis as a cause of various forms of malnutrition and for operative measures in dealing with slight mechanical obstructions; on this subject we hope for further evidence.

The additions to diagnosis yielded by x-ray exploration are like the creation of a sixth sense, and its curative applications and those of radium are the opening of a new chapter of therapeutics.

I ventured to hint that medicine had now and then led to the rewriting of some chapters of physiology, and I may add that recent researches on diseases of the heart have led to the re-editing of neglected knowledge of the minute structure of heart muscle, and of orderly and disorderly mechanism of its movements.

Of the magnificent triumphs of the surgery of this generation it is beyond my power adequately to speak, but I can refer to the wide fields opened up through the beneficent protection of Listerism. We are staggered by the reasoned and calculated audacity of our brethren when sinuses of the skull are drained, cerebral abscesses evacuated, cerebral tumours removed, the pituitary body even being investigated, when pleuro-pericardial adhesions are freed, to the great relief of the heart, when different parts of the alimentary canal are short-circuited and when one or other damaged viscus is removed either entirely or in part. The active co-operation of surgeons and physicians has gained for us some knowledge of what Moynihan and others have happily described as "living pathology," and we gratefully acknowledge the invaluable information of correlated symptoms, signs, and morbid conditions, and the statistics of comparative frequency which surgical experience has brought to the common store.

The supreme gain, after all, is that many more useful lives are saved than in the last generation, that the realm of grave and hitherto incurable disease is invaded on every side, and that the danger of operation *qua* operation is retreating to a vanishing point.

It is impossible even to enumerate the varied ways in which medicine has co-operated with economics, social

legislation and philanthropy, which we sum up briefly as public health. The school house and the scholars, the home of the poor, the colliery, and the factory, the dangerous occupations, the sunless life of the mentally deficient, have benefited, and will benefit still more, by its friendly invasion. And I venture to foretell that, not many years hence, every department of life and work shall be strengthened and purified and brightened by its genial and penetrating influence.

Surely I have said more than enough to justify my contention that we have come into a goodly heritage, and that that heritage is like a lofty and magnificent tableland of knowledge and efficiency. The gaps are being filled; we are no longer isolated, but are working side by side on adjacent areas which are inseparably connected. Every day we gain fresh help from the auxiliary sciences, and we realize more and more the unity and the universality of medicine.

Brethren from foreign lands, we thank you for the treasures, new and old, of observation and experiment, and of a ripe experience, which you have brought to this Congress for the common weal.

I venture to affirm that the output of work of the Congress week in its twenty-three goodly volumes will astonish civilized countries by its amount and its solid worth.

I welcome you to our dear country, this ancient home of freedom, and I speak not only for the medical men of the British Isles but for our brethren of the Overseas Dominions, who join with us in our cordial greeting.

May this Congress add to the common store of fruitful and useful knowledge; may it increase our good fellowship, our mutual understanding and co-operation, and may it help to break down the barriers of race and country in the onward beneficent march of world medicine.

Address in Medicine,

ON

MEDICAL PROGNOSIS: ITS METHODS, ITS EVOLUTION, ITS LIMITATIONS.

DELIVERED AT THE SEVENTEENTH INTERNATIONAL CONGRESS OF MEDICINE.

BY A. CHAUFFARD, M.D.,

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MR. PRESIDENT, LADIES, AND GENTLEMEN,—In asking me to address to-day this great medical assembly, the Committee of the Seventeenth International Congress of Medicine has conferred on me a signal honour for which I desire in the first place to express my very sincere thanks. I should feel most unworthy of this high distinction were I not conscious that it is offered much less to my person than to French medical science. The medical men of France have come in large numbers to this Congress with the desire of learning, of making known their work, and also of maintaining and tightening the bonds of amity and esteem which link them to their colleagues of every nation, and more especially of the great country which is receiving them so splendidly to-day. Since, for one brief instant, it is given to me to be their spokesman before you, allow me to enter immediately upon the theme which I shall have the honour to consider in this address.

EVOLUTION.

