ON SOME OF THE LESSONS TO BE DERIVED FROM THE PRESENT EPIDEMIC OF SMALL-POX.*

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THE subject of the prevention of small-pox by vaccination is one of interest to us at all times, but of the utmost interest just now that we are passing through an epidemic of that disease, which is unquestionably the most intense of any that have occurred in my own time and probably in the time of most of those who hear me, and which is trying to the utmost the value of the prophylactic in which we have all been taught to confide. When, notwithstanding all that has been done by the State within the last thirty years to extend and improve the practice of vaccination, and notwithstanding the extension and improvement that have really taken place, we find small-pox so fatally prevalent as it is around us, we cannot be surprised that questions should be raised, if not within the pale of the profession, yet among those who only see and judge things by their superficial aspects, as to the soundness of our faith in that practice. It has been said, and is being said, "It is all very well to boast of the decline in small-pox mortality which, it cannot be denied, has been gradually going on in this country, and to attribute it to the extension of vaccination; but epidemics of small-pox are things which vary in their times of coming, and vary in their intensity. What you thought was the result of your vaccination, was only the absence or mildness of the infection. Now the infection is come, and come with its old virulence, and you are just as badly off as you were thirty years ago." But I need not say that the question is thus altogether wrongly put. What we have to ask ourselves is, not whether epidemics vary in their severity and diffusiveness, which we know they do—not epidemics of small-pox only, but epidemics of all kinds, scarlet fever, measles, cholera—but what, in reference to this intense small-pox epidemic, has been the relative position of the vaccinated and of the unvaccinated. Has there been anything at all at variance with what in seventy years' experience has always before been seen—that, among persons directly exposed to the infection of the disease, escape from the influence of that infection has been the rule among the vaccinated, and the exception—the rare exception—among the unvaccinated? On this point I shall hope to hear, by-and-bye, the experience of my friends around me who have had much to do with the epidemic. All the facts that have been brought under my own notice hitherto have been entirely in accordance with our former experience, whether as regards the immunity from attack which the large majority of the vaccinated have enjoyed, or as regards the striking manner in which the disease has, as a rule, been modified in those of the vaccinated whom it has not altogether spared. It is quite true that, from the intensity of the epidemic, a more than usual proportion of the vaccinated who have been attacked have died, just as, under the same intense epidemic influence, a more than usual proportion of unvaccinated cases have died. You will recollect that, in the ordinary experience of the Small-pox Hospital at Highgate, less than 7 per cent. of their vaccinated patients die (I am making no distinction now between the kinds and qualities of vaccination, but I take the average of the whole, however the work of vaccination may have been done), while of the unvaccinated they lose 35 per cent. During the present epidemic, the proportion of deaths to attacks among the vaccinated has mounted from below 7 to fully 9 per cent.; but then the rate of deaths among the unvaccinated has mounted from 35 to 49 per cent. I had occasion three years ago to call attention to a similar fact as regards the epidemic of 1863, when the mortality of the vaccinated in the hospital rose to nearly 10 per cent. and of the unvaccinated from 35 to 47 per cent.; and I made these observations, which hold good, in my opinion, now. "The difference [*i.e.*, the difference between the death-rate of 7 and of 9 per cent.] was due, not to falling off in the prophylactic power of vaccination, but to the greater intensity of the variolous influence. This varying intensity of epidemic influence must be well kept in mind. From overlooking it, the most erroneous conclusions are sometimes drawn as to the decadence of the protection of vaccination. Any time the last fifty years that an unusually severe epidemic has occurred, there have been those who have asserted that vaccination was wearing out. It was said as much fifty years ago (in the epidemic of 1818-19) as now. Yet the records of the Small-pox Hospital for 1825 teach the same lesson as the records for 1863 [and now let me add for 1870]; "in 1825 the epidemic

