THE LUMLEIAN LECTURES ON THE SEQUELS OF DISEASES.

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By SIR DYCE DUCKWORTH, M.D., LL.D. EDIN.,
F.R.C.P. LOND., ETC.,

Fellow and Treasurer of the College; Physician and Lecturer on
Medicine, St. Bartholomew's Hospital; and Honorary
Physician to H.R.H. the Prince of Wales.

LECTURE II.

[PRESSURE on our space has compelled us to abridge some portions of this lecture, and we have therefore omitted the brief remarks the lecturer devoted to the sequels of variola, parotitis, pertussis, erysipelas, dengue, epidemic cerebro-spinal meningitis, cholera, and bubonic plague.]

Scarlet Fever in severe cases has many complications and several sequels. Pleurisy is amongst the latter, and may be purulent from the first. Endocarditis is not infrequent, and some cases of valvular heart disease met with in later life are probably attributable to this. I shall presently discuss the intimate nature of this condition. Sero-fibrinous or purulent pericarditis may develop during convalescence, also myocarditis associated either with rheumatic or pyæmic conditions. Lymphadenitis may remain, become chronic, and but slowly amenable to treatment. Multiple neuritis, with progressive paralysis and muscular wasting, may occur. The possibility of associated diphtheria must be borne in mind in such cases. Mania, idiocy, insanity, and melancholia have been recorded as sequels. Slight hemiplegia (recoverable) has been noted, in all probability due to embolism or thrombosis. Optic neuritis may occur independently of organic cerebral change. Acute myelitis is noted amongst the sequels, and epilepsy with more frequency than after any other acute infectious disorder. Nephritis is rather to be regarded as a phase of the disorder, or at least as a complication, and not a true sequel of scarlet fever. It is a definite form, attacking mainly the glomerular system of the kidney. Although it so commonly supervenes on apparent convalescence about the third or fourth week and while desquamation is in progress over the body, I think it should be regarded as part of the original disease. It is as specific as the cutaneous exanthem, and its significance may be taken to indicate a late invasion of the kidneys by the microbic elements or their toxins as yet not eliminated from the body, and possibly finding their way out by this emunctory channel. The occurrence of dropsy in some cases without albuminuria lends support to the old idea that the anasarca is probably a specific inflammatory exudation into the integuments and cavities. It is rare for such cases to recover ultimately without some degree of albuminuria. Cirrhosis of the liver may be a sequel of scarlet fever, and an interstitial overgrowth has been frequently observed in the livers of patients who have succumbed to the disease. The sequels of otitis media suppurativa, perforation of the tympanic membrane, suppuration in the labyrinth, and necrosis of the petrous bone may be far-reaching and tedious. Facial palsy, thrombosis of the lateral sinus, meningitis, and cerebral abscess may all ensue. Permanent deafness thus results. The tonsils may remain permanently enlarged. Suppurative peritonitis, enteritis, chronic diarrhoea, symmetrical gangrene, noma, and perforation of the palate have been noted, though rarely, as sequels. The arthritis which occurs in connection with scarlet fever has been carefully studied only within a recent period. It had commonly been regarded as "rheumatic," or, at all events, as rheumatoid. There is an apparent analogy between scarlatinal and gonorrhœal rheumatism so-called, the former being regarded as a pyæmic infection from sores in the fauces. But articular disorder occurs in the course of scarlatina *sine angina* when there is no source for infection from the fauces. Endocarditis and pericarditis may occur, and chorea may supervene; subcutaneous nodules may appear, also erythema nodosum and marginatum. With these facts before us, it is, I think, impossible to disregard the conclusion that scarlatina strongly predisposes to rheumatism, and my belief is that the occurrence of it will be found most frequently,

if not solely, in children of an inherited arthritic diathesis—an opinion of M. Peter in which I fully concur. This and other forms of zymotic disease may so test this habit of body as to awaken and reveal a rheumatic tendency hitherto dormant in the patient. In my opinion then, we may regard it as nearly certain, (1) that true rheumatic complication and sequels may be met with in scarlet fever and (2) that varieties of arthritis, due to septic or pyæmic influence, may also occur. A purulent arthritis is rare.

