THE MILROY LECTURES ON CHANGES OF TYPE IN EPIDEMIC DISEASES.

Delivered at the Royal College of Physicians.

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LECTURE I.

Distinction between Quantity and Quality in Epidemic Prevalence.—Grouping of Infective Diseases according to Degree of Mobility of Type.—Its Connotation.—Diseases of Unstable Type.

THE statistical records of epidemic diseases show that from time to time prevalence occurs, on a larger or smaller scale, and after a time subsides again, leaving more or less conspicuous traces upon the death-roll. Sometimes the epidemic is so exceptional in point of average severity of attack that attention is perforce drawn to the fact of change of quality; as, for example, the malignant small-pox of 1871, or the attenuated scarlet fever of the last few years. But as a rule, statistical records, or rather the inferences which are based upon them, tacitly assume that the variation is one of quantity in the main if not entirely, and that the quality remains practically the same year after year, and epidemic after epidemic. This assumption is necessary if death-rates, or even attack-rates are to be taken as the sole measure of the epidemic course; but it is far from being sound, as clinical records and the detailed study of local epidemics abundantly prove.

Changes of type, changes, that is, in the quality of the contagium, are constantly taking place, rapidly and even fitfully in some diseases, slowly and more rhythmically in others. These changes have often a dominant influence over the epidemic course, not inferior even to the mechanical variations due to the thousand and one external conditions which render easy or difficult the transfer of infection from person to person. Something akin to this was implied in the old doctrine of "cycles," which however scarcely recognised more than one kind of epidemic, and fails in practical application because the cycle is not infrequently interrupted or lost. There are at least two distinct classes of epidemics, those which are and those which are not determined by increased energy of the disease itself. The term "cycle" cannot be applied to both except in different senses. This distinction may serve to clear up some of the irregularities which the cyclic theory in its simplest form leaves unexplained. Perhaps the simplest illustration of orderly variations in quality are afforded by the malarial fevers. They present a well-defined gradation of types, each having a distinctive name. It is convenient, too, to have the problem simplified by the absence of infection from person to person, so that human beings may be regarded as test objects, serving to demonstrate the degree of virulence as well as the time and range of epidemic or endemic prevalence, without acting and reacting one upon another, as in diseases of the infectious kind. At definite seasons, under tolerably definite conditions of warmth and moisture, the malarial poison becomes active, and infects a larger and larger number of persons until a maximum is reached, after which the number of attacks declines. But, as Hirsch¹ states, there is a tolerably constant relation between the prevalence and severity of the fever. As the attacks increase in number, they increase in average severity, and *vice versa*. Hence increased infectiveness or power of grafting itself on man is associated with increased virulence of the disease so grafted. Whatever the degree of intensity to which the fever attains, the severest type is met with at the height of the endemic or epidemic, the milder forms predominating at the beginning and end. Here there are changes of the most unmistakable kind, both in quality and quantity, the former dominating and in a sense causing the latter. The change of quality takes place outside the human body, in the soil. In scarlet fever and measles there

are analogous changes, but they are slower and less conspicuous, owing to the fact that other causes besides intensification of the poison bring about epidemic prevalence, and other causes than attenuation arrest it.