being, as Dr. Gregory stated, unusually malignant; the mortality in the hospital of post-vaccinal cases amounted to 8 per cent., and the mortality of the natural disease correspondingly rose to 41 per cent." In the early experience of the Small-pox Asylum at Hampstead, the mortality both among vaccinated and unvaccinated strikingly corresponded with what Mr. Marson has observed at the Small-pox Hospital; viz., above 9 per cent. of deaths among the vaccinated, and 46 per cent. among the unvaccinated. Later on, more cases were admitted of a less malignant type; so that, if we take the results of all the Asylums up to the end of February, we find that, while the percentage of mortality to attacks among the vaccinated has scarcely amounted to 7, or a very little more than the ordinary average mortality of the Small-pox Hospital, the mortality among the unvaccinated has amounted to above 40 per cent. And in Liverpool, as in London, while the epidemic influence has manifested itself in the rate of mortality to attacks, both among the vaccinated and unvaccinated, the *relative position* of the two classes has remained the same.

But when I say that vaccination occupies entirely the same position now as a prophylactic as it did, it seems to me very important that we should consider, before going further, what that position is. I think this of the more consequence, because there is nothing more injurious in the long run to a case than to overstate it; and because, in the very interesting discussion which is now going on in the Surgical Society of Ireland—a country thirty years ago among the worst, and now among the best, vaccinated in Europe—in which many distinguished men are taking part, I am doubtful whether too much is not being claimed for vaccination: I mean for a single infantile vaccination. On the question of revaccination I propose to speak separately by-and-bye. Vaccination, I think we shall all allow, does not, however well performed, confer on every individual submitted to its influence complete immunity against small-pox infection; but it does confer complete exemption on the vast majority of such persons. In those not wholly exempted from small-pox by vaccination, the disease is usually modified and controlled by it. The degree of protection, however, which vaccination affords, depends largely on the way in which the vaccination has been done; so that, while persons who have gone through the process imperfectly may either remain unprotected altogether, or acquire a protection more or less good according to the degree of imperfection of their vaccination, those who have been vaccinated in the most complete way, though it may not be denied that some of them may hereafter contract the disease, need have no more fear of having it in a fatal or disfiguring form than a person who has already had small-pox. But even the most modified form of small-pox is an infliction which all would be glad to escape. Hence, while a repetition of vaccination is a necessity for the imperfectly vaccinated, it is an important additional protection even to the best vaccinated. In brief, a single infantile vaccination, though an invaluable, is not to all a perfect protection; but, by careful revaccination, the protection may be made all but absolutely perfect. The unabated confidence of the profession in vaccination has been recently expressed by the College of Physicians of England, and by the Académie de Médecine in Paris; and you yourselves will, I am sure, proclaim to-night with one accord your assent to the statement—recently put forth by the Medical Officer of the Privy Council—that, after seventy years' experience of vaccination, educated medical practitioners of every country of the world are practically unanimous in recommending its adoption.

Of course, however, if this view of the value of vaccination be correct, the fatality of the present epidemic in London and in Liverpool, as in some other places in England which were attacked last year, must be taken as evidence either that vaccination has been much neglected in those places, or that the professional work of vaccination has been very imperfectly done. There have, indeed, been sad shortcomings in both respects; and it will be a lesson worth all the price we are paying for it, if we are induced by the present discreditable calamity to put our house in order. And the questions which in this respect I shall have briefly to submit for your consideration are these: (1) To what extent is vaccination really neglected in our population? what are the causes of that neglect? and how may we hope to obviate those causes? (2) What has been amiss in our performance of vaccination? and what is required to make vaccination do all that we believe it to be capable of doing?

Now, in speaking of neglect of vaccination, let us endeavour to arrive at some clear understanding of what we mean. The term neglect is very indefinite; it might mean that half, or a third, or a quarter of the population were unvaccinated; but I think I need scarcely say that, as things have been of late years, it has never meant anything like that. But what I want to put before you is, that an unvaccinated proportion of the population, which is relatively small, may constitute actually so large a number of persons as to be a very great source of danger. Take a town, for instance, of 30,000 inhabitants, and let 5 per cent. only of

* Read at an ordinary meeting of the Metropolitan Counties Branch, April 21st. For the subsequent discussion, see page 486.

