REMARKS ON SOME MODERN MEDICAL ASPECTS OF LIFE ASSURANCE.*

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IN these changing times of medical knowledge and medical opinions, and with the more exact power of differentiation of many classes and forms of disease which we now possess, it could not be but that the bearing of these later views upon proposals for life insurance on the part of invalid lives should be such as to require very careful and frequently revised consideration at the hands of medical examiners and referees. I have thought that a short paper devoted to a notice of some of the most salient points in this connection might be acceptable to the members of this Society. As is probably known to most of its members, Mr. Robinson and myself are directors of the Norwich Union Life Assurance Society, and in that capacity the duty has been assigned to us of considering in their medical aspects the various proposals, with medical reports attached, for insurance of lives which are offered to the Society. As such referees our experience has now become very large, and when I state that during the last ten years alone more than 27,000 such proposals have passed through our hands you will readily understand that any opinions we may have formed as the result of this experience rest upon a sufficiently wide basis.

It would, of course, be impossible here to mention more than a very few of the medical points which are gradually forcing themselves upon the attention of the insurance world, and especially upon those who have to examine lives proposing for insurance, or to express their opinion upon their value. I would only remark that so great, and even still increasing, is the practice of life insurance, that it is now as much a necessity for every medical man of whatever grade or wherever located to understand the latest bearings of this branch of professional practice, as it is to keep himself fully acquainted with other modern developments of medical knowledge. The chief subjects in connection with medical examinations for life assurance that I shall touch on are

1. Tuberculosis.
2. Pneumonia and pleurisy.
3. Diseases of the heart.
4. Albuminuria.
5. Glycosuria.
6. Heredity and longevity.
7. Physical development and physique.
8. Intemperate habits.

TUBERCULOUS DISEASES.

The recent researches into the communicability of tuberculosis, and its usual propagation from person to person instead of by hereditary influences, have necessarily called the attention of the insurance world as well as of the general public to the hope, indeed the probability, that before long a further marked diminution may be expected in the very heavy mortality which arises from this disease, and which, indeed, has made it one of the terrors of life offices.

Sir Richard Thorne has recently stated that a comparison of the statistics of the years 1851-60 with those of 1890-95 showed that deaths from all forms of tuberculous disease had during that period undergone a diminution amounting for all ages to over 36 per cent., and for pulmonary consumption to over 40 per cent. From this latter about 40,000 persons appear now to die annually in England and Wales. The actual proportion of deaths from this disease varies considerably in different localities, but on the average about 1 death in every 10 is due to phthisis.¹

Sir W. Broadbent, in a recent lecture at Huddersfield, quoted the returns of that borough for 1897, which showed that of the total deaths occurring in that town (of about 100,000) in that year, no fewer than 222, or 1 in 7.5 of those who died were due to tuberculous disease. Many of these doubtless were in the younger portion of the population, in whom this class of disease appears to be rather on the increase than otherwise. But such figures show how enormously rife tuberculosis still is, and that we must yet wait

awhile before any great modification of our views as to insurable risks connected with it can safely be made.

Our great hopes for the future, as we all know, with regard to it lie in the more intelligent appreciation of its nature and chief modes of diffusion; and consequent upon this, in its prevention by improved hygiene by securing that our milk and meat shall be free from specific contamination, and by proper management of expectorated or other discharges by which the infective bacilli are conveyed from person to person.² We will at least hope for some further, even if slight, diminution in our mortality records from the curing or respiting of persons already diseased, through the modern treatment of the consumptives by open air, sunshine, and the best hygienic conditions.

Now that the ready communicability of phthisis by the dust of dried sputum is known, many cases of its occurrence in several members of an apparently healthy family, one after the other, or in husband or wife consecutively, are fully explained. There would seem to be a well-grounded expectation that by acting upon this knowledge many lives will be spared, and therefore the total mortality of adults from this disease be sensibly lessened.

