started from Laveran's discovery of the germ of malaria; the discovery by Löffler and Frosch, Roux and Nocard, of the viruses which pass through filters; and the recognition of insects as intermediate hosts and transmitters of infectious diseases, connected with the name of Theobald Smith, which has led to the most important consequences.

On the other hand, we have the study of the immunity theory which was first inaugurated so brilliantly by Metchnikoff and received a new impetus from the wonderful discovery of antitoxins by von Behring. A wide new field—that of the science of immunity and the investigation of serums—was opened up, and here Pfeiffer, Bordet, Widal, Wassermann, and many others including myself, have worked with successful result. Some of the most valuable fruits of these labours, from a practical point of view, have been the diagnosis of diseases, first in the form of the Widal-Grüber reaction, and later the Wassermann syphilis reaction, the importance of which for diagnostic and therapeutic value cannot be over-estimated.

All these discoveries, especially in regard to the ways of spreading disease by infecting agents, have, in accordance with the principle that "prevention is better than cure," been made good use of in the fight against epidemics and for prophylactic measures, and have brought about an improvement surpassing expectation. In the second place the struggle with diseases which have already broken out has benefited by these discoveries, the most wonderful example being antidiaphtheritic serum.

Epidemics and other diseases are much less dangerous nowadays than they used to be. The efforts of chemiotherapeutics must be directed as far as possible to fill up the gaps left in our defences, more especially to bring healing to diseases in which the natural powers of the organism are insufficient. And I believe that now definite and sure foundations have been laid for the scientific principles and the method of chemiotherapeutics, the way is visible before us—a way not always easy but yet practicable. In the diseases due to protozoa and spirilla extraordinarily favourable results have already been gained, as I have shown. There are many valuable indications that in a series of other diseases—small-pox, scarlatina, typhus exanthematicus, perhaps also yellow fever, and, above all, the infectious diseases caused by invisible germs—the prospects of success are brightening. But in contradistinction to the protozoan disorders the ordinary or common bacterial diseases (diseases due to the streptococcus and staphylococcus, *B. coli*, typhoid and dysentery, and above all tuberculosis) will not be vanquished without a hard struggle. Nevertheless, I look forward with full confidence to this development also, and, without being set down as an optimist, will put forward the view that in the next five years we shall have advances of the highest importance to record in this field of research. There are indeed problems which often prove too great for the powers of individuals, and can only be solved by a many-sided effort. Considering the enormous number of chemical combinations which must be taken into consideration in the struggle with disease, it will always be a caprice of chance or fortune or of intuition that decides which investigator gets into his hands the substances which turn out to be the best for fighting the disease, or who it is that happens on the basal substances for the discovery of such. But the chances in favour of finding a real cure, and so of winning the big prize, will naturally increase with the number of those who occupy themselves with the problem. It is just here that we should unite our forces, and special importance attaches to that motto, *Vivibus unitis*, which gives guidance in so many other fields. For this is the noble legend on the flag of this great International Congress, to which thousands have been drawn from all lands to bear testimony to the fact that in the world of science all national barriers have fallen.

THE Government of Ontario having instituted the post of inspector of the feeble-minded has appointed thereto Dr. Helen MacMurchy, a medical woman whose name has long been familiar in connexion with the study of questions relating to infant mortality, and who is personally known to many of her colleagues in this country owing to her attendance at the annual meeting of the Association in 1910. She will also bear the title of inspector of hospitals and public charities, and act in this capacity as assistant to the head of the hospitals department at the Ontario Home Office, Dr. Bruce Smith.

Address ON HEREDITY.

DELIVERED AT THE SEVENTEENTH INTERNATIONAL CONGRESS
OF MEDICINE.

By W. BATESON, M.A., F.R.S.

LET me on behalf of my colleagues, the students of genetics, express our deep sense of the honour conferred upon us by the organization of your Congress in choosing our science as the subject of one of the general addresses. It is scarcely necessary that I should say, on my own behalf, that I feel it an extraordinary privilege to be permitted to represent that science on such an occasion.