The subject I purpose to discuss is that of medical prognosis considered in regard to its methods, its evolution, its limitations.

Medical prognosis! Is it not for us the daily problem, the anxious question which is constantly being put to us and which we put to ourselves? Ever since there have been sick patients and men who endeavour to relieve them and to restore them to health, the same query has come up in every case: Will a cure be effected, and by what therapeutical means? Prognosis and treatment—such were from the very first the two instinctive needs, the two immediate demands of the sick man. It was only at

a later period, at a more advanced stage of medical culture, that the need of first making a diagnosis arose, a notion of purely intellectual and logical order. But if diagnosis has been the latest of our acquisitions, it has now taken its proper rank—the first. What physician, failing an accurate diagnosis, could venture on a prognosis or prescribe a treatment? An entirely modern idea—but one which should imbue our minds nowadays—is that of defining in each particular case the mutual relationship between those three fundamental elements of medical judgement—to know, to foresee, to act. Instinctive in the remote ages and, later, hesitating and seeking its way for a long period of time, the act of the physician tends to become more and more rational and systematic. It is the passing from art to science, which our epoch is striving hard to achieve, often with success.

In this uninterrupted evolution medical prognosis has not remained at a standstill; almost before our own eyes, and by the mere progress of contemporary science, it has undergone a gradual change. Its methods are being modified, its limitations are being carried further back every day; it is in a state of perpetual transformation. The present time is perhaps a suitable one for a general survey of our present position and for an appraisalment of our acquisitions and desiderata. Such is the task I intend to attempt before you this afternoon.

The Hippocratic Era.

In the history of medical prognosis a large place should be reserved for the Hippocratic era, and it is impossible to peruse these venerable writings without a feeling of deep admiration. In those days the physician, having no technical means of investigation at his command, could naturally have but a purely objective vision of his patient; but how penetrating was this vision, how skilful in grasping, co-ordinating, and interpreting the most minute details! What a searching study, what a constant scrutiny of the prognostic signs derived from the general condition of the patient and revealed by his facies, his position in bed, the movements of his hands, his breathing, his sweating, the state of his hypochondria, his dropsical swellings, his sleep, his urine, his stools, his vomit, his sputum. The book on "Prognosis" is only concerned with acute febrile diseases, but from its descriptions there is nothing to be omitted. "The best physician appears to be the one who knows how to know beforehand"; such is the opening sentence of those admirable pages, so full of clinical observation and medical philosophy. The body should always be considered as a whole and "all things should always be judged by the study of signs and the estimation of their relative value." The same idea is upheld by Plato in his *Charmides* when he says: "It is impossible to cure a part without the whole." The same principle pervades all the Hippocratic works, and the famous doctrine of the *Crises* is but a systematization of prognosis in acute diseases. Thus prognosis was considered as a comprehensive survey of disease and its probable course. From the very first Hippocratic medicine had placed itself at the centre-point and had attempted to synthesize clinical prognosis.

Such are the earliest sources to which we must ever revert. Those primordial notions have lost none of their value, and if we have added much we have parted with nothing. To this day those objective data are amongst those that no clinician has the right to neglect, and the general impression they suggest at the patient's bedside leads us to pretty much the same prognostic conclusions as of old.

For more than twenty centuries medical observation went no further and was restricted to the same elementary information, until the day when new methods were added to the ancient practices, rendering possible the analysis of morbid disturbances. Thenceforth it is by the analytical method, with the help of a more and more penetrating technique, that medical inquiries progress; at the same time, more direct paths are open to prognosis.

The Modern Era.