them be unvaccinated, and you have at any given moment 1,500 susceptible people. An unvaccinated 5 per cent. of the London population, would give you 160,000 persons—a population larger than that of Bristol and Clifton in 1861. Let us begin from what point we may, we must remember that we can never have all our population vaccinated. We cannot vaccinate children the moment they are born; some time must, of course, be allowed; and if we can reduce the number unprotected to only the recently born, there can be no great danger remaining. But whatever delay takes place beyond the time by which, in each individual case, vaccination can properly be done, is neglect. It was in this sense that the Epidemiological Society presented the question eighteen years ago, at a time when more than half the public primary vaccination in England was not done till the children were more than a year old, and when, consequently, the annual small-pox mortality was more than half as great again as it is now. This is the neglect which constitutes our great danger—the neglect of procrastination; and of this there is, with all our improvements, still a most lamentable and dangerous amount. The neglect which arises from resolute objection is relatively very insignificant in amount, but the number of persons who require the terrors of impending small-pox, or the impulse of a legal obligation, to stir their apathy or overcome their superficial objections, is very far from inconsiderable. Terrors of remote small-pox will not do; they are always ready to chance those. And if these people were let alone, what happened before would happen again; and the unvaccinated would rise to such proportions (not, as now, in particular places, where there have been unusual difficulties or special indifference in carrying out the law, but generally throughout the kingdom) as constantly to invite the localisation of small-pox epidemics, and to furnish ample material for the disease to extend itself. If we would see what the result of the let-alone system is, we have but to cross the sea to Holland, where vaccination is voluntary, and where, by custom, the children under school-age are generally unvaccinated, and many of those above school-age. I hand you a table which I have compiled from information, derived from official sources, supplied me weekly by my excellent friend Dr. Ballot of Rotterdam, showing the frightful prevalence and fatality of small-pox in the principal towns of that country—a mortality which, in proportion to population, reduces to insignificance our mortality in London or in Liverpool.

Week ending	Rotterdam (pop. 121,027).	The Hague (pop. 92,021).	Utrecht (pop. 60,428).	Amsterdam (pop. 274,931).
January 7	30	40	27	5
„ 14	37	95	26	5
„ 21	55	121	33	10
„ 28	54	97	58	12
February 4	62	118	45	22
„ 11	63	98	54	19
„ 18	72	85	46	29
„ 25	98	64	46	38
March 4	88	58	36	35
„ 11	98	57	54	31
„ 18	116	45	35	25
„ 25	96	48	33	54
April 1	116	26	36	47
	985	952	529	332

The mortality from small-pox in London (pop. considerably above 3,200,000) for the same period was 2710.

The mortality, Dr. Ballot tells me, has been chiefly among the poorer children, who have been left unvaccinated through, he says, a sort of puritanism and nonchalance. In the Hague and in Utrecht, the epidemic has apparently culminated; but there is no evidence of this being the case as yet in Rotterdam, while in Amsterdam it is evidently advancing.

It is only since the Act of 1867 began to come into operation, that we have had any means of knowing in England how many of our children whose births are registered are vaccinated or not; for, though there was a system of registration of vaccination provided under the Act of 1853, it so generally failed as to be practically worthless. The Act is too recent, and affects therefore too small a proportion of our population, for me to be able to lay before you its results as affecting the present epidemic. I may mention, however, that in one of the metropolitan parishes in which the Act was earliest applied, I have caused the death-registers to be searched for information which I thought would be interesting to you. In a parliamentary return made in 1864, the parish of St. Luke, Middlesex (population 57,000), stood highest but one in regard to the proportionate mortality from small-pox, for a series of ten years, of its population under five years of age; and this is tantamount to saying that it is a parish in which there had been great neg-