This is a great privilege, but it entails also a very grave responsibility. Conscious as we are of the exceptional significance that the study of heredity must before long assume, it would be mere affectation were I to suggest any misgiving as to the propriety of allotting to this subject a conspicuous position in your deliberations. To the penetrative foresight of Francis Galton it was evident long ago that these aspects of physiology must one day become one of the chief preoccupations of reflecting minds. That inference he drew from a broad contemplation of the facts of descent. Traces of order among these phenomena he did indeed perceive, and by great labour and ingenuity he even gave numerical expression to his conclusions. But great as his services were in attracting attention to the problem, no one before the re-discovery of Mendel's work had ventured to imagine that the confusion, the paradoxes, the capricious disorder of the phenomena of descent were, in very great measure, capable of a simple and ready analysis. It is this knowledge which has given to genetic science a position paramount among the branches of physiology, showing that in accurate genetic analysis a means is given not merely of elucidating the inter-relations of parent and offspring—the immediate subject of our investigations—but of contributing also to a right interpretation of various special problems of pathology and of anthropology, perhaps, also, to a true understanding of the course of human history, and certainly to the direction and control of the destinies of mankind. Knowing, as I must, that the manner in which these issues are presented to you to-day cannot fail to influence in some measure the development of genetic study in the medical world, I should be insensitive did I not feel how responsible is the position I now occupy. Most of all I fear that I may seem in some degree to exaggerate not the importance of the principles already ascertained, but the precision with which they can be shown to apply in the special cases of human physiology. In all the arts, perhaps most in the art of exposition, the hardest thing is to simplify the presentation by the omission of detail, and at the same time to leave the picture true to natural fact. So let me, therefore, at the outset say that in regard to almost every instance of principle I shall bring before you, though rule may be perceived, we have evidence of exceptions also. This is true even of the rules traced by minute analysis in the plants and animals amenable to experiment, and necessarily far more true of the human phenomena which are brought within our reach for the most part by imperfect records. As in every department of physiological advance, we have first to trace the course of those great sweeping curves which lead to the recognition of ascertained law, and later those minor deviations, perhaps equally significant, which must hereafter be the subject of a further analysis.

Now the essence of Mendelian principle is very easily expressed. It is, first, that in great measure the properties of organisms are due to the presence of distinct, detachable elements, separately transmitted in heredity; and secondly, that the parent cannot pass on to offspring an element—and consequently the corresponding property—which it does not itself possess. The determination or recognition of these elements by analytical breeding is one of the main objects of present-day genetic research. Each germ cell, ovum or sperm, may contain or be devoid of any of these

elements, and since all ordinary animals and plants arise by the union of two germ cells in fertilization, each resulting individual may obviously receive in fertilization similar elements from both parents or from neither. In these cases the offspring is "pure" bred for the *presence* of the character in question, or for its *absence*. But it may be formed by the union of dissimilar germs, one containing the element, the other devoid of it, and in this case we call the individual cross-bred, or heterozygous in that respect.

A population thus consists of three classes of individuals—those pure for the presence, having received two doses, of an element; those pure for the absence of the element, having received none of it; and the cross-breeds, which have received one dose only.

From the physiological standpoint it is of great importance to distinguish the positive from the negative characteristic. But since it often happens that the full effect is produced in the organism by one dose only of a character, we have felt justified in regarding this positive effect as the sign or proof that it is caused by something present. A plant, for example, though cross-bred for tallness, may be as tall as one pure-bred for tallness.

Each dwarf plant, whatever be its parentage, can only produce dwarf offspring. Not having tallness, it cannot transmit that property. A cross-bred tall plant can, by self-fertilization, produce both tall and dwarf offspring. Fowls with silky feathers cannot, if bred together, have offspring with normal feathers; but two birds, normal to all appearance, can, if they be cross-bred in that respect, produce silky offspring.

At a later stage we will consider to what extent we are justified in thus discriminating between the positive and the negative characters, but for the present we will note that, as a matter of symbolical expression, the distinction is immaterial. Now the organism produces germ cells representing in equal number the several characteristics of the germ cells from which it arose. There is, as we call it, *segregation* between the elements introduced from the parent. The double structure of the soma is, when the germ cells are sound, resolved into the single structures of the germ cells. If the organism is pure-bred in any respect, all its germ cells are alike in that respect. If it is cross-bred, its germ cells represent in equal numbers the positive or negative characters which were brought together in fertilization. In consequence, the numbers of individuals resulting from the various possible forms of union follow regular arithmetical rules, and the proportions in which the several classes appear give us the means of tracing and identifying the various systems of descent.