The modern era begins with Auenbrugger and Corvisart, who introduced percussion; with Laënnec, the immortal inventor of auscultation; with Richard Bright, the creator of renal pathology. By those memorable discoveries the whole of medicine was at once transformed. Direct

exploration became possible and efforts were made, in Laënnec's own words, "to place internal organic lesions on the same line with surgical diseases in regard to diagnosis." To detect morbid changes in the living subject, to ascertain their degree and evolution, amounted to creating modern diagnosis and to giving prognosis a more certain basis. It amounted also to demonstrating all the importance of a new science, pathological anatomy, which by its precise descriptions was going to corroborate and check clinical investigation and to direct medicine for a time towards the exclusive quest for lesions and for organic changes. To detect the lesion in the living subject, to identify it in the cadaver and to deduce therefrom diagnosis and prognosis, such became the system of what was to be, for more than half a century, *Organicist Medicine*—a noble system which contained a large share of truth, but a narrow doctrine which tended to confuse the lesion with the disease which caused it. Doubtless, to a certain extent, the lesion is the disease in the course of evolution; but the anatomy of the dead body affords but the conclusion, the terminal condition. *Anatomical prognosis* therefore soon found its limitations. It is probably in the field of neuro-pathology that it has achieved its greatest triumphs, and the whole of Charcot's work rests on the anatomo-clinical method rationally applied. Need I add that if we are mere organicists no longer, we have nevertheless cast aside or forgotten no part of our predecessors' labour? Their work rests on the ancient fabric like a new geological stratum: on this stratum we have erected our modern constructions, more extensive and solid because they rest on larger and deeper foundations.

Unceasing Progress.

The succeeding stage is marked by the influence of Claude Bernard's memorable work. With him pathology became abnormal physiology, and disease became a disturbance of normal functions. We can recognize a morbid state and alter its probable course and consequences only if we are acquainted with the *functional disturbances* it causes. Without this essential notion how could we scientifically conceive the prognosis of a lesion of the heart, or liver, or kidney, or of the digestive or respiratory systems? Modern effort tends each day to greater advances along the paths opened up by Claude Bernard. With our improved instruments and laboratory technique, through our researches on the blood and body fluids and on cytological reactions, we aim at gauging accurately the functional value of the various structures, the organic reactions of defence, the substitutions and compensations as well as the morbid synergical actions that take place in the human system. We physicians now strive to reason and to act as physiologists, or, better still, as biologists. Our system of analysis makes use at the same time of the methods, now closely associated, of clinical medicine and of experimental pathology. It attempts to dissociate the infinitely complex problems of pathogenesis and the relationship between causation and secondary reaction. Nor can we arrive at a prognosis unless we take all those factors into account.

And so, after this long circuit, after all this analytical work, we find ourselves returning—as in the early ages of medicine—to Hippocratic prognosis, to the synthetic and comparative consideration of what the ancients used to call the *State of forces*. Whether from a historical or a practical standpoint, we thus find that prognostic investigation has progressed by successive stages from anatomical lesions to functional disturbances and chemical changes, until it has reached the stage where judgement is based on criteria of a dynamic and vital order. How can we estimate the prognosis of heart disease if we do not take into account the functional value of the myocardium, of hepatic disease if we ignore the ureogenetic function of the liver, of nephritis if we know not the degree of renal permeability and the amount of urea in the blood serum? What should we know about the future of a diabetic subject if we did not ascertain the state of his nutritional exchanges, if we did not detect the first signs of the acid intoxication which threatens him? Again, what should we know about a gouty subject if we knew nothing of his blood pressure or the working of his kidneys? If diagnosis consisted simply, as Pinel would have it, in "assigning to a given disease its proper place in Nosology" it would be a most fruitless and conventional

effort. Our conception is a very different one; for us diagnosis signifies the recognition, as perfect and precise as our means of investigation will allow, of a morbid condition considered in regard to its origin, its present state, its future course. Thorough diagnosis is almost one with scientific prognosis—at least they constitute two closely connected ways of considering the same fact. If we remember all that we owe to contemporary haematology, to biological chemistry, to electrolgy, to skiagraphy, we see how inseparable are the notions of diagnosis and prognosis thus obtained. Of equal importance, both for diagnosis and prognosis, are the temperature charts, the curves of urine and weight, the cardio-vascular tracings such as we have learnt to take and to interpret from Marey and from James Mackenzie; the research in the blood of bactericidal properties, of agglutinins, of opsonins; the analysis, both qualitative and quantitative, of the various constituents of the serum. We arrive at the same conclusion if we consider the history of the leucocytes of the blood, with their chemiotactic and phagocytic reactions.