lect of early vaccination. But in this parish, from the beginning of 1868, vaccination has been thoroughly looked after. St. Luke, you are aware, is contiguous to the parish which has suffered the most severely of all during this epidemic, viz., Shoreditch; and it has itself been largely infected; for, irrespective of any cases that might have gone to hospital, 47 deaths from small-pox have been registered from December 1st to April 8th inclusive. Now, on inquiry as to what portion of these deaths had been in children subject to the provisions of our present Act—children between five months and three years of age—I find that there were only four; and I have not yet been able to ascertain whether those four had or had not been born in the parish. But the state of the metropolis generally was widely different from this. It differed, of course, in different districts; but in most districts the number of children brought for vaccination at ages from six months to six years and upwards, as well as the large number of young children that have caught small-pox and succumbed for want of vaccination, attest the extensive neglect. There have died in London of small-pox, from October 1st, 1870, to April 8th, 1871, 1,344 children under five years of age; and when you remember Gregory's and Marson's statement, that the deaths in vaccinated children under fourteen years of age are scarcely noticeable, you see what neglect of vaccination is herein exhibited.

But the experience which we have in St. Luke's, and which I am happy to say we are now having in a large portion of England, justifies me in stating to you that this neglect is of a kind easily remediable—that, with individual exceptions only, it is due to apathy or a mere indefinite unwillingness which yields to the slightest touch of the law; the cases only requiring systematic looking after for the vaccination to be duly effected. Hence we may hope by-and-by to attain the results which have already, as you are aware, been attained in Scotland, in which country all the children born since the compulsory Act came into operation, *i. e.*, since January 1st, 1864, are duly accounted for, with an insignificant exception. Amendment, however, of some of our provisions will be necessary for securing this full result. One of these is an amendment outside a Vaccination Act, an amendment necessary for other purposes as well, and of the importance of which I am sure you are all convinced—a compulsory registration of births, as in Scotland. The amendments required in the Vaccination Act itself as regards compulsion are these: the good working of the law in unions in which it works is invariably due to there being a paid officer, whose prescribed duty it is to look after things, and see that they are done; now, the Act requires the Guardians to see that they are done, and it permits them to appoint a person for the purpose; but the appointment of such person should be in all unions a matter of obligation. And, again, defaults require to be looked after monthly, as is provided in the Act for Scotland; while our own Act only requires that this should be done every six months. Wherever the Act is now worked properly, it is, in fact, by a system of monthly working—in other words, by doing something in excess of what the Act itself requires.

But, concurrently with these improvements, is there nothing that we can do to remove the objections which are often alleged, and by some seriously entertained, to the practice of vaccination? While we make people do what is right, ought we not also to do something to show them that it is right? These prejudices against vaccination are not of modern growth; they are of the same kind as were raised against small-pox inoculation; they are the very same as were raised against vaccination at its introduction; and, so far from gaining ground, they have within my time very largely diminished: of that I am quite certain, though of course the application of compulsion has brought what remains of them to the fore. In the extensive correspondence which the Epidemiological Society had about twenty years ago with practitioners in England on this subject, it was universally stated that indolence and indifference were the main obstacles to the universal diffusion of vaccination; but two classes of objections to it were also referred to as obstacles of greater or less weight; viz., that it was looked on by some as an insufficient safeguard, and that it was alleged to be the means of introducing other diseases into the system. I do not think the first of these objections, as a popular objection, need detain us long: it belongs rather to a period gone by, when small-pox inoculation was in the memory of the people, and when some of them retained a preference for “the real thing”; but we may not wholly neglect it now, because attempts are systematically made not merely to revive it, but to persuade the people that vaccination is actually no protection whatever, by the agents and lecturers of a league organised to obstruct the law, composed in great part of Morisonians and so-called herbalists, reinforced by some half-dozen persons having, I believe, a medical qualification. Bewildering themselves in a maze of statistical fallacies, these persons even go the length of asserting that vaccination and revaccination are the