In considering the question of heredity in phthisis, we are glad to recognise the sharp distinction that can now be drawn between the old doctrine that tubercle bacilli are transmitted from parent to child, and the new one that the heredity consists only in the tissues of some bodies being so constituted as to form an unusually suitable soil for the bacillus to grow in. For clearly, if the germs of the disease can be kept away, these specially structured individuals will have a much greater chance of survival, even if they be somewhat more delicately-constituted than their neighbours. In this way, again, the tuberculous mortality may be distinctly lessened.

Of course we must for the present act very cautiously.³ The great hoped-for changes are as yet only in the future. And with regard to the table of insurance rates, it must not be forgotten that the usually accepted expectation of life at the various ages is deduced from the experience of healthy lives, under what is called the Hm. table, and not of diseased ones. And it is probable that comparatively few of those actually consumptive or belonging to the so-called predisposed families would be included in this category. The duty of medical examiners must, therefore, still be to continue in their reports to lay great stress upon the presence of or evidence of special liability to tuberculous disease; and the duty of insurance offices, which have to safeguard the interests of the general body of their insurers, will still be either to reject such doubtful lives or only to accept them with a due and often very heavy rating-up equivalent to the apparent risk involved.

I may mention in passing that the deaths in our own city of about 110,000 persons for 1897 were 2,062, of which number 238 deaths were due to tuberculous disease, or about 1 in 8.5 deaths, and from pulmonary phthisis alone 155, or about 1 in 13.5 deaths.

PNEUMONIA AND PLEURISY.

Perhaps the principal point in connection with these diseases worthy of mention here is the ascertained fact that they both, where not tuberculous, are usually connected with and probably solely caused by the presence of a parasitic micrococcus. In the former the pneumococcus seems to be the disease-producing germ; and in the latter the staphylococcus or streptococcus. And it is right hopefully to note in connection with the common and fatal form of pneumonia so prevalent in Italy and some other Southern countries that Professor Pane has recently not only shown the constant presence of this bacterial germ, but has also brought evidence to show the probability that he has produced a serum that is capable of proving an antidote to this deadly disease. If so, we may fairly hope that we may soon in a similar or analogous way be able to reduce the large mortality which occurs in our own country from inflammation of the lungs—a disease which, as we all know, not infrequently occurs, even here, in an epidemic form.

One other insurance point which I may mention as observed is in connection with pleurisy, and that is the frequency with which previous attacks of pleurisy, usually denominated as "slight," are mentioned in the reports sent to us of those

* A paper read before the Norwich Medico-Chirurgical Society

whose histories show some tuberculous family proclivities. Naturally we regard these previous pleural illnesses, even when restricted to one side of the chest, with some suspicion; but especially so when the pleurisy has affected both sides, and we remember the accepted doctrine that double pleurisy with effusion is in so very large a proportion of cases due to the presence of the tubercle bacillus.

In reference to this point, I would quote Dr. de Havilland Hall, who in his book on *Life Assurance*, recently published, says: "Pleurisy, again, is very commonly of tuberculous origin, and carefully collected statistics have shown that within five years after the occurrence of what was apparently a simple attack of pleurisy, nearly half the patients were dead of phthisis."

DISEASES OF THE HEART.

We are gradually arriving at a better knowledge of diseases of the heart, and are becoming more and more able to differentiate their varying influences for harm upon the individual, and so to appreciate more exactly the depreciation of the value of life which they respectively cause.

It is not so very long ago that, in our daily practice, the discovery of an organic valvular murmur in the precordial region was considered to be the signal for a most serious immediate prognosis, and to require the most exact and precautionary mode of living to avert the probability at any time of sudden death; but in later years we have come to recognise that these murmurs have to be weighed by the light of their cardiac and general effects, as well as by their duration and situation; and so by degrees we have come to see that in life assurance examinations and reports it is necessary and right to take a more discriminating view of this class of ailments, and in many cases to express the opinion that a life thus diseased is not necessarily to be summarily rejected as wholly uninsurable, but that often the insuring office may fairly arrange terms; and these better than were formerly thought to be possible. Of course this improved estimation requires a most careful and exact medical diagnosis. It also implies a careful interpretation of the lesion present, and a note of the cardiac and systemic effects (if any) which it may have produced.