Malarial fever shows, too, the real meaning of infectiveness and the purely relative character of susceptibility and insusceptibility. Under favourable conditions it becomes more and more capable of infecting man; first the more susceptible, then the less susceptible. Thus the attacks grow more and more numerous, for greater and greater resistances are overcome; and meanwhile the most susceptible no longer escape with slight attacks. The intensity of the contagium is increasing, and now that the less susceptible suffer mild attacks the more susceptible are stricken with fever of a graver type. Had the disease been infectious from person to person, increased prevalence would naturally be attributed to that cause; but as it is not, an increased infectiveness of another kind has to be recognised, an increased power of overcoming resistance, coincidently with the clinical changes in the average attack, or rather in the most severe varieties met with. And there is another way in which this increased intensity makes itself manifest; and that is by an increased power of grafting itself upon new soil. From time to time malaria extends to localities not usually malarious, and the periods at which the extension occurs are those of greatest intensity in the endemic area. In the permanent foci themselves prevalence occurs every year, but not always to the same extent nor with the same virulence or power of spreading into habitually non-malarious regions. The farther it travels from its endemic seat, the less severe and less permanent is the infection of the soil; less permanent, for it is found to die down to its former limits sooner or later, and first of course from the distant parts; and less severe, for the attacks to which it gives rise in human test objects are less virulent and less numerous. The last that is heard of malaria in a country from which it is departing is a scanty prevalence of the milder forms of intermittent fever. The epidemic and endemic history of cholera presents many points of analogy. In its endemic foci an annual cycle is manifest under the influence of physical conditions affecting the soil. The tendency to epidemic extension is greatest at the period of maximum endemic intensity; in other words, the change in quality which gives to cholera its ferocity as regards numbers and severity of attack in man confers upon it also the power of travel, of grafting itself upon new soil. Its power of overcoming resistance is increased, measured either by human or geographical units. The degree of local infection has still to be estimated indirectly in terms of the number and severity of attacks among the population, and although the gradations of severity are less definite and bear less distinctive names than in ague, they range from the malignant and rapidly fatal forms down to those which are indistinguishable from simple diarrhoea.

Something of the same kind occurs in diarrhoea, as Dr. Ballard² has shown. It reappears year after year, not with the same intensity, under the influence of physical conditions, and especially the temperature of the subsoil. Dr. Ballard finds some indication of a change in quality in the course of the brief annual outburst. Its severity appears to be least at the beginning, and to increase as the season advances, the greater severity being indicated by a lessened interval between onset and death in fatal cases, and also by an increased incidence upon children over 1 year of age.

In diphtheria a new and important element is introduced—namely, infection from person to person, although an endemic character is still evident. As Dr. Thorne Thorne³ states, "Prevalences of recognised diphtheria are commonly associated in their beginnings, during their continuance, and after their apparent cessation, with a large amount of ill-defined throat illness." Elsewhere, he shews that certain forms of sore throat, clinically indistinguishable from the rest, are in all probability slight forms of diphtheria; and further, that all forms of sore throat—infectious or otherwise—afford a congenial nidus for diphtheria, and bring about abnormal susceptibility.

A typical diphtheria epidemic then is of different quality

¹ *Geographical and Historical Pathology*, vol. (p. 239, etc.

² Supplement to the Seventeenth Annual Report of the Local Government Board, 1887-8.

³ *Diphtheria; its Natural History and Prevention*, p. 218.

at different stages; the attacks are most severe at the height of the epidemic, and the slighter forms prevail at the beginning and end; but in an infectious disease it cannot be assumed that the variation in quality is attributable to telluric conditions, for the poison may be passed on from one susceptible subject to another without recourse to soil, and it seems that diphtheria and certain other diseases may be rapidly intensified in the process. In Dr. Thorne Thorne's words, "There is reason to believe that attacks of so-called sore throat exhibit, under certain favouring conditions, a 'progressive development of the property of infectiveness,' culminating in a definite specific type which is indistinguishable from diphtheria." Such conditions are found in the aggregation of susceptible children at school in localities where sore throats are common and include some of potentially diphtherial character. The type of the disease is mobile, and capable of rapidly assuming an intense form, if the virus is repeatedly transferred from one abnormally susceptible throat to another. There seems to be no reason to doubt that the intensification thus brought about is comparable to that of the purely telluric diseases, except in causation. There are other changes of type of far wider range. Diphtheria was in abeyance, in name at all events, during the first half of the present century, but from 1855 onwards it again became virulent and prevalent. Since then it seems that a less intense type has prevailed on the whole, but in the earlier part of this period diphtheria mortality rose and fell at intervals of about five or six years, as Dr. Longstaff⁴ has shown, and from analogy with the almost exactly parallel course of scarlet fever it may be suspected that this cycle was one of varying quality as well as quantity, although statistical proof is wanting. Several other diseases present a similar curve of mortality, among them erysipelas, puerperal fever, and acute rheumatism. Of late years the mortality from diphtheria has again increased, but it has not yet been conclusively shown how far this is due to any increase in the average virulence of the disease, and how far to the greater facilities for diffusion.