means of calling down small-pox. Cases in which small-pox, and even fatal small-pox, has occurred after vaccination, are referred to, and exceptions are treated as though they were laws. Now, as regards the influence that statements of this kind uncontradicted may have on the popular mind, we must not forget the altered state of things since the introduction of vaccination. When the vaccinated constituted a small part of the community, and people saw the comparative security of this class among the ravages which small-pox was making generally around them, it was the wonderful protectiveness of vaccination which would strike their minds; but now that the vaccinated are the great bulk of the community, and that, in fine, the memory of small-pox as it was has almost died away—it is the exceptions which strike. And though I think the sense of the people is not likely to be led much astray in this matter, it is yet important not only that the real truth should be put before them as to the protectiveness of vaccination, but that they should be reminded again and again of what they are being protected from—what small-pox was and what it would be again if we were to relax any of our securities. And I think great credit is due to men like Thorburn of Manchester, Morley Douglas of Sunderland, Woodward of Worcester, Oliver, Dixon, and others, who have come forward with this purpose. Our supreme duty, indeed, in reference to this objection is so to do our professional work that the protection we give our patients shall *not*, so far as we can control, fail or be insufficient; but besides that, we have a duty of informing the minds of the people—each of us, at all events, within the sphere of his influence—on a matter in which they of course look up to us for guidance. There is one stumbling-block particularly, apt to occur at times of epidemics, which our explanations can make clear: whenever we vaccinate a person who may have been exposed to the infection of small-pox, let us take care to make it clear that we cannot for ten days tell them whether the vaccination, though it may take effect, will be in time to prevent or modify small-pox, and that we can promise nothing till the cow-pox has attained a certain period of its course.

The opponents of vaccination strike upon a prejudice more difficult to handle when they persuade people that vaccination induces ill-health, and is the means of importing disease. There are many excellent persons who are far indeed from entertaining objection to the performance of vaccination, who rather would hold themselves greatly in the wrong were they to leave their children unvaccinated, who are yet more or less in dread of this; and the feelings are worthy of our utmost consideration and respect. The chief ground of the feeling is that they have seen or heard of vaccination being the *point de départ* of various illnesses. Now, without denying at all (for it may be so) that, in a child whose skin is about to give forth, say an eczema, or perhaps an hereditary syphilis, the febrility of vaccination may, like the febrility of teething, hasten the appearance of that affection, I would only illustrate from my own experience the enormous extent in which mere accidental coincidence may be taken for consequence, by referring to cases which I could now count by the score, in which, vaccination having for some accidental reason (as because the child was brought too late, or there was not a good vaccinator, or there was perhaps no lymph that had not been long kept) been put off for a single week or fortnight, a latent eruption has in the meanwhile developed itself. Three cases of this kind came recently to my knowledge in different places, in one week only. Now the prejudice of attributing to vaccination all that soon follows it is one that is brought to the fore by the practice (indispensable for our security against small-pox) of early vaccination. When vaccination was habitually delayed till children were nearly or more than a year old, the eruptions of teething used to come before vaccination: now they come after it, and vaccination often gets the blame. And it is noteworthy that the late Dr. Gregory, in treating of vaccination in his system of medicine in 1837, never thought of alluding to this subject at all. My own experience agrees altogether with that of Professor Paget, that latent constitutional eruptions, though they may be, are not often, evoked by vaccination. The only real risks that I know of that are worth consideration in regard to vaccination are the risk of erysipelas supervening and the possibility of invaccinating syphilis from a syphilitic vaccinator by the incautious introduction of blood along with the lymph. And what, practically, do these risks amount to? The one is of very rare occurrence, and traceable to causes independent of the vaccination itself; the other, so rare and only possible under such exceptional conditions, that its possibility has only within the last few years been accepted, and that vaccinators on the largest scale have passed through long lives without having even met with a case. You know that every experiment directly made with the purpose of inducing syphilis by vaccination has failed, even though no pains were taken to prevent the admixture of blood. These small possibilities of accident are all, then, that can be put against the overwhelming benefits of a practice which, with all the imperfection with which it may have been carried out, has reduced the annual death-rate of England from the three thousand

per million of population, which unprejudiced observers like Blane and Lettson assigned it at the end of last century, to a death-rate below two hundred per million.