Thus prognosis takes its immediate share in all the advances of diagnostic technique. This unceasing progress might make us imagine that there are no limits to its possibilities. It certainly is far from having reached its future boundaries, although we feel hemmed in by those of the present day. These we shall try to define later.

REMOTE PROGNOSIS.

Medical prognosis, then, is a very complex matter necessitating the consideration of multiple criteria. Yet, if thus strictly considered, it would still be very incomplete, inasmuch as it would not be taking the future into sufficient account.

Now to us physicians the future is a preoccupation inseparable from the actual disease we are treating. This is a recent notion, it is true; for it was formerly imagined that a disease cured had no morrow. How great was this error and how far we now are from such a fallacy! Every day this question of remote prognosis arises, and it may be said to have made its appearance in science with the discovery by Bouillaud of rheumatic endocarditis. The French physician had doubtless more than one forerunner, and it is in England that the early work was accomplished. David Pitcairn, physician to St. Bartholomew's Hospital, was the first to observe that rheumatic fever is a common cause of heart disease; he taught this fact to Matthew Baillie, a great pathologist who, in the words of Sir Dyce Duckworth, deserves to be called "the English Morgagni of his time." With Wells, David Dundas, this notion acquired greater precision, and at the same time Odier and Matthey, in Geneva, reached a similar conclusion. Finally, in 1818, James Johnson recognized and described the cardiac metastasis of rheumatic fever.

When Bouillaud took up the subject he was better armed than his predecessors. Through systematic auscultation of his patients, and through *post-mortem* examinations, he discovered and described rheumatic endocarditis. From that time on the prognosis of rheumatic fever was a different matter. Next to—or rather before—immediate prognosis now arose the question of remote prognosis. When we are called to a case of rheumatic fever the first thing we want to know is whether the heart is affected or not. Over and beyond the present illness we see and fear possible valvular disease; we try to avert it or to arrest its progress. The prognosis for the morrow takes the lead of the prognosis of the day.

The various zymotic diseases afford many examples analogous to this classical instance of chronic heart disease originating with rheumatic fever and progressing afterwards for years and years as an autonomous disease, with its special association of anatomical lesions and functional disturbances. The Pasteurian discoveries have provided us with a general theory of infection; they have shown the preponderating part played by microbic toxins in the many visceral diseases, acute or chronic, seen every day in clinical medicine as well as in experimental pathology. How many patients appear to be cured of an acute infection, and yet their health may remain affected, perhaps for ever! Innumerable instances might be quoted; the kidney of patients having had scarlet fever or pneumonia, the arterial system of enteric patients, post-infectious lesions of the ductless glands, trophic disturbance and arrest of

growth following infantile paralysis. How often, after apparent cure has been effected, do we find morbid conditions progressing which our best efforts do not always arrest!

If we pass from acute to chronic infections this question of remote prognosis becomes of still greater moment. Let us consider an individual who has recently contracted syphilis. Do we for a moment imagine that after we have cured the secondary manifestations all is over, and that our task is at an end? So little do we think so that in our apparently quite healthy subject we go on applying the treatment, we periodically ascertain the result of Wassermann's reaction, we keep in mind the possibility of late tertiary manifestations or of vascular syphilis in the shape of aneurysm, or again of one of those redoubtable cerebro-spinal localizations which constitute the darkest chapter in the history of syphilis. We have got to the point that we are wondering whether numerous lesions, apparently commonplace, are not due, wholly or in part, to remote syphilitic infection. For my part I am convinced that such is often the case with arterio-sclerosis and with certain chronic conditions of the liver, kidneys, and myocardium.