It was naturally with great interest that we began the examination of human pedigrees, and the result of that search soon showed that many of the more definite hereditary diseases and malformations follow one or other of the systems with which Mendelian analysis has familiarized us. The first condition thus recognized to have a simple Mendelian inheritance was the peculiar malformation known as brachydactyly, described in America by Farabee. Another example is congenital cataract, studied by Nettleship, to whose admirable researches we owe many of our most valuable and instructive pedigrees. Both these conditions descend as dominants. It is characteristic of them that unaffected members of the families do not transmit. Not having in them the critical element which causes the condition, they cannot pass it on to their posterity. In the human examples the individuals affected are almost always heterozygous, and hence among the children which are born to their marriages with normal persons, we expect the affected and unaffected to be in equal numbers.

Since then such pedigrees have been recognized in abundance. The collection of such evidence we owe especially to Nettleship, Gossage, Drinkwater, Lundborg, Weil, Bulloch, and many more.

Some of these, which may be stated with fair confidence to descend commonly as dominants, are the following:

Brachydactyly; claw-shaped extremities; cartilaginous exostoses; membranous cranio-cleido-dysostosis; hypoplasia of the teeth; diabetes insipidus; chronic trophoedema (generally).

Skin Affections.—Tylosis, epidermolysis bullosa, telangiectasis, hypotrichosis, porokeratosis, xanthoma.

Ophthalmic Diseases.—Presenile cataract, ectopia lentis (sometimes), coloboma (sometimes), distichiasis, night-blindness (certain forms), retinitis pigmentosa (sometimes).

Nervous Diseases.—Angeio-neurotic oedema, tremor hereditarius, ptosis, Huntingdon's chorea, and probably several of the forms of spastic paralysis and of myatrophia.

Respecting nearly all these it may be remarked that exceptional cases, some undoubtedly authentic, are on record in which affected children have been born to parents actually or apparently normal. Many of these exceptions are undoubtedly genuine and serious, but others may be ascribed to irregularities in the age of incidence, and to mistakes as to slight cases.

Another difficulty arises from the fact that the numbers are frequently irregular. This is in part caused by imperfection in the records. In part, however, I think these aberrations point to real peculiarities in the process of segregation. We know well that in certain plants like wheat and peas the expected numbers appear with great constancy, but in others, as stocks and the primulas, long "runs" are so common that smooth results are only obtained by the summation of large series of observations. We are perhaps right in conceiving the germinal tissue of a heterozygote as an emulsion of the two types, sometimes coarse, sometimes fine, and the degree of smoothness of the results may be an indication of its state in this respect.

In regard to the large group of diseases of nervous origin, such as Friedreich's disease, Thomsen's disease, and others, these sources of difficulty are especially serious; and though from study of many genealogies I have come to the conclusion that most of them are essentially dominants, I offer this opinion with reserve.

Of recessive conditions in man we have less abundant evidence. Inasmuch as they usually appear from the unions of parents both apparently normal, though heterozygous for the condition, their occurrence is rare and sporadic. Lundborg has shown with great probability that paralysis agitans is one of these. The constant intermarriage of families in the valleys of Sweden, Norway, and the Alps gives the best opportunity for the study of this form of descent. Lately, also, the American students of genetics have produced evidence making it clear that feeble-mindedness has at least one of the marked features of a recessive condition. When both parents are feeble-minded they have no normal children. It is nevertheless difficult to regard this condition as a simple recessive, for unions of the feeble-minded with normal persons almost always produce some feeble-minded children. Among our experimental families of plants and animals there are mysterious examples somewhat comparable with those, but the exact nature of the complication is still obscure.

Other conditions which exhibit a behaviour characteristic of recessives are albinism, myoclonus epilepsy, and alkaptonuria. They may all appear in the children of normal persons, with special frequency as the result of marriages of related parents, and there can be no reasonable doubt that these conditions are due to the loss of some factor present in normal persons.

At this stage attention should be called to a remarkable group of cases in which the appearance of abnormality may almost without doubt be regarded as partially dependent on the conditions to which the soma is subjected. Of these, I may mention in particular some of the congenital abnormalities, such as hallux valgus, and some of the congenital deformities of the joints, as, for example, dislocation of the hip or of the radius. In these cases we meet the curious fact that whereas the condition most usually appears in the offspring of normal parents, it may, in certain families, be transmitted from parent to offspring as a dominant. I am inclined to compare these phenomena with those so often witnessed in incubating eggs. When the incubators are not running uniformly, many of the chickens are born with deformed feet. Such abnormality, however, is found with especial frequency in particular strains of birds, though eggs from other strains exposed to the same conditions may give perfectly normal results. The liability is the thing transmitted, but without the appropriate conditions the effect is not produced.