The best mode of meeting these prejudices consists, in my opinion, in patient explanations, in the most careful selection of vaccinifers, and making the parent see that there is such care in selection; in carefulness to postpone vaccination wherever the health appears in any way unsound, and in thorough and unflinching investigation of any allegation of mischief. Something may sometimes be gained by allowing a parent her own choice of vaccinator where such a choice is unobjectionable; though it is remarkable, as I think you will agree with me, how very often the choice thus made is not a good one. The argument which seems to me the most forcible is, that we are doing for their children what we do for our own children, and that we shall do it with just as much care. The declamations against vaccination, which find what little help they get in these mistaken interpretations of natural illnesses, or in these rare possibilities of harm—the allegations of wholesale blood-poisoning, and I know not what—will be borne down in the end by the diffusion of sound knowledge, a work in which the Government and the schoolmaster, as well as the profession, should be ready to bear their part. I would have an official synopsis of the advantages of vaccination distributed by every registrar with every notice paper which he gives a parent; and vaccination should be a part of the elementary teaching which ought to be given in every school.

It would be a delusion, however, to speak of these prejudices even now as if they were widely operative in preventing the operation of the law wherever its machinery is properly applied. I could take you in England to town after town, and rural district after rural district, in which, notwithstanding that the agitators have been busy, the vaccination of children from the time that machinery was applied is practically complete, and that without any recourse, or with only rare recourse, to the penalties of the law; and in Scotland, all the children born since the beginning of 1864 have been vaccinated, except an insignificant fraction, not of objectors, but of persons who cannot be traced.

And now I come to the questions which also I am able to submit for your consideration, which refer not to the unvaccinated, but to the vaccinated who have contracted small-pox. Besides the 1,344 children under five years of age who perished from that disease in London (October 1st to April 8th), of whom no doubt scarcely any had been timely vaccinated, there were in the same period 865 deaths between the ages of five and twenty, and 985 above the age of twenty; and among the 865 and the 985, and particularly among the latter, a large number no doubt had been vaccinated. We cannot tell how many, for our death-registers do not generally record in cases of small-pox whether there had been vaccination or not; and when they do record it, it is often on such imperfect information that the entries are—I am sorry to say, in a large number of cases—very misleading. But we know, at all events, that many vaccinated have succumbed: and the question then at once arises, “Of what kind had their vaccination been?” We have no means of answering this as regards all the individual patients: but we find by reference to the records of the small-pox hospitals that, of the vaccinated patients admitted into them in whom small-pox was fatal, only an extremely small proportion had been properly vaccinated, and that a death-rate of 7 to 9 per cent. would have been reduced to a death-rate of less than one per cent. by the substitution of good and sufficient for bad and insufficient vaccination. There can be no reason to suppose that it was otherwise with patients outside the hospitals, or that the deaths in vaccinated persons would not have been really very few, if the vaccination in all had been thoroughly done. It is not more than twenty years since Marson presented that memorable paper which fixed thenceforth our standard of vaccination; the large majority of the people above twenty years old would, I presume, have been vaccinated before that period; but even after that, and long after that, we know that our vaccinations fell very generally below his standard. And it is of this that, in my opinion, we are now paying the penalty. The performance of the vaccinations, according to that standard, which is now, I believe, generally if not universally accepted, seems then to me our first duty. But in the state in which we are now, I cannot but regard the revaccination of the adult population of the utmost importance, and its necessity as one of the most valuable lessons which we may derive from this epidemic. What a powerful means we have in the revaccination of adults, not merely for repairing anything which was defective in a first vaccination, but also for extinguishing the susceptibility to small-pox which may re-arise among an uncertain portion even of the well vaccinated, is now a matter of familiar observation. Marson's experience with regard to his nurses and servants has been confirmed by the experience of all the metropolitan asylums during this epidemic. Not one of their revaccinated inmates or *employees* has suffered; and two or three apparent excep-

tions have but proved the rule, for they were in persons in whom, on one ground or another, revaccination had *not* been done. Revaccination, I need scarcely say, requires that we should bring to its performance all the care and all the pains to ensure success which are given to a primary case; and this is almost tantamount to saying that it ought not to be left to be done at times of epidemics, and when people are under the influence of panics. What I have long endeavoured to urge as essential for complete protection is a thoroughly good vaccination in infancy, as the sheet-anchor, and a careful revaccination after puberty, so conducted as to give evidence that the lymph is absorbed, and repeated, if necessary, till that result is obtained. The revaccination should be done as systematically about sixteen years of age, as the primary vaccination is at six weeks or two months, and with this, when successful to the extent which I have stated, people may rest content.