What we have just said of syphilis is equally true of tuberculosis, and those two great infections share between them a very wide field in pathology. Tuberculosis, like syphilis, has far-reaching and tardy consequences. Inoculated in infancy it may come to life in the adult age, and sometimes even in old age; it is often after many years that the real gravity of a long-forgotten glandular enlargement or of a pleural effusion long since cured is revealed. Moreover, apart from the typical forms of tuberculosis, caseous and follicular, we have learnt to distinguish numerous varieties of atypical or inflammatory tubercle, of which the true nature is demonstrated by experimental inoculation. This generalization has perhaps been carried too far; it would tend to make us believe that the greater number of pathological findings are referable to remote syphilitic or tuberculous infection. This, in my opinion, would be an exaggeration; but the fact remains that in regard to syphilis and tubercle we know where prognosis begins, but we cannot foresee its limits. No physician can assure his patient of absolute cure without any possibility of some tardy sequel, whether specific or atypical in character.

The same might be said about gout, lead poisoning, alcoholism, etc. The acute disturbance disappears, but remote sequelae are always possible. We might almost say that nothing is forgotten in the system, and that any adulteration of a tissue or body fluid leaves its trace. The discovery of anaphylaxis by Charles Richet affords the best demonstration of this fact, and we can repeat, in the words of that distinguished scientist, that "we have a humoral personality which makes us different from other individuals: this personality of our humours is due precisely to the various ingestions and intoxications which have affected our system and left their indelible traces."

If we bear these notions in mind the scope of prognosis in morbid conditions is found to be remarkably extended. The pathological life of an individual appears no longer merely as an interrupted series of isolated episodes; but we try to discern its unity, to follow its continuous course, and to take into account the sudden and sometimes final deviations and the new pathological directions that may be given to the organism by an intercurrent disease. On these points, as well as on many others, the findings of modern clinical medicine approximate to and complete the teachings of tradition. The "humoral personalities" of Charles Richet seem very closely connected with the ancient doctrine of the "diatheses," recently defended with such conviction and eloquence by Sir Dyce Duckworth.

Family, Collective, and Social Prognosis.

Let us now extend a little farther the scope of our medical foresight. Our prognosis will then include the future of the patient's descendants. I cannot dwell at length on this very important aspect of my subject, but it is evident that the possibility of inherited syphilis or tuberculosis, that the transmission of abnormal humoral conditions, such as haemophilia and congenital haemolytic icterus, or of family taints like those so often met with in neuro-pathology, do aggravate those several

diseases by placing them in the group of hereditary pathological conditions.

This is not all. Next to the prognosis concerning the individual and his descendants we must consider *collective prognosis*. This is a question of a practical order which originated quite recently with the contemporary investigations on *germ carriers*. Take, for instance, a school where a case of diphtheria has broken out. Will this be an isolated case or will it become the starting point of a small localized epidemic? The preventive measures to be taken will depend to a great extent on our decision, and we must be guided by the direct examination of the other children in the school. We must ascertain whether amongst them there are not some who are carrying Loeffler's bacillus in their naso-pharyngeal membrane or in their tonsils. The number of these bacilli carriers will afford us precise and valuable information.

It is also to direct examination that we must turn if in a military unit, company, or squadron there suddenly appears one of those cases, often so rapidly fatal, of cerebro-spinal meningitis. In the last few years we have had in France too many opportunities of witnessing the birth and growth of such local foci of meningococcal infection, and our military colleagues are fully aware of their duties in this respect. In cases of this kind the systematic quest for meningococcal carriers is immediately proceeded with, and it very speedily shows whether the cases observed are sporadic or whether they are the first signs of a more or less extensive epidemic. We are thus led to form the *epidemiological prognosis*, which to a certain extent remains distinct from *individual prognosis*.