Erysipelas comes near to diphtheria in many of its characteristics, and especially in its inconstancy of type. Widespread epidemics are not common, but something approaching to a pandemic occurred in America from 1840 to 1860, and was characterised by malignancy no less than extent. In this country it is better known in the sporadic form or in very limited epidemics. Not long ago it was familiar in hospital experience, and especially where surgical cases were crowded together in wards with insufficient care for cleanliness and ventilation—conditions not dissimilar to those under which diphtheria is liable to take an increased activity. There is aggregation of susceptible persons in a confined space, and the open wound in the one instance may be regarded as analogous to the catarrhal condition of the fauces in the other, affording a ready nidus. However this may be, erysipelas habitually made its appearance under such conditions, often without clue to its origin, and increased indefinitely in virulence. It is capable of existence as a saprophyte, or at all events under some form not recognised as erysipelas, and its constant association with filth conditions at once suggests itself as a confirmation of the former view.

Acute rheumatism, which Dr. Longstaff⁵ has shown to have such close relation to the diphtheria group in its mortality statistics, is not without other indications of affinity. Professor Pel, of Amsterdam, found evidence of epidemics among hospital patients, epidemics which differed one from another in severity and also in the tendency to one or other kind of complication.⁶

Plague seems to be closely connected with this group in its relation to telluric conditions as well as filth and overcrowding. The interval between epidemics in plague-haunted countries is bridged over by sporadic cases of mild type and scanty infectiousness,⁷ and Dickson,⁸ writing of an outbreak of the plague in Mesopotamia, states that two or three months previously, in the winter, there was prevalence of glandular swellings, unaccompanied by other symptoms.

Finally plague broke out in severe form, reached its acme in the spring, and died out during the summer, but on its cessation glandular swellings again became prevalent, and continued for two months. The parallelism to diphtheria and ague is close, and the evidence of rapid change of type sufficiently clear. And, moreover, under favourable circumstances of squalor and overcrowding, practically an accumulation of susceptible persons, plague like typhus is apt to make its appearance and spreads fiercely, thus raising a suspicion of some intensification of the virus.

Before passing to other diseases of similarly unstable type it may be well to contrast with them the diseases of less changeable character, in order to obtain a broader view of the meaning of stability or instability. These fixed types will, however, be considered more fully in the next lecture. It will be sufficient to take scarlet fever and small-pox for present reference. Scarlet fever is one degree further removed from malaria. It is by no means certain that under ordinary circumstances soil has much to do with the present stage of its epidemiology. It is infectious, and although we cannot affirm that no other cause than direct or indirect infection from another case of scarlet fever can possibly bring about the disease, it is at all events clear that the sporadic cases in which it is open to us to suspect other origin are far fewer than in diphtheria, and, moreover, with advancing knowledge of the possible channels of infection, the apparent exceptions are becoming still more rare. Severity of attack and infectiousness rise and fall together, as is shown by statistical evidence on a large scale (to be considered later on), and also by the common clinical experience that malignant cases are more infectious than others under equal conditions. Sometimes the quality of scarlet fever will change almost as suddenly as that of diphtheria, and this is true of epidemics as well as individual attacks. But while abrupt changes are the rule in diphtheria, they are the exception in scarlet fever. An epidemic lasting only weeks or months is usually fairly constant in type, without intensification, of the kind seen in malarial and diphtherial outbreaks. The type is more stable, though occasionally showing signs of instability. The "progressive increase in the property of infectiveness" occurs no less certainly in scarlet fever than in diphtheria, but it is seldom rapid, and extends usually over a term of years. The type may be persistent for long periods at either the maximum or minimum intensity, and at any phase in its cycle epidemic diffusion may take place, its quality being governed by that of the prevailing phase, and its quantity or extension by the climatic, social, or other accidents, which give facilities for its distribution. Small-pox differs from scarlet fever in possessing still greater stability of type, still slower variations in intensity, and still less evidence of any dependence upon saprophytic stages of existence. It is highly infectious and apparently dependent entirely upon infection for its continued existence. Severe and mild cases may occur side by side, owing to difference in susceptibility, natural or acquired, but unequivocal transitions from mild to severe type, apart from this, are rare, and abrupt changes of epidemic type equally so. There is little trace of progressive development of infectiousness on a small scale, but, nevertheless, there is a slow change in virulence, obvious enough in its extreme manifestations, in 1871 for example. Although the records prove to demonstration the inhibitory effects of vaccination, they show also traces of a cycle of intensity, modified, but not obliterated, by modern precautionary measures. There seems little evidence to warrant the assumption that small-pox can live in soil or other outside media, or that insanitary surroundings affect its etiology, however much they may interfere with the recovery of those who are attacked.