CATARRHAL INFLAMMATION.*

By H. FRANKLIN PARSONS, M.D., Beckington.

HAVING been asked to contribute a paper to one of our branch meetings, I have thought that I might not altogether waste the time and patience of the members by bringing forward some general remarks upon catarrhal inflammation, with a comparison of the symptoms and effects of this lesion as it affects the various mucous membranes of the body. I am led to choose this subject, partly because catarrh is the commonest of morbid processes, so that even the youngest of us can boast of considerable experience in its treatment. Of the cases attended by me in general practice last year, I find that in more than one-fourth catarrh of one or other organ was the primary lesion, and in more than another eighth more or less of catarrh might be observed as a part or complication of the case; catarrh, therefore, being present in nearly half the cases. Moreover, not only is catarrh the most frequent of morbid processes, but it is one of the most amenable to treatment, even after due allowance has been made for its natural tendency towards recovery; hence it is, I think, quite as worthy the attention of those whose mission it is to cure disease as many maladies which would generally be considered more interesting, but which occur rarely, and when they do occur are beyond our power to cure.

Catarrh is well defined by Niemeyer as "Engorgement of the blood-vessels of a mucous membrane, accompanied by abnormal secretion, swelling, succulence of its tissues, and copious generation of young cells." The distinguishing feature of catarrhal, as compared with common inflammation, is that it tends to cell-multiplication rather than to exudation of fibrin; hence, although we find tough stringy masses of mucus, and swelling of the mucous membrane, in cases of catarrh, we never get the firmly attached false membranes, or chronic indurations which are commonly produced by inflammations of the ordinary fibro-plastic character. The alterations produced by catarrh are better studied in the living than in the dead body, as the elasticity of the mucous membrane often squeezes out the excess of blood from the vessels when the propelling power has ceased; so that we cannot, from the absence of hyperæmia *post mortem*, infer with certainty that there has been none during life. In coryza and catarrhal sore-throat—maladies of which we all, probably, have had experience in our own persons—we notice, first, a redness and swelling of the mucous membrane, the surface of which is covered with clear, glairy, salt-tasted mucus. The swelling of the mucous membrane causes a "stuffy" feeling, as if a foreign body were present, which we attempt to get rid of by blowing our nose, hawking, or making efforts at swallowing. There is also an increased sensitiveness of the mucous membrane; hence irritation, so slight as ordinarily to pass unnoticed, when exerted on the inflamed mucous membrane, produces convulsive reflex actions, as sneezing and coughing; these actions thus appearing, though no doubt fallaciously, to occur without any immediate exciting cause. The part also feels hot. After a few days, the secretion becomes looser, either watery or yellow, from a more copious development of mucus-corpuscles with granular contents, approaching pus-cells in character; the tenderness subsides, and the mucous membrane is seen (easily in the throat) to be less red, but relaxed and with dilated vessels. This condition usually soon passes off, but may remain, forming chronic catarrh; the redness assuming a brownish hue from deposition of pigment, and the discharge becoming profuse and puriform. Where, as in the mouth and pharynx, there are follicular glands, catarrh is apt to extend into them, causing an increased production of epithelial cells, which, being shed in sufficient quantity to plug the tubes, act as foreign bodies, and cause small round ulcers. The catarrhal process is the same in other