The next group of cases to which I would call your attention is one in which the descent of the abnormality is limited wholly or partially by sex. Of these, the best known examples are those of the descent of colour blindness, haemophilia, and one of the forms of nystagmus.

In regard to colour blindness, the fact has long been known that males are affected with exceptional frequency. Colour blindness among women is decidedly rare. Horner was, I think, the first to call attention to the fact that in

the pedigrees of this condition there is remarkable regularity. Normal women transmit the affection to their sons, whereas colour-blind males with rare exceptions have only normal offspring. It is possible to interpret these phenomena by the suggestion to which several of us inclined some years ago, that colour blindness is a dominant, inasmuch as the normal males cannot transmit it. We were led to regard the condition as due to the presence of something inhibiting normal colour sense rather than to the absence of the factor to which that sense is due. Further investigation has, however, thrown doubt on this simple explanation. As to the descent, however, there is no doubt that the sons of colour-blind males do not inherit the peculiarity, and therefore cannot transmit it. The daughters of colour-blind fathers inherit it, and though it does not appear in them, probably all of them have the power of transmitting it to their sons. Knowledge derived from direct experimental breeding of various animals has provided a very remarkable scheme by which this course of descent can be represented factorially. One of the simplest of such examples is that of the inheritance of colour in Sebright bantams. When a cross is made between a golden hen and a silver cock, all the chickens come silver, but when a reciprocal cross is made, a silver hen being mated with a golden cock, the pullets come golden but the cockerels come silver. In this case we must regard the silver as dependent on the presence of a dominant factor, and the golden as due to its absence. The silver male is purely for silver, SS, having received that factor from both parents, but no pure silver hen exists. The hen is heterozygous for silver, and may be represented as Ss. We must further regard the hen as also heterozygous for femaleness, Ff. In the formation of the eggs there is what we call repulsion between the factor F and the factor S; the two are not present together in any egg. Those eggs which are destined to become males carry factor S, and those eggs which are destined to become females carry factor F. Now in colour blindness, the repulsion that has been so clearly proved between these factors may be represented as acting in the germ cells of the male between the factor for maleness and the factor for colour blindness; such that the sperms destined to become males carry factor M, but do not carry the factor for colour blindness, which passes entirely into those sperms which are destined to produce femaleness. It is evident that females heterozygous for colour blindness are not colour blind, and that colour-blind females can only be produced by the meeting of two germ cells both bearing the affection.

It follows from the hypothesis that the sons of colour-blind women will all be colour blind, and all the records of such families with which I am acquainted, with a single doubtful exception, are in agreement, in that the sons of such women were all colour blind.

It is practically certain that the same system of descent sometimes holds for nystagmus, respecting which Nettleship has recently collected some important genealogies.

As to the other sex-limited conditions in man, I can only say a few words. Haemophilia is the most familiarly known of these. It is likely that the condition in men follows the same descent as that established in the cases of colour blindness, but inasmuch as males affected with the condition very rarely live to the age of puberty, little is known of their powers of transmission.

I have already spoken of night blindness as a condition which descends as a dominant, but it is very interesting that Nettleship has lately published certain pedigrees of night blindness in which the descent is of the sex-limited type. This particular night blindness is apparently associated always with a high degree of myopia, and I suppose there can be little doubt that the recognition of the genetic distinction will lead to the discrimination of pathological differences also. Pseudo-hypertrophic muscular paralysis is another condition which descends in a similar way, and at least one large pedigree has been compiled by Herringham showing the same descent for peroneal atrophy.

At an earlier stage of this lecture I mentioned a doubt as to the justice of the inference that the characteristics which behave as dominants are due to the presence of factors, and to that point I must now return. In our experimental studies of animals and plants we are aware that certain negative characteristics may be produced not

by the absence of a quality, but by the presence of some factor which inhibits its expression.

In illustration I may show you an example in the Chinese primrose. These plants may have their flowers coloured or white and we are aware that the white may owe their whiteness in certain cases to the absence of colour; in which case, of a cross with the coloured form, the offspring are all coloured, whereas other whites contain something which destroys or inhibits the development of the pigment which is contained in them, and when such whites are crossed with coloured the offspring are white or nearly so.