Many writers have dwelt upon the question of the ultimate origin of infective diseases, and have suggested that all, even those which have lost all trace of saprophytic relations, may have been developed in the course of ages from harmless saprophytes. Following out this idea, it is interesting to note that most of those which are most inconstant in type, and present the most striking and rapid changes in quality, retain saprophytic properties in a more or less marked degree. Their contagia are capable of growing, habitually or occasionally, in non-living media, some of them in earth, almost all of them in artificial pabulum in the laboratory. On the other hand, the diseases which are the most stable in

⁴ *Studies in Statistics*, p. 313, etc.

⁵ *Loc. cit.*

⁶ *BRITISH MEDICAL JOURNAL*, January 5th, 1889.

⁷ Hirsch, vol. i, page 533.

⁸ *Trans. Epid. Soc.*, 1879.

type are comparatively free from suspicion of saprophytism. It is precisely these fixed and purely parasitic contagia which have most successfully resisted the attempts of bacteriologists to induce them to grow in artificial media. This is in keeping with their other characteristics, and may be regarded as a further illustration of a fixity of character, which does not allow them either to adapt themselves readily to new conditions, or to undergo rapid physiological modifications. Then again the diseases which are most changeable in type are, on the whole, most transmissible to lower animals, and, unlike the opposite group, are not infrequently conveyed by milk or water.

The degree of protection conferred by an attack affords another point of contrast. It is far more lasting in diseases of stable type, and reduced to an almost doubtful quantity in the mobile group. The tendency to relapses and to a chronic form of the disease is strongly marked in many of the latter, but unknown in the former group. In all these respects scarlet fever occupies an intermediate position between the two extremes. It is allied to the diseases of inconstant type in many respects. It affects comparatively few of the lower animals. It is conveyed by milk, but not apparently by water. Relapses are not unknown; in hospital practice they are met with in about 4 per cent. of the cases, but the proportion in private practice would seem to be far smaller, since comparatively few practitioners seem to meet with them at all. Possibly this tendency may prove to be due to hospital conditions, a faint manifestation of the effects of aggregation which are found in diphtheria and erysipelas. On the other hand, scarlet fever approximates to the other group in its lasting protectiveness and in the stability of type, which it usually but not always displays. The seasonal curves of mortality⁹ on the whole confirm the suggestion of similarity of habit among the members of the respective groups. Diarrhoea and "English cholera" are most fatal in July and August, Asiatic cholera a little later, plague (seventeenth century), and "dysentery" in September. Enteric fever is most fatal in September in New York, but in October and November in London. Diphtheria, erysipelas, puerperal fever, and rheumatic fever are as closely allied with each other and with scarlet fever in their seasonal curves as in the annual course between 1855 and 1880. The more stable and more purely parasitic diseases are most fatal and presumably most prevalent in the first half of the year in this country, with the exception of the occasional second maximum of measles in December. They do not, however, hold very closely together in this respect.