I think I shall not be wrong in saying that the profession is largely indebted to the late Sir Andrew Clark for arousing attention to the improved prognosis in many cases of organic heart disease, which is possible and justifiable. We all know how diligently this question has been since examined and studied by other physicians and pathologists, especially by Dr. Pye-Smith, Sir W. Broadbent, and Sir Dyce Duckworth, whilst I venture to think that Dr. Gibson, of Edinburgh, has treated this subject in a no less learned and practical way.

The general view of the relative importance of these organic valvular troubles appears now to be that the lesion allowing of aortic regurgitation is the most serious; that that producing aortic obstruction is much less so; but that at the mitral orifice obstruction is of more importance than disease allowing of regurgitation. Any opinion founded on these general views must, of course, be checked by the effects already actually produced upon the cardiac muscle itself or upon the other various organs of the body.

I feel quite justified in thus dwelling upon this subject, for in the numerous proposals in which some lesion of the heart is reported, it is no very rare thing for the medical examiner simply to state that a valvular murmur is audible at the apex or base, but to give little or no further information as to any secondary effect it may have produced in the way of hypertrophy or dilatation of the heart walls, or as to its probable past duration or future influence.

The due estimation of cases where *congenital heart disease* is present must also not be forgotten. Examples of this condition are by no means rare in which the patient has upon the whole led a comfortable life, subject only to occasional attacks of cardiac distress upon any special exertion or excitement, and in which life is prolonged to a good middle age. I do not recall, however, any case of this kind in which real old age has been reached, and every such one is therefore only insurable at an early age, and with a most careful estimation of the whole condition. Such cases seem to be peculiarly suitable for "endowment" insurances.

It follows from what has now been said, that we have arrived at a stage of knowledge on the subject of heart diseases

in which we are bound to give a more discriminating prognosis, and must avoid the error of refusing every case of organic heart affection without reference to rates of premium or time for which an insurance is desired.

RENAL DISEASE.

The two most important renal diseases with which life offices have to deal, and which, indeed, are almost always before them, are albuminuria, and diabetes or glycosuric conditions. Both subjects are large, full of unsettled views and changing opinions. But I have only time to refer to them in the briefest manner, and solely with reference to the bearing of modern knowledge upon their insurance aspects.

1. *Albumen in the Urine*.—In the first place there is no doubt that this is always a pathological condition. Perfectly normal urine contains none; and although the seriousness of its presence varies infinitely with the circumstances in which it occurs, yet I think all will agree with the dictum of the late Sir George Johnson that it is always "a danger signal." In earlier times it was supposed always to indicate organic kidney disease, and to be the special sign of "Bright's disease." But later knowledge has taught us how varying are the conditions under which it occurs, and in how many of these it is comparatively harmless and temporary. For example, the observations of Dr. Dukes and others have taught us how frequently albumen may be present in the urine of the young and adolescent, even to the extent of some 20 per cent. or more of the boys of a large public school (there chiefly in the form of what is called "functional albuminuria"); and how it may often be induced temporarily by slight chills, by strong exertion, and even by unsuitable or excessive feeding. Its exceedingly frequent occurrence in many acute diseases or specific fevers is also well known; and we are familiar with the fact that in these cases it commonly passes away in convalescence, along with the other symptoms of these disorders.

But in adults, especially those who have arrived at middle age, the occurrence of albuminuria must—from an insurance point of view—be always regarded as a serious symptom, and one requiring the most careful consideration. As in the young, its presence may be due to a passing attack of pneumonia, influenza, diphtheria, or other acute disease, or to some of those temporary causes already alluded to; and in these cases a postponement of the proposal for a sufficient time may probably show a complete restoration to health. But in many other cases the probability of its presence being due to permanent and organic causes is so great as to render an insurance upon the life, at any reasonable rate, quite incompatible with security to the office. Free habits of living, a chronic gouty condition of the kidneys, lardaceous or tuberculous disease of these organs, the presence of a renal calculus, heart disease, advanced diabetes, and many other organic affections may produce the symptoms, and the discovery of their existence necessarily makes the life ineligible. In all cases of albuminuria, it is unnecessary to say, the use of the microscope is helpful or essential to an exact diagnosis of its cause. Especially is this so in those cases of sedentary or studious young men, in whom it is often found in combination with oxaluria, and where a hopeful prognosis may usually be given, and the life even be accepted at ordinary rates after the recovery which may confidently be hoped for.