In view of these examples the question fairly arises whether some of the dominants whose descent I have traced in human pedigrees may not in reality be due to the absence of some factor which in normal persons prevents such development. This suggestion was prominently brought forward by Doncaster in regard to colour blindness. He lately suggested a scheme according to which we should regard all normal males of the population as heterozygous Nn for a factor N normality, and all ordinary females as homozygous NN for the same factor. In either case the course of the descent would, both qualitatively and numerically, be the same as that represented by the earlier scheme. Between these two methods of representation we cannot as yet distinguish. The point is of great importance in another respect. The question will be prominent in most of your minds, whence do these dominant factors come? Whereas it is comparatively easy to conceive some process by which some elements of the composition may be lost, we are quite unable to suggest any source from which a factor may be derived or any mode by which it may be taken into the genetic system of the organism. We have been accustomed to speak of factors as being added to or subtracted from the sum total of an individual composition, but as to the actual origin of new dominants there is very little contemporary evidence.

In the case of those animals, such as the fowl, the wild original of which we think we know, many factors exist in our domesticated breeds which are not possessed by any of the wild species. No wild species, for example, has the complicated combs that we know in our domesticated breeds. None has the dominant white colour of the leghorn, and many other such instances might be given. How have these elements been added to the composition of the fowl? The problem is exactly parallel to that constituted by the occurrence of brachydactyly or night blindness in man. We can only trace back these peculiarities to a single individual of whose origin nothing is known, but whence did he derive the factor to which he owes his peculiarity?

We may compare these cases with those of the origin of an infectious disease, such as typhoid fever. When a medical officer of health recognizes typhoid in his district he knows that it must have come from some definite source of infection, and but for one feature in the descent of dominants we might be tempted to suggest that they also arose through the introduction of some element from without into the system. I see no *a priori* impossibility in such a belief, but in these dominants we know that the distribution among the germ cells is approximately symmetrical, and nothing that we know of animals and plants justifies the suggestion that a foreign element can be so treated in gametogenesis. Perverse as such a suggestion may appear, I do not think we should close our minds to the possibility that these dominants arise by a process of loss of some inhibiting factor. Until we have some far more direct method of recognizing the presence of factors this suggestion cannot be positively gainsaid.

Let me call your attention also to the inference which this suggestion would have on the conception of evolution. We might extend the same reasoning to all cases of genetic variation, and thus conceive of all alike as due to loss of elements present in the original complex. For all practical purposes of symbolic expression we can still continue to use in our analyses the modes of representation hitherto adopted, but we must not, merely on the ground of apparent perversity, refuse to admit that the lines of argument here indicated may prove sound.

Much as we now know of the inheritance of these abnormalities—some common, others rare—we know little of the descent of the normal characteristics of an ordinary human population. Indeed the only normal characteristics

as to the genetic nature of which we have clear evidence, are the colour of the iris and, to some extent, the colour of the hair. Our knowledge of these is derived from the work of Hurst; he it was who first succeeded in determining the inheritance of eye colour, which had long been a puzzle to anthropologists. The facts which he collected clearly showed that the presence of pigment on the front of the iris—the condition commonly known as brown or black eyes—is a dominant, whereas the absence of this pigment—the eyes we variously call grey or blue—is a recessive. And so far, though I anticipate the possibility of exceptions, no example has yet been produced of two parents critically known to have blue eyes producing offspring with brown or black eyes. As similarly shown, red hair behaves as a recessive, and I understand that at the forthcoming meeting of the British Association in Birmingham Hurst will arrange a demonstration of this as exemplified by the inhabitants of a Midland village.

From the records of portraits of the royal house of Hapsburg it is clear that the familiar facial characteristics of the family behave with fair regularity as a dominant, and there are indications that several of the artistic gifts follow with some accuracy the course characteristic of recessives. By careful observation and record the list might rapidly be increased.

Referring to the descent of various forms of insanity, nothing has been made out with certainty with the exceptions that I have mentioned—hereditary chorea, which behaves as a dominant, and the condition somewhat vaguely described as feeble-mindedness, which behaves as a recessive. The genetic analysis of insanity is at the present time practically impossible from the fact that the diagnosis of the various forms of insanity is by no means clear, and also from the fact that the conditions of life have obviously much to do with the development of such weaknesses.

Similar difficulties arise in regard to deaf-mutism. It is not in question that this condition is very often transmitted, but forms of deafness are so various, and there is such uncertainty as to the nature of the condition in any given case that we cannot expect to perceive the operation of any regular system here. It is not impossible, also, that in regard to the descent of liability to infectious disease, we may hereafter trace rules similar to those which have now been established in plants, especially by Biffen.