From the clinical standpoint, too, there is confirmation of the distinction between the constant and inconstant types, apart from variation in virulence. The former are more orderly in the course of the individual attack, more regular in the duration of the successive stages and the character of the symptoms, and less liable to erratic complications, relapses, and indefinite continuance in chronic form. Implication of the nervous system especially is a characteristic of many of the mobile class, and the fauces, kidneys, and serous surfaces are often attacked. The incubation is usually short, while in diseases of fixed type it is usually long.

From many points of view influenza is a typical member of the lower group. It varies conspicuously in quality, passing rapidly from mild to severe forms and *vice versa*, although in particular localities it has seemed to retain a tolerably definite epidemic character during its brief stay. It is infectious in a very variable degree, but scarcely protective, and relapses are common enough. In many instances aggregation of susceptible persons has been instrumental in determining an outbreak, although the evidence of intensification is not clear. The incidence has sometimes been limited to adults, at other times children have suffered in large numbers. The symptoms and complications vary in the most erratic fashion, although here again a brief and more or less local constancy has often been observed. There is not much indication of endemicity, though Dr. Parsons finds reason to suspect that it has a more or less permanent focus in the western part of Russia,¹⁰ and in certain parts of England it has remained long enough to bridge over the interval between two

epidemics. Thus in the Colne valley (Yorkshire) it is stated by Dr. Burnley Walker to have been prevalent throughout 1891. Some degree of saprophytism has been established by the cultivation of the specific organism. On the other hand, it has no definite relation to season, and little periodicity in other respects. The epidemic of 1847 was preceded and followed by minor outbreaks at intervals of three or four years, but we are now witnessing a fourth outbreak within little more than three years. It has been suggested that influenza is in a sense always with us—that it is an intensified form of catarrh which is prevalent at all times.¹¹

In many places in this country the influenza epidemic was preceded by an unusual prevalence of ordinary catarrh, among which were scattered, according to some observers, cases having symptoms similar to the epidemic disease. Dr. Parsons does not accept this view, but elsewhere he mentions that influenza as a cause of death has never entirely disappeared from the Registrar-General's returns, and that, not only was there some indication of epidemic recurrence in 1851, 1855, and 1858, but something very like influenza broke out in Norfolk in 1878, and at Northallerton in 1887. If influenza in horses be really identical with influenza in man, we have high veterinary authority for the statement that it is of frequent occurrence in England. A similarly far-reaching suggestion has been made by Dr. Foxwell,¹² who is inclined to recognise in epidemic pneumonia simply a variety of a general infective catarrhal fever, a "constitutional pyrexial state which has respiratory, cutaneous, intestinal, meningeal, and renal varieties, just as there are pulmonary, anginous, nephritic, rheumatic, pyæmic, and cutaneous varieties of the constitutional pyrexial state called scarlet fever." Dr. Sadler also recognises an ordinary febrile catarrh of infectious quality, cases of which are often associated with pneumonia, bronchitis, and diarrhoea in other members of the household.¹³

These views will be considered later on. They are mentioned here as tending to show that in pneumonia and influenza, as in diphtheria, the range of possible variation includes forms not generally recognised as akin to the more severe. But pneumonia must in any case be classed with the diseases of changeable type. Its epidemics are attended with high case mortality, whether in outbreaks limited to one or two households or widespread epidemics like that which raged at Middlesbrough in 1888, and was found by Dr. Ballard to kill 21 out of every 100 attacked.¹⁴ He quotes from Dr. Grimshaw figures which show that the fatality of Dublin hospital cases varied in different years from 2.6 to 24.4 per cent. Epidemic pneumonia has come to be regarded as a filth disease, aggravated if not originated by insanitary conditions, and this was confirmed by Dr. Ballard. Unlike the other filth disease, however, it is most fatal in spring, a circumstance which raises a suspicion that its real affinities may be with the typhus group rather than with erysipelas or epidemic diarrhoea. It is saprophytic, in the sense that it can be cultivated in artificial media.