Finally, above the individual, the family, and the small communities, there is the *race*, the human species considered as a whole. Now, considering as social diseases tuberculosis, syphilis, alcoholism, shall we not be reaching the highest point that can be attained by medical prognosis? How far do we thus find ourselves from the old belief of the physician who, having treated his patient, thought he had done all that could be expected of him! We now feel that this would be an inadequate conception of our duty, and that not infrequently the particular patient cannot, and must not, be separated from his multifarious connexions with the rest of the human race. All our legislative measures in regard to disinfection and preventive vaccination find their justification in the social prognosis of disease. I need not dilate on this subject in the country of Jenner, the land of efficient prophylaxis. Is it not also in this great London that as a result of the memorable work of Sir Francis Galton and his school a new science came into being, eugenics, which held its first congress here? By improving, according to Galton's ideas, the racial qualities, both physical and mental, of the generations to come, and also by surrounding with all possible care the life of the child before and after birth, in conformity with Pinard's teaching, it seems to me that we are transferring the notion of collective and social prognosis into the domain of prophylaxis, for the greater good of the race.

Starting, then, from the daily observation of the sick, the physician has therefore unceasingly looked higher and further. Every day he realizes better that he cannot neglect the individual, or the family, or the race; that in a social body where so many nefarious forces are working together to bring about the degeneration of man he must bring to all men the tribute of his beneficent knowledge and useful labour.

THERAPEUTICAL ADVANCES.

Does our progressively extended prognosis, based on the use of new methods and on a wider comprehension of the far-reaching effects of disease, deal with facts that are always identical with themselves? Is the prognosis of a given disease immutable? If not, why and how does it vary?

To admit the immutability of medical prognosis would be to declare that our therapeutics have not progressed. Now, surely, it is not at the present time that such a dispiriting opinion could be upheld. In the last forty years, before our very eyes, the whole of scientific and practical medicine, undergoing an incredibly rapid evolution, has been wonderfully transformed. The problems of pathogenesis, our means of clinical investigation, our methods of treatment have all assumed a new aspect, and the

prognosis of all morbid conditions has thus been deeply modified. I think it can be said that there is almost no group of diseases the gravity of which has not been notably attenuated in recent years. No doubt there are still too many cases where the physician feels powerless; but even then his lack of power is no longer so absolute. The cancer problem is always before us, but we cannot deny that, thanks to x rays and radium, thanks to improvement in surgical technique, thanks also to recent advances in chemical treatment, our means of action have become less scanty and more often efficient. We may be unable to modify the prognosis of a given lesion: cerebral haemorrhage, pulmonary embolism have lost none of their gravity. But the changes in the arterial or venous systems which give rise to those serious accidents are better known to us; we can prevent them or treat them with greater success. Thus even in the least favourable cases we have gained some ground.

On the other hand, we might quote many instances, especially in the domain of the infections, where to-day's prognosis is widely different from that of former times. Rheumatic fever nowadays is no longer what it was in Bouillaud's time: salicylic medication has made another disease of it. Since the introduction of Brandt's treatment our enteric patients are no longer the same, and the results already obtained by antityphoid bacteriotherapy enable us to look forward to a near and decisive advance. We cannot forget what diphtheria was before the discovery of diphtheritic antitoxin by Behring and Kitasato and the splendid therapeutical deduction brought forward by Roux at the Congress of Budapest. The morbidity and mortality tables have since demonstrated throughout the world what a change has been brought about in the prognosis of diphtheria. Even the most terrible and relentless of diseases—rabies—has met its master, and the antirabic vaccination of Pasteur is perhaps the most amazing therapeutical triumph of our time.

And so each day brings with it some progress, some attenuation or modification of our prognosis criteria, some new methods of fighting disease. Armed as we are with our modern methods, having at our command mercury and arsenic in extremely active forms, do we not treat syphilis with much greater chances of success than formerly? It is not my intention to dwell on this point, but I should like to recall two other quite recent and typical instances.

Consider one of the hitherto incurable forms of trypanosomiasis—*sleeping sickness*. Thornton, and later Nicol and Mesnil, demonstrated experimentally the value of atoxyl in animal trypanosomiasis. Ayres Kopke, of Lisbon, applied for the first time the treatment to the human being, and since then results have been constantly improving. At the Pasteur Hospital in Paris Dr. Louis Martin has treated and followed in the last few years 40 cases of sleeping sickness, and he has kindly supplied me with his statistics. Of the first 20 cases, 11 died; of the next 10, 4 died; of the last 10 cases none died, and yet two patients of the last series were treated more than three years after the onset of the malady. Those gratifying results are due to the improvement in the method of treatment; for large doses, separated by intervals of ten days, Louis Martin has gradually substituted smaller doses repeated more often, and success has been more complete and more lasting. We can now talk of cure in a disease the recognition of which a few years back was equivalent to a death sentence.