Measles is occasionally followed by chronic catarrh of the bronchi and lungs. Tuberculosis may become generalised, probably starting from a source in the bronchial glands or from patches of broncho-pneumonia. Enlarged tonsils and lymphasia may remain long after the illness. Post-nasal glandular growths may occur as a sequel. Some observers mention the occurrence of endocarditis. I have never met with an instance of this. Rheumatic fever, however, sometimes supervenes on measles, and the latter condition appears to predispose to rheumatic manifestations in predisposed subjects. Endocarditis (rheumatic, not morbillous) may be one of these. Cancrum oris and gangrene of the vulva have been noted. Destruction of nasal cartilages and necrosis of the upper or lower jaw may result in feeble children. A case of postmorbillous disseminated myelitis has been described, and paraplegic symptoms due to polyneuritis have also been witnessed. Diarrhoea from intestinal catarrh and dysenteric symptoms due to colitis have been noted. The kidneys very rarely suffer. A condition of low health may long remain after an attack of measles, with a general vulnerability of most of the textures of the body. There has long been observed a relation between pertussis and measles. The same may be said of membranous laryngitis (diphtheria) which sometimes coexists with or follows shortly after an attack of measles. We have here an illustration of what may be termed a succession of diseases, one preparing the way, as it were, for another. The following series of illnesses in a family of three young children indicates fairly well what I mean (albeit the intervals between the several disorders were somewhat protracted). In the middle of June, 1895, all had measles. In November all had whooping-cough. Post-nasal adenomata occurred in one child as a sequel, and were removed. In January, 1896, all these children had chicken-pox. Occurrences of this kind are by no means uncommon.

Influenza.—The sequels of this disorder have only been studied with care in the course of the epidemics which have prevailed in the last seven years. They escaped the attention of the older observers. They are very numerous. It may be fairly affirmed that many of the gravest characters of the malady occur after the acute stage has passed away, and when convalescence is apparently assured. I think there has possibly been exaggeration in respect of some of the alleged sequels of influenza, still they are, as I have said, numerous. The general asthenic type of the disease is well recognised. The enfeebled mental and bodily states left behind it have been forcibly and sadly brought home to most of us of late, both in our own persons and in our patients and friends. Recognising the fact that each epidemic is signalised by a dominant form for the most part, we may discuss the particular sequels attending, first, the thoracic; secondly, the gastro-intestinal; and thirdly, the nervous varieties of influenza. The personal factor comes in here strongly in respect of each individual affected, and as has been said, "each patient convalesces according to his temperament," and, no less, I would say, his diathesis. Nearly sixty years ago, Sir Henry Holland noted the long persisting influence of this disease upon the constitution as a remarkable feature; also the variation of parts affected in different individuals, or at different periods in its progress. In respect of sequels ensuing on the thoracic forms, we may note the prolonged course of the peculiar broncho-pneumonia, so often fatal to the weakly and the aged in its earlier stage. Next the onset of tuberculosis. Abscess of the lung has been several times met with supervening on pneumonia, and Pfeiffer's bacillus has been found in the yellowish brown sputa expectorated from it, together with elastic fibres from the lung.

Pleurisy is common and empyema may result. The heart is often severely infected. Great weakness of the organ is

common; arrhythmia, bradycardia, tachycardia, and pseudo-anginal attacks may occur long after the illness. Vertigo is a very frequent symptom, a tendency to it persisting for some months after an attack. The gastro-intestinal variety of influenza may lead subsequently to vomiting, simple catarrhal jaundice, chronic gastro-intestinal catarrh, diarrhoea, or constipation, with marked nervous depression. The nervous variety is apt to lead up to many subsequent troubles. A rapid denutrition of nerve centres is more or less common in all cases presenting any severity in the early stages. Neurasthenia may prevail for one or two years subsequently. Polyneuritis is a common sequel. The arms may be paralysed with both motory and sensory disturbance, and wrist-drop may occur; moreover, the same process may occur over large areas. Neuritis may involve cranial and other nerves locally. Encephalitis, myelitis, sclerosis of various tracts of the spinal cord, neuralgia, especially the intercostal variety, conjunctivitis, iritis, otitis media, mastoid abscess, malignant endocarditis, parotitis, orchitis, and lymphadenoma, with many other affections, have been noted among sequels in various recent epidemics in all parts of the world. Somnolence, or extraordinary drowsiness with hebetude, is a noteworthy feature. Headache, vomiting, and various mental disorders may occur. Melancholia leading to suicide is by no means uncommon. Mental incapacity long remains, and many patients affected in middle life tell of inability for efforts, mental and bodily, that were easy to them previously. They feel many years older in all respects. The natural level of health may never be regained, or not fully re-established for two or three years after a severe attack. Abscess of the brain has been several times noted as a sequel, also simple lepto-meningitis. Mental affections may also sometimes subside after an attack. The sequels of this disease are doubtless often very varied, and often extraordinary. A medical friend of mine has been unable to take coffee since he suffered from a severe attack in February, 1895, without feeling considerable cardiac discomfort, although there was no arrhythmia, and the heart sounds remained normal. In his case, too, and in another there remained for months subsequently a liability to paroxysms of low temperature, with extreme chilliness and distressing sensations; observations made in the mouth, axillæ, and rectum recording a temperature of only 96°. Such attacks continued to occur once in every eight or ten days, and not infrequently in the night. (Nothing afforded so much relief as an ounce of whisky taken as hot toddy.)