Enteric fever, on the whole, belongs to the same group. The contagium has been cultivated, and is capable of living in water and in milk as well as in soil. A probably saprophytic character is also implied by its notorious affinity for filth conditions. Its seasonal curve is not unlike that of erysipelas, diphtheria, and scarlet fever. The maximum is in October and November, but in New York it comes earlier and approximates more closely to the season of the more purely telluric diseases. Little is known of its transmissibility to lower animals, and, even as regards man, the transmission seems to be usually of an indirect kind, like that of cholera. The protection conferred by an attack is slight, and relapses are common. Dr. Spottiswoode Cameron has found reason to suspect that in the Leeds Fever Hospital a larger proportion of relapses and a higher case mortality occurred when the number of patients in a given ward space was doubled. There is little constancy of type in the instances where infection can be traced from one person to another, a slight attack being often the antecedent of a severe or fatal one, or even an epidemic. There are abundant records of

¹¹ Parsons, *loc. cit.*

¹² Practitioner, July, 1888.

¹³ *Lancet*, July 14th, 1888.

¹⁴ Supplement to the Eighteenth Annual Report of the Local Government Board for 1888-89, p. 196, etc.

⁹ Buchanan and Mitchell, *Journal of the Scottish Meteorological Society*; Longstaff, *Studies in Statistics*; Registrar General, *Annual Summary for 1890*.

¹⁰ Report on the Influenza Epidemic of 1889-90, p. 103.

both mild and severe outbreaks, some of which will come under consideration in connection with milk and water epidemics. The death-rate from enteric fever has for many years been falling, and hospital statistics show that there has been some decline in severity of hospital cases, insufficient, however, to account for the less mortality. Apparently therefore there has been lessened prevalence as well. The statistics published by the Metropolitan Asylums Board show that the case mortality has varied considerably in different years, but neither the hospital records nor the death-rates show any clear trace of the five-yearly cycle which at one time was so conspicuous in regard to erysipelas, diphtheria, and scarlet fever. On the whole, therefore, enteric fever may be regarded as decreasing in severity and still more in prevalence, but exhibiting irregular fluctuations in both respects.

Many other examples might be given, but the above may serve to illustrate the broad principle that the contagia which are most changeable in type are those which remain in closest touch with the saprophytic forms to which they are allied.

ON THE TREATMENT OF COMPLETE OBSTRUCTION OF THE LARGE INTESTINE BY TEMPORARY TYPHLOTOMY.¹

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THE train of symptoms arising from complete obstruction of the large intestine is such that in the majority of cases a differential diagnosis can be clearly made between obstructions in this part of the bowel and the small intestine. It will be well to consider a few of the broader features which point to the obstruction being in the large rather than in the small intestine.

HISTORY OF THE ATTACK.

Speaking generally, all the symptoms are more sudden and acute in obstructions of the small than of the large bowel. Thus in the former the symptoms may be reckoned by hours and days, while in the latter it is rather by days and weeks. Hence the terms which some writers employ, acute intestinal obstruction and chronic intestinal obstruction, the former referring to the small, the latter to the large intestine. It is possible that the nervous mechanism of the upper bowel is more sensitive to injury, but it is probable that the difference in severity arises more from the cause of the obstruction than from its actual position. In far the larger number of instances the cause of obstruction to the small intestine arises external to the gut—twists, herniæ through the omentum and mesentery, or slipping of the gut beneath old bands of adhesions. In such accidents not merely is the calibre of the bowel obstructed, but its vessels are strangulated, and the experience of ordinary herniæ demonstrates clearly that the severity of the symptoms is in proportion to the degree to which the bowel is nipped. Obstruction of the large intestine, on the other hand, most commonly results from obstruction within—strictures fibrous or malignant, impacted fæces, etc. Indeed, very commonly it is a combination of the two. Thus, a bowel may be considerably narrowed by stricture, and yet give rise to no severe symptoms till a scybalous mass accidentally becomes jammed into its upper orifice. Occasionally the large intestine, or more commonly its sigmoid flexure, may be the seat of volvulus, when the symptoms are often as acute as if the small intestine were implicated. The acute symptoms consequent on obstruction of the small intestine are generally ushered in with severe pain and violent vomiting, and the patient quickly passes into a state of collapse; unless the obstruction is low down there is comparatively little abdominal distension. When the obstruction is in the large bowel the onset is more insidious. Vague colicky pains, with obstinate constipation and a feeling of nausea, may be all that is complained of the first few days. Purgative medicine may have been taken, coincidentally with which the severity of the symptoms increase; vomiting is slight at first, merely consisting of the contents of the stomach and duodenum, seldom becoming fæcal till at