Let us now take another instance afforded by *dysentery*. We know that in this disease identical symptoms may be produced through different etiological agencies, and we recognize two essential forms of dysentery, one due to bacillary, the other to amoebic infection. Therapeutical advance has not been long in confirming this distinction, and to two specific infections we now oppose two specific treatments. Bacillary dysentery is almost immediately arrested and cured by specific serum-therapy as established by Shiga, Kruse, Todd, Rosenthal, Vaillard and Dopter—to mention only the early workers in the field. As for amoebic dysentery, it now possesses also its specific treatment, which, although quite recent, has already proved its high value. This new treatment we owe to a British physician, Leonard Rogers, of Calcutta. For the last twelve years Rogers has devoted himself to the study of ipecacuanha medication in amoebic dysentery, and to the demonstration of its preventive action in regard to

liver abscess. Later, following Vedder's experiments, for ipecacuanha itself he substituted one of its alkaloids, emetin (or rather emetin hydrochloride), and he achieved the greatest success in curing quickly and entirely the intestinal and hepatic forms of amoebic dysentery. Whereas in dysenteries of equal gravity the death-rate for the cases treated with powdered ipecacuanha was 34.6 per 1,000, with emetin it is reduced to 8 per 1,000. With ipecacuanha the average duration of the treatment was 16.4 days, with emetin it has dropped to 7.2 days. As for dysenteric abscess of the liver treated by emetin injections, both hypodermically and in the abscess cavity, results have been no less favourable, and a cure is effected with astonishing ease and swiftness. The numerous cases reported by Rogers, those observed since in the Philippines and in Paris, can leave no doubt about the fact that, thanks to Rogers, a new specific therapy is born. It is one of the most active known, and such an acquisition is an inestimable benefit, a splendid therapeutical triumph. Here, then, is another disease and a grave one, the prognosis of which has been entirely modified in a remarkably short time.

If from infections we pass to the other groups of disease progress seems less brilliant, and the future possibilities appear to be more limited. The study of the disturbances of nutritional metabolism brings us face to face with causes more obscure, that act more slowly, and that are less favourable to therapeutic intervention. And yet, here again, our modern conquests are innumerable. Of these, we may mention organotherapy, dietetic treatment, and physical therapeutics. Everywhere disease is falling back before the ceaseless efforts of therapeutics and hygiene; everywhere prognosis is undergoing an evolution and holding out fresh hopes.

The Limitations of Medical Prognosis.

The foregoing consideration of a few of the general aspects of that great subject—medical prognosis—would appear to lead us to a very hopeful conclusion. Yet to this, as to all branches of human knowledge, there are limitations that we must not lose sight of, and that are calculated to humble, if needs be, our medical pride and to bring it down to a suitable degree of modesty.

What, then, are the limitations of medical prognosis? An essential distinction must here be made between *theoretical* and *clinical* prognosis. Theoretically almost everything is known to us. In a given disease we can enumerate and describe, without serious risk of omission or error, most of the complications or contingencies that may modify its course. But all that is *book prognosis*, far removed—unfortunately—from the living and individual prognosis, which relates not to a disease but to a patient. How many are the unknown quantities in medical practice, and how many the surprises! How little does it avail to know all the possible complications of typhoid fever if at the bedside we cannot foresee the intestinal haemorrhage or perforation which, perhaps in a few hours, may endanger the enteric patient's life. Again, for the newly infected syphilitic, for the gouty subject, for the epileptic at his first attack, for countless other sick patients of all kinds, how many uncertainties for the future! When a morbid condition begins we know theoretically the various paths it *may* follow; but which one *will* it follow? That is the real prognostic problem, the solution of which too often eludes our grasp. Doubtless the knowledge of the inherited soil and of previous disturbances may sometimes help us; but we are ignorant of the conditions which determine the localization of septicaemic or toxæmic infections. No one can predict at the onset of pneumonia the pneumococcal endocarditis or meningitis that will cause death. Once the metastasis is established, we cannot always appreciate the degree or the evolution of the anatomical lesion. We cannot tell whether, in an enteric case, intestinal ulceration is growing deeper, thus threatening to cause perforation. Again, in a patient with mitral stenosis, we cannot foresee whether haemoptysis, infarction, or cerebral embolism is going to occur. And so, even in those diseases with which we are most thoroughly acquainted prognosis remains uncertain. It is strong in theory but faltering in practice.