2. *Diabetes* is another condition which, like the symptoms of albuminuria, we have of late years been able to regard in a modified manner. Recent researches have shown that a condition of intermittent glycosuria often exists which requires to be discriminated from ordinary confirmed diabetes, seeing that the subjects of it, although always to be regarded as diseased lives, are yet often acceptable for insurance at properly-estimated rates of premium. The form of diabetes, too, which so frequently occurs in stout people at or past middle life, seems to be one which permits of a comparatively favourable estimation. The close relation which has been established between the formation of fat and sugar is very distinct, and it has often appeared as if the system laid on fat as long as possible, and then at a later period excreted the excess of hydrocarbon in the form of sugar. In any case, it is now established that a stout person of 45 or 50 who begins to pass sugar in the urine and is otherwise healthy, may very probably live at least ten or fifteen years, or possibly a little

more, and may therefore be insurable on an endowment policy for shortened periods. Nevertheless, such a life can, of course, never be regarded as a normal one, and must always be judged by the special circumstances of the case, aided by a consideration of the ordinary family longevity or proclivities. It is quite remarkable how often medical examiners report to us the presence of a small quantity of sugar in the urine of persons in whom it was quite unsuspected. In many of these it appears to be a temporary or passing phenomenon, and to have no direct significance. But with our present limited knowledge of its meaning, and the risk of its being a sign of incipient true diabetes, we are bound to err, if at all, on the side of caution, and to postpone acceptance of the life for a sufficient time to establish the certainty of its being a mere passing occurrence. When I was a student, I remember one of our eminent teachers, when speaking of a case of diabetes, saying: "Study this case well, for one case of diabetes is exactly like another, and when you have mastered the facts of this one, you know the disease thoroughly and once for all." How different is such a statement from the present state of our knowledge, which tells us that few pathological conditions are more variable and uncertain in their origin and causation than that of the abnormal excretion of sugar in the urine!

HEREDITY AND LONGEVITY.

The influence of hereditary tendencies and the bearing of the longevity of parents and grandparents upon the probable duration of life in a proposed insurer, is a subject which has quite recently attracted a good deal of attention. A few months ago Dr. Weber brought this matter prominently before the profession, and at the late meeting of the British Medical Association at Edinburgh it was fully discussed. I think I may say that the experience gained at the Norwich Union Life Office fully confirms and harmonises with the views there expressed. This experience tells us that the bearing of the duration of life of the parents upon the probable longevity of the children is a very direct and important one.

Of course, in estimating the vitality or probable longevity of the members of any particular family, we must always consider the age of the parents at the time of proposal; for it is manifest that even where grandparents or great grandparents may be proved always to have died at an earlier age than the average, yet the proposer's parents (and all their children) may be alive, if they at the time have only reached middle life, and yet after a very few years both the parents and an undue proportion of their children may have died off from pure inherited feebleness of constitution and defective general vitality. This knowledge justifies the question now found in many proposal papers as to the age of grandparents or collateral relatives, although its value is somewhat diminished by the vagueness of the knowledge which often exists on this point.

On the question of the average longevity of the British population at the present day, statistics show that this has distinctly increased, and that the expectation of life at birth is greater by some two or three years than in the earlier part of this century. This is in itself very satisfactory, but from an insurance point of view is not quite so helpful as at first sight appears. For, on further examination, the figures show that this prolongation of life is largely in some of the earlier periods, and not an equal increase at all ages. In fact, the calculations show that at some higher ages the average duration of life is actually somewhat shortened. So that in the case of an adult past middle age, the office expectation of life may be somewhat lessened rather than the contrary. On the other hand, in the case of young lives, there will clearly be hope of increased longevity, although this gain will largely be more to industrial and Friendly Society offices than to such as our own, seeing that much of the saving of life has occurred through the better care of childhood and protection of our vast industrial population.