Influenza, in common with other infectious diseases, distinctly appears to predispose to the onset of other diseases. The lowered vitality induced by the primary malady leaves the patient a more ready prey to the attack of any other he may be exposed to. Or a distant interval may elapse between the one disorder and the other. Translated into the language of to-day, we may substitute for the term "lowered vitality" a condition of the solids and fluids of the body in respect of their powers of resistance to invasion by specific toxins which is unequal to the struggle between them and the infection. It is also conceived by Broadbent and others that germs of disease may lie latent in the body and remain inoperative till the resistance of the host is impaired by some circumstance such as infectious or other illness, or traumatism, which forthwith liberates the latent germs with the consecutive onset of a fresh ailment. The occurrence, so frequently, of tuberculosis after injuries and infectious fevers, may possibly be explained in this way, also the development of tertiary syphilitic disorders.

Relapses of influenza are commonly met with, and may occur several times at fairly long intervals after the primary infection and long after the original epidemic has passed away. We may doubt the occurrence of fresh infection from without, as by sporadic influence, in many such instances, and I think we may consider as probable a view of this matter, for which I am indebted to our Registrar, Dr. Edward Liveing. He conceives it to be not unlikely that the toxin of influenza may act very much as does that of malaria, leaving behind it residues of specific infective matter, which wake up into activity from time to time, and induce fresh outbursts of the disease in response to any conditions which temporarily lower the general vitality of the body. We may thus regard such relapses as evidences of sequels of the

direct residual class. I have experience of cases in which four or five attacks have occurred within two or three years, and at varying intervals. The conditions in respect of symptoms, type of pyrexia, and general character leave no doubt as to the true nature of the disorder, and intelligent patients, in three cases in the persons of well-known members of our profession, have recognised only too well the specific qualities of it.

Acute bronchocele has been several times observed to follow influenza. One lobe may become greatly enlarged and give rise to dyspnoea or orthopnoea, with a fluctuating tumour. Incisions give exit to viscid fluid, with relief to the symptoms, but the discharge may continue to flow for months. One of the most remarkable cases I have seen occurred in a gentleman, aged 68, in whom great wasting had occurred in the pectoral muscles. This followed an attack of influenza nine months previously. Twenty-eight pounds weight had been lost during that time. The ribs were plainly visible. There was marked difficulty of inspiration, and the upper portion of the chest hardly moved. There was no myxœdema. The brachial muscles were soft, but those of the lower limbs were firm. There was general weakness and early fatigue on walking. Improvement slowly followed treatment by massage, warm douching, and dosage with strychnine, phosphorus, and arsenic. This man was at one time apparently in peril from respiratory difficulties. There was evidently some focal myelitis in the cervical portion of the cord. Recovery ensued after treatment. Bladder troubles may set in and persist after an attack. Diabetes has been several times observed as a sequel. Arthritis and multiple synovitis sometimes follow influenza. At the outset of many cases it is sometimes difficult to be sure that rheumatic fever is not in progress. There may be pains in joints and pyrexia. The two disorders may even occur together and lead to a very grave condition, owing to carditis. Cases have been carefully observed in which symptoms of myelitis, involving several tracts in the cord as well as the cornua, have led to arthritis or true spinal arthropathy.

Were I to enter at length in laying before you an account of the sequels of influenza as set forth in the special literature on the subject during the last five years, the whole time allotted to me would not suffice for the purpose.