To all those reasons for uncertainty and prudent reserve I must add one of major importance—I mean the reaction of the nervous system. I forget what statesman once said

that in politics one must always reckon with the "imponderables"; surely in medical practice this remark is no less true. The nerve cell may always add its perturbing influence to all morbid processes, whether in the sense of inhibition or of stimulation; and we cannot calculate or master at will nervous reaction, either in the sphere of motor or sensitive manifestations, or of psychical phenomena, or of visceral pain. We try to redress, or direct it, but it may be impossible for us to foresee its gravity or duration.

Finally, and dominating the whole question of prognosis, there remains for us to gauge the possibilities of the organism that has fallen a prey to sickness. Shall we find in it the resources necessary for overpowering disease? How much can it stand and how much can we expect of it? That is the great problem which commands and includes all the others. Are we always able to solve it? I fear not.

CONCLUSION.

I must now conclude, and I must ask you to excuse the shortcomings of what has been, I am afraid, a very lengthy discourse.

Medical prognosis is, as it were, the corollary and the practical application of diagnosis; it borrows its methods, it follows its progress. In the course of its modern evolution it has taken its share of all the advances of scientific medicine; it has not ceased to walk in the paths of clinical analysis and of experimental pathogenesis; its aim has been raised, its scope extended. It appears as the synthesis of medical criteria; it precedes, checks, and justifies treatment and prophylaxis. If we consider the constant advances of medical prognosis and the many opportunities it affords us of ascertaining the lessened gravity of disease we can better appreciate the progress already achieved, and our efforts will thus meet with their greatest reward and incentive.

Uncertainty and disappointment must necessarily be often our lot; but since the science of prognosis is one of the loftiest summits of medicine, we must, in our ceaseless advance, ever strive to behold its crowning height. Even if it remains distant and lost in the clouds, we must never despair of lessening the intervening distance. Such an ambition is a duty, and it will ever be the best stimulant to medical endeavour.

Address in Surgery,

ON

REALINEMENTS IN GREATER MEDICINE: THEIR EFFECT UPON SURGERY AND THE INFLUENCE OF SURGERY UPON THEM.

DELIVERED BEFORE THE SEVENTEENTH INTERNATIONAL
CONGRESS OF MEDICINE.

BY HARVEY CUSHING, M.D.,

PROFESSOR OF SURGERY, HARVARD UNIVERSITY.

MR. PRESIDENT, LADIES, AND GENTLEMEN,—Thirty-two years have elapsed—a full generation—since this Congress, under the distinguished leadership of Sir James Paget, last gathered in London. Among the participants on that occasion were five of the immortals in the history of medical sciences: Huxley—naval surgeon, zoologist, palaeontologist, educator, philosopher, public servant; Virchow—pathologist, anthropologist, archaeologist, statesman and sanitarian; Pasteur, the chemist; Lister, the surgeon; and Koch, the bacteriologist—among the foremost contributors of all time to the welfare of their kind. On the foundations which these men laid—a new conception of biology and man's place in Nature; the doctrine of cellular pathology; fermentation and immunity; wound healing without suppuration; bacterial diseases—a transformed medical edifice has been erected. Methods of investigation, the direct outcome of those which they evolved, we still employ; weapons which they devised are still, and always will be, effective, not only in a hand-to-