The subject of hereditary longevity or otherwise is of special importance to those offices which, like the Norwich Union, transact business in foreign countries, in some of which the average duration of life is considerably greater than in others, and in some of which also a large and undue proportion of the adults appear to die off not later than 60 or 65, from some of the diseases peculiar to or endemic in the country.

Quite recently the following statement, quoted from the *Bulletin Général de Thérapeutique* was published by our medical journals: "The average duration of life amongst the chief nations of Europe is as follows, the figures being based upon the bills of mortality for the decade 1881—1890:

Sweden and Norway	... 50 years.
England	... 45 years and three months.
Belgium	... 44 years and eleven months.
Switzerland	... 44 years and four months.
France	... 43 years and six months.
Austria	... 39 years and eight months.
Prussia and Italy	... 39 years.
Bavaria	... 36 years.
Spain	... 32 years and four months."

The Norwich Union Office transacts a limited amount of business in some of these countries, and our general impression with regard to the respective value of the lives coincides to a very considerable extent with the above figures.

It is satisfactory to find that attention is now being strongly directed to the elucidation of the nature and parasitic relations of the malarial diseases which are so common and so fatal in some of the southern countries of Europe. A great deal of work in this direction has been done by British observers, and more recently by some Italian scientists. Professor Koch, with the assistance of the eminent Dr. Baccelli, the Minister of Public Instruction in Italy, has during the past season been engaged in the study of this subject. He "has satisfied himself that in all essentials Italian and tropical malaria are identical." "He has also been able to indicate properties hitherto unnoticed in the pathogenic germ of malaria as found external to man—properties possessing a distinct prophylactic value towards limiting the diffusion of the malarial, if not arresting it at its point of origin." Here, therefore, as in most cases, knowledge is power; and it may fairly be hoped that still more certain knowledge as to the nature and preventability of malarial disease may do much in the future to limit its ravages, and so to add to the value of life in the countries in which it is at present so fatally prevalent.

PHYSICAL DEVELOPMENT AND PHYSIQUE.

As bearing upon the subject of probable length of life, attention may for a moment be called to some recent statements in a letter to the *Times*, signed "M.D.," as to the physical condition of a number of boys examined on their entrance at one of our great public schools. For it is manifest that the more perfect the development and constitution of the youthful individual the greater is the probability of a vigorous and long sustained life; whilst under contrary conditions the probabilities will certainly lie in the opposite direction. It is stated by "M.D." that of 100 boys so examined no fewer than 63 were the subjects in some degree of some physical defect, such as lateral curvature of the spine, pigeon breast, bow leg, flat foot, hernia, or the like, whilst 20 of them were suffering from some form of defective sight and 22 from albuminuria. Such a statement is a strong argument in favour of the present system of regulated recreative and muscular exercises and of suitable athletic training. It is satisfactory to believe that the effect of these is to a large extent to overcome these adolescent defects, and to produce an adult male population far more healthy and normally developed than such statistics would lead us to expect and fear.

HEIGHT AND WEIGHT.

The tables published as to the proper proportion between these two give a very fair approximation to what is a general standard; but our large experience rather tends to show that at present the average weight for average height there given is rather above what is commonly met with in practice, and the same applies to chest measurements. Dr. de Havilland Hall says: "A margin of 15 per cent. in either direction is admissible under ordinary circumstances. Some authorities allow 20 per cent., but the mortality of the light weights from tuberculosis and other wasting diseases is so great that applicants for assurance who are more than 15 per cent. under weight should only be accepted after a most careful and rigorous examination." With this we shall all fully agree, but with due regard to the experience above mentioned.

INTEMPERATE HABITS.