least four or five days after its onset. Day by day the abdomen becomes more and more distended and tympanitic, and if unrelieved the patient gradually passes into a state of collapse. Although in most cases of obstruction of the large intestine the symptoms are comparatively chronic, there is great variation in the interval which elapses between the first onset of the symptoms and their fatal termination. Sometimes a patient may be in an extreme condition after a week or ten days, while in a few instances a month or even longer may elapse before the general symptoms become urgent. In such cases, however, the obstruction is generally quite low down—in the rectum.

Intussusception, with its characteristic symptoms, belongs both to the small and large intestine; its treatment, therefore, will not be considered in this paper. Nor do I propose to go further into the details of the symptoms of obstruction.

It is assumed that we are now at the bedside of a patient who is obviously suffering from obstruction, and the general symptoms point to the large intestine as being its probable seat. The symptoms have been present for some days, and have been gradually increasing in severity. A careful examination of the abdomen has revealed no definite tumour or other indication suggesting the exact site of the obstruction, and an examination of the rectum by the finger has given merely negative results. I may here say that the evidence afforded by the passage of tubes up the bowel is absolutely worthless, and that their employment is not devoid of danger. I have been present when some feet of soft rubber tubing or œsophageal bougie have been triumphantly passed up the rectum, and the procedure regarded as evidence that the obstruction must be at least as high as the transverse colon. Nevertheless, *post-mortem* examination showed an impassable stricture in the upper part of the rectum. Fortunately, these tubes bend and coil up, otherwise, if any force were used, they would certainly perforate the bowel. Even when no obstruction exists, I suspect that few tubes have ever been passed as high as the sigmoid flexure, and probably never beyond it.

TREATMENT.

Injections.—Since many cases of obstruction are due to a scybalous mass impacted into a previously narrowed or strictured portion of the bowel, the effect of carefully administered injections should be tried with a view to the washing away or breaking up of the obstructing plug. Injections should be used on a regular plan. I pass into the rectum, as far as it will go without using the slightest force, a half-inch india-rubber tube. It is then cut off so that only a few inches protrude from the anus. The patient being placed on his side at the edge of the bed, as much warm water as the bowel will hold without undue pressure is injected slowly up the tube by means of a Higginson's syringe. This having remained a few minutes, the nozzle of the syringe is removed, and the water allowed to return through the tube. This water is usually mixed with a certain amount of fæcal *débris* which has collected below the obstruction. A second quantity of water is now injected. If this returns clear, it is probable that little good will result from the washing, although it may be repeated once or twice again. On the other hand, should it return markedly stained the case is more hopeful, for it may mean that the water is disintegrating the lower part of a fæcal block. Indeed, so long as the water returns stained the injections should be repeated, and in fortunate cases it may happen that after a few washings the obstruction gives way, and copious evacuations follow. Warm water seems preferable to oil as having more solvent properties, and it also enables the effect of the injections to be more accurately gauged by observing the extent to which it is stained. We will now suppose that the injections have afforded no relief, and the question arises as to what further treatment can be adopted. Of course it is possible that, if untreated surgically, the obstruction may give way by the aid of Nature alone, but the question for decision is whether a better chance is given to the patient by leaving the case to Nature, or by direct surgical interference. Provided the patient be not *in extremis*, I have no hesitation in strongly urging operative measures as affording the patient the better chance.

THE SELECTION OF AN OPERATION.

An operation being decided upon, the best manner of pro-

¹ Read before the Harveian Society.