organs, but, of course, the symptoms produced by it vary according to the functions of the organ affected. Similar redness, swelling, and mucous or muco-purulent secretion may be seen on the conjunctiva, and on the mucous coats of the rectum and vagina, by means of the speculum, or when the organs are prolapsed; and similar appearances are recorded by Dr. Beaumont as having been seen during an attack of acute indigestion in the stomach of Alexis St. Martin—than whom it would be difficult to find a better example of a man who had fame thrust upon him. When the catarrh is intense, and the inflamed surface large, as the lining membrane of the air-tubes, stomach, or intestines, there is fever. This is ushered in by shiverings, which are often repeated throughout the acute stage, so that the fever has a remittent character, occasionally becoming very high, especially in acute bronchitis and gastro-intestinal catarrh in children. The same uneasy stuffy feeling, before spoken of, is present elsewhere: in bronchial catarrh, as a tickling just above the sternum, or a sense of oppression about its centre; in gastric catarrh, as nausea or a feeling of weight and fullness, or even pain in the epigastrium; in catarrh of the intestines, as a constant feeling as if a motion were about to pass, and needed an effort of the will to restrain it—which feeling, when the lower bowel is affected, is especially severe, constituting tenesmus; in vesical catarrh, as a constant desire to pass urine. Acute pain, however, is not usually a prominent symptom of catarrh.

Hyperæsthesia of the inflamed surface occurs elsewhere as well as in the nose; hence sources of irritation, so slight as ordinarily to pass unnoticed, suffice to give rise to reflex contractions of the muscles by which a viscus is emptied, when the mucous membrane lining it is affected with catarrh. Thus, when the air-passages are affected, we have cough; when the stomach, vomiting; when the intestines, diarrhoea; when the bladder, inability to retain more than a small quantity of urine; when the uterus, bearing-down pains. It is worthy of remark that, although catarrh increases the sensitiveness to pain, yet when an organ of special sense is affected, its special endowments are impaired or lost. Thus, aural catarrh causes deafness; catarrhal ophthalmia, weakness of sight, with chromatic aberration, due to the film of mucus on the cornea; coryza prevents the appreciation of odours and of those sensations midway between taste and smell, termed savours, which take an important place among the pleasures of the table; while patients with a foul tongue (*i.e.*, one affected with catarrh), complain that they can taste nothing that they eat.

The secretion—at first mucous, afterwards generally muco-purulent—forms the sputa coughed up in bronchitis, and the leucorrhœal discharge in catarrh of the uterus and vagina; in catarrh of the stomach and bladder, being mixed with the normal contents of those viscera, it induces in them putrefactive changes: causing, in the first case, putrid eructations and evacuations; in the other, ammoniacal ropy urine, with phosphatic sediment, owing to decomposition of the urea into carbonate of ammonia. In catarrhal diarrhoea the mucus is voided more or less mixed with feces, and often with a little blood, and is described by anxious mothers as "slime and corruption." It is to be borne in mind that a perfectly healthy mucous membrane does not secrete mucus. The swelling of the mucous membrane, together with the mucus on its surface, produce a narrowing of the canal which the membrane lines; this narrowing, although in the larger passages merely producing slight inconvenience, in the smaller tubes may suspend the function of the organ, or even, as in the case of laryngitis or capillary bronchitis, endanger life. Thus a common cause of deafness is catarrh, extending from the pharynx up the Eustachian tube to the tympanum, and preventing the communication between that cavity and the outer air, which is necessary for hearing; while the commonest form of jaundice—that occurring, together with gastric catarrh, to form what is popularly termed a "bilious attack"—is to be attributed, not so much to congestion of the liver, as to catarrh extending from the duodenum up the narrow ductus choledochus, the channel of which being occluded, retention of bile ensues. While on this subject, allow me to notice what appears to me the probable solution of the much debated question of the action of mercury on the liver. On the one hand, it is clearly proved by the experiments of Dr. Hughes Bennett and the Committee of the Association, that the administration of mercury to healthy dogs has no effect in increasing the flow of bile, and therefore it is very unlikely to have any such action on the human frame. On the other hand, every practitioner meets with cases such as I have mentioned above, with jaundice, light-coloured offensive stools, pain or feeling of weight in the epigastrium and right hypochondrium, foul tongue, and loss of appetite, etc., which are cured after taking a few doses of calomel or blue pill; the bile reappearing in the stools, and the jaundice disappearing. Now, in these cases, the jaundice occurs, not because the bile is not formed, but because, being formed and not excreted, it is reabsorbed; hence, if mercury did cause an increased

* Read before the Bath and Bristol Branch.