The question of what are called the "habits" of the proposer is too frequently a source of anxiety and watchful

doubt, and I fear there is not much ground at present for relaxation of the usual strict inquiries on this point. In spite of temperance societies and of efforts to educate the public mind, a far too large habitual consumption of fermented liquors, and especially of the strong whisky spirit, still goes on. This constitutes a continual menace to the acceptors of life risks. How great may well be roughly estimated from the favourable reports of those offices which have formed a separate department for abstaining insurers.

Probably more of the disputed cases in the event of early death are in some way connected with concealment of intemperate habits than with all other causes put together. We all know that excess of alcohol destroys the moral sense, and so prepares the mind of an intemperate proposer to make statements which are not justified by actual facts. As medical examiners we are bound to ascertain pretty closely and report the daily habitual consumption of these alcoholic drinks, always remembering that it is not an occasional actual intoxication that produces the greatest deterioration of life, but that frequent taking of alcohol during the day, in whatever form disguised, which is now so common. The sure result is disease or degeneration of the nervous tissues or other organs, and the shortening of the life-expectation proper to the special age, and on which the normal premiums are based.

CONCLUSION.

As we all know, several excellent and most reliable works upon life assurance have been published during the last half-century, notably by Drs. Brinton, Sieveking, S. Thompson, and (quite recently) de Havilland Hall. These are all of great value, and are at present our guides and counsellors in considering the various points, the sum of which regulates our opinions and valuations of the lives submitted for examination.

Somewhat modified views of many insurance risks are already acted on by all the best offices. But in the present times facts of to-day may require tomorrow to be reconsidered by the light of fresh knowledge, and I think I have brought before our Society enough to show that no finality has yet been arrived at in this department of medical science, but that, on the contrary, we shall ere long still further modify many of our views as to the value of diseased lives; and that still increased and more thorough knowledge of many diseased conditions will elevate the practice of insurance of invalid or defective lives into something more like exact science than has hitherto been at all possible or practicable.

Still, at present the only safe way for offices to which invalid risks are offered, is to proceed slowly and cautiously. The security of these offices, and with them the interests of their insurers, are closely bound up in a proper and sufficient estimation of the risks incurred. But, even so, I would repeat that there seems to be good reason to hope before long for at least a more modified view as to the absolute or comparative non-insurability of many of the lives now customarily rejected on account of present morbid conditions or proclivities.

I have thus been able to touch upon only a few of the great medical problems which await the future consideration of doctors, actuaries, and all others engaged in the great business and science of life assurance. Any changes which can be made must necessarily be most carefully thought out, and most discriminatingly acted upon. My purpose to-day will have been answered if I have succeeded in directing your attention, however imperfectly, to some of the great issues with which hereafter we, in our several vocations and localisations, shall necessarily have to deal, and the consideration of which is being continually forced upon our attention.

NOTES AND REFERENCE.

¹ See further and similar statistics given at the meeting at Marlborough House on December 20th, 1898, since this paper was written, in the *BRITISH MEDICAL JOURNAL*, December 24th, 1898. ² But it would appear to be not yet proven that these are the only sources of infection. Dr. Manfredi has recently shown the existence of tubercle bacilli in the dust of some of the streets in Naples. ³ *Lancet*, October 8th, 1898.

MEDICAL MAGISTRATE.—The Lord Chancellor has added the name of Dr. West Symes, Senior Surgeon to the Royal Halifax Infirmary, to the Commission of the Peace for the County Borough of Halifax.

A CASE OF TYPHOID FEVER WITHOUT ANY LESION OF THE INTESTINE,

WHICH GAVE THE WIDAL REACTION DURING LIFE, AND FROM WHICH THE *BACILLUS TYPHI ABDOMINALIS* WAS OBTAINED BY CULTURE FROM THE ENLARGED MESENTERIC GLANDS FOUND AT THE NECROPSY.