I propose now briefly to allude to some other significant aspects of these results. First as to the nature of segregation. This, I think, we must regard as a process comparable with the mechanical separation of substances which will not mix, or mix imperfectly; whereas some factors are continually transmitted in their entirety, others are liable to be broken up by what I regard as a process of quantitative fractionation occurring in the mechanical dissociation of the elements at certain critical cell divisions. As to which are the critical cell divisions, we have no clear indication. I cannot agree with those of my colleagues who think segregation must occur exclusively in the maturation processes. The case of the double stock, in which the whole male side of the plant differs genetically from the female side, as proved by Miss Saunders, shows almost conclusively that segregation may occur in somatic divisions. It is also difficult otherwise to interpret the fact that in certain cases the parental combination influences the distribution of factors among the gametes so that the distribution among the grandchildren is different according to the way in which the characters were combined in their grandparents. Into these details I cannot now enter.

The tendency of our work, as you will perceive, is more and more to exhibit the definiteness and fixity of the laws of descent. The medical man, justly proud of what he can do to make good bodily shortcomings, looks naturally to the conditions of life as the influences which chiefly determine destiny. The statesman, to whom physiological fact is a mystery that he rarely feels any desire to explore, inclines naturally to a similar conception of life. There are signs that more true views are beginning to prevail. It is impossible to study such pedigrees as those of night blindness, in which a condition introduced by one individual into a community hundreds of years ago continues to be perpetuated according to definite arithmetical rules among a remote posterity, without being impressed with the fact that whatever influences may be brought to bear by hygiene or by education, the ultimate decision

rests with the germ cells. Evolutionary change is effected not so much by gradual transformation of masses under ameliorating or detrimental conditions, but, in the main, by the occurrence of individual and sporadic variation.

It is beyond my province to discuss in detail the practical question denoted by the word "eugenics." Those who are engaged in the work of physiological analysis probably do well to keep clear of those distractions. The direction, however, in which genetic research points is not difficult to determine. Sir James Crichton-Browne has discussed at this Congress the striking percentage increase of lunacy in recent decades, and, as always when such topics are under consideration, there are persons disposed to lay the blame on the conditions of life, the severity of the modern struggle, a greater or less consumption of alcohol or other drugs, and so forth; those, however, who have some knowledge of genetic physiology are aware that the whole force of modern science and legislation has hitherto been exercised in the preservation of defective strains in our midst, and will not feel serious hesitation as to the true cause of the increase.

The Mental Deficiency Bill we recognize as, in principle, a wise beginning of reform, but, on the other hand, we cannot hear without disquietude, of the violent measures that are being adopted in certain parts of the United States with similar objects. It is one thing to check the reproduction of hopeless defectives, but another to organize a wholesale tampering with the structure of the population, such as will follow if any marriage not regarded by officials as eugenic is liable to prohibition. This measure, we are told, is actually proposed in certain States. Nothing yet ascertained by genetic science justifies such a course, and we may well wonder how genius and the arts will fare in a community constructed according to the ideals of State Legislatures.

Philologists tell us that, by an irony of development, the word "dull" comes from the same original which in Dutch has become "dol"—mad, and is better known to most of us in the German equivalent "toll." But I anticipate that, connected as the ideas may be, we might, by ridding our community of mania, leave it gravely infected with dullness. There are other no less obvious considerations which I might develop, but I trust I have said enough to show that in the experimental analysis of genetics we have an instrument of novel and extraordinary power, and I am not alone in foreseeing that genetic science must profoundly influence the course of human thought, and, ultimately, the conduct of society.

Address

ON

THE RELATIONSHIP BETWEEN MEDICINE AND PUBLIC HEALTH.

DELIVERED AT THE SEVENTEENTH INTERNATIONAL
CONGRESS OF MEDICINE.

BY

THE RIGHT HONOURABLE JOHN BURNS, M.P.,
PRESIDENT OF THE LOCAL GOVERNMENT BOARD.

I MUCH appreciate this opportunity of addressing an audience which is representative of the medical culture of the entire civilized world; an audience of men who have assembled to interchange experience, to report progress, and to give and receive mutual enlightenment in their glorious work for the benefit of suffering humanity.

My intention in addressing you to-day is in the first place to bear my testimony to the immense debt of gratitude owing to you by the whole of humanity. Arising out of this, my remarks will in the main be concerned with the intimate relationship which exists between medicine and public health.

THE SAVING OF LIFE.

When speaking of the marvellous lowering that has taken place in the death-rate in this country, one is perhaps too apt to remember only social and sanitary progress as the explanation of this great change. My address to you to-day may, I trust, serve to show the appreciation by the public of the fact that to a very large extent humanity is indebted for the saving of life