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I PUBLISH this important case, and give a brief review of the few similar cases which have been reported on account of their rarity, as an important vindication of the great value of a positive Widal reaction in the diagnosis of typhoid fever and to show the necessity of making careful bacteriological examinations at all necropsies in which the slightest doubt arises as to the nature of the disease which has caused the patient's death. Necropsies in this country, in the majority of instances, are performed in a most perfunctory manner, a macroscopical examination only of the viscera often being considered sufficient. In this way many points of interest are lost, many erroneous conclusions are deduced, and many opportunities of advancing our knowledge of the causes and nature of disease by research are missed.

With our present imperfect knowledge of the pathological changes produced in the body by the action of micro-organisms, I maintain that a systematic bacteriological examination of the diseased structures should be made in all cases. If cultures had not been taken from the enlarged mesenteric glands in the case reported below, the cause of death would have been assigned in all probability to the broncho-pneumonia, and the diagnostic value of the serum reaction as an indication of typhoid fever would have been depreciated. I am indebted to Dr. Hale White for permission to publish the clinical notes of the case.

Male, aged 1 year and 9 months, was admitted on September 20th, 1898, for diarrhoea and vomiting. The mother stated that previously he had always been healthy. For the first nine months she fed him from the breast, since then on cow's milk, bread and butter, mutton broth, vegetables, and occasionally boiled fish. For some time previous to admission the child was always very thirsty, and in consequence was given a large quantity of milk. In July wasting was first noticed.

Family History.—Father healthy, mother healthy but delicate before marriage; she has had six children and a miscarriage at three months. The six children were all full term. One died of convulsions, aged 7 weeks; another of pneumonia when 7 months old. One sister, aged 7 years, was admitted into Miriam Ward on September 6th, and a brother, aged 5, into Stephen Ward on September 23rd, both suffering from a similar disease to that of the patient.

Present Illness.—Two weeks previous to admission diarrhoea and vomiting came on. A doctor was called in, and the symptoms were relieved by medicine. On Sunday, September 17th, the mother stated that the child appeared to be quite well; on the 18th diarrhoea and vomiting again commenced, but this time the symptoms did not yield to treatment. On the 19th, as the child was worse, he was brought to the hospital and admitted.

Condition on Admission.—Temperature 103.8°, pulse 136, respiration 48. He was very anæmic and wasted, and was noticed to be lying on his side with his legs and head flexed on the trunk. The abdomen was slightly distended and a little rigid. The edge of the spleen could be felt 2 inches below the costal margin. The edge of the liver could also be felt just below the costal margin in the right nipple line. The areas of liver and splenic dullness were increased downwards.

Respiratory System.—A small patch of impaired resonance was found at the right base behind, just below the angle of the scapula. *Râles* and rhonchi were heard all over the chest behind on the right side; over the area of impaired resonance the *râles* were slightly consonating in character. The heart sounds were normal.

October 20th to 24th. The head still remained flexed on the chest. The child was drowsy. *Râles* and rhonchi were still heard over the back. The highest temperature was at 2 A.M. and 6 A.M. on October 21st, when it reached 105.2°, the pulse-rate being 150 to 160, and the respiration-rate 48. The bowels were opened six times on the 21st, seven times on the 22nd, six times on the 23rd and 24th, and ten times on the 25th.

On October 26th the child was a good deal worse, the diarrhoea was very bad, the bowels were opened eleven times, the motions being of a greenish colour and of watery consistence. The temperature again reached 105.2°, the pulse-rate being 160, and the respiration-rate 60.

On October 27th the child was much worse, the bowels were opened nine times, and he was sick all day, being unable to keep anything at all down. The abdomen was very distended. The highest temperature was 104.8° at 10 A.M., the pulse being 150, and the respirations 56. Dr. Washbourn examined the patient and diagnosed typhoid fever. A specimen of blood was subsequently obtained from the patient, and it gave the Widal test, a very smart reaction being obtained both with 5 per cent. and 50 per cent. serum in two minutes. In the evening he became worse, and died at 8 P.M.

Necropsy.—Eighteen hours after death rigor mortis was well marked. There were no signs of decomposition. The body was thin and emaciated. The brain was not examined. There was recent pleurisy over the right