Diphtheria.—The sequels of this disease are so remarkable, and at times so serious, that they have attracted close attention. I cannot discover evidence that these very obvious consequences were witnessed or described by the older physicians. But since diphtheria became endemic in this country in 1855, they have not failed to be noted and recognised as depending upon the original malady. The albuminuria which is so common during the active stage of the disease usually passes off leaving no trace of nephritis. But it may persist for two months subsequently. Dropsy is of very rare occurrence in this relation. Parenchymatous nephritis has been noted, but it is open to question whether the disorder thus complicated is not scarlatina rather than diphtheria. It is certainly very rare. The albuminuria is probably of toxic origin, and so far specific. The gravest sequels are paralytic conditions, and the latest researches respecting them plainly indicate that they are due to a toxic neuritis, which may be widely spread. These paralyses occur in 10 to 20 per cent. of all cases. They occur usually in from two to six weeks after the onset of diphtheria, and are commonly more marked in adults than in children. They may be local or general. Of the former we note palatal and pharyngeal palsies, strabismus, ptosis, ophthalmoplegia interna, and facial palsy. With some of these may be associated symptoms of general paresis or actual palsy. The general paralyses are of the same nature as the local, and are due to polyneuritis of toxic nature with loss of reflexes. The vagus nerve is especially apt to suffer, and the evidence of this is afforded by great cardiac weakness with bradycardia or tachycardia, or by fatal syncope. Vomiting may be troublesome, and may precede the cardiac symptoms. Loss of knee-jerk may sometimes be the only sign of nervous sequels. This is, however, always a symptom indicating gravity, and demanding vigilance in any case. The sphincters, as a rule, are unaffected. With due care in treatment, and an intelligent appreciation of the social dangers of such cases, the prognosis is on the whole good. Perfect recovery may be

anticipated within three or four months. Rarely there may persist some enfeeblement of muscles in the limbs. I have a general impression, although unsupported by any figures in proof of it, that the nervous sequels of this disease have been less frequently met with since treatment by antitoxin has been employed. We are fairly justified in anticipating that such may be the case.

As indicating the remarkable advance made in pathological and clinical study in quite recent times I may recall here a passage taken from Sir Thomas Watson's classical lectures to be found in the last edition, issued just twenty-five years ago. He remarks: "All these sequelæ are significant of blood poisoning. We cannot suppose that the nervous symptoms—transient and wandering as they often are—can have their cause in any grave or material damage in the nervous centres. They denote, I presume, disturbed nutrition of the tissues from imperfect or altered conditions of its circulating blood." Watson was right in his belief that the nerve centres were not involved, but the whole subject of neuritis in its many forms now constitutes a new chapter in medicine, one for which few materials existed in Watson's time, and those the careful observations of Chomel and of Graves, now sixty-eight years old, which might have, but somehow did not, set inquirers upon the track to discover peripheral neuritis.

As indicating how the supervention of a new infection may prepare the way for fresh outbursts of diphtherial disease, I may quote the case, recorded by Dr. Hayward, of a child who, while recovering from diphtheria, was attacked with measles. On the invasion of the latter there was a renewed activity of the lingering diphtherial bacilli with a reformation of faucial membrane. Disorders of the mucous membrane of the nose and otitis are to be included amongst the occasional sequels of diphtheria, also post-nasal adenoid growths. It is probable, if not certain, that some of the post-diphtherial sequels are due, as in other cases, to the results of mixed bacillary infections. The commonly associated bronchopneumonia has been proved to be due to specific bacillary invasion of the lung. Malignant endocarditis is sometimes a sequel of diphtheria.

Malarial Fevers.—The sequels of these present several problems upon which much light has been recently shed since the discovery of their intimate nature and their dependence upon the several phases of the life of certain hæmatozoa or sporozoa. We have the fact that, according to the degree of impregnation of the system by these parasitic bodies, there remains for long, sometimes for life, a tendency to recurrence of specific pyretic processes under certain provocations, and, not seldom, the establishment of what is well known as malarial cachexia. A subject of the latter condition may resist all treatment and die of anæmia or from hæmorrhage. The liver and spleen are commonly, but not always, enlarged. Paraplegia, sometimes spastic, has occasionally been noted. Intermittent paralyses, intermittent aphasia, cramps, hyperæsthesia, anæsthesia, articular pain and swellings, cedema, and urticaria, very specially have been noted to follow malarial impregnation, all of these impressed with a periodic or intermittent character. These strange conditions we now explain by reference to the particular organs infested from time to time, and yielding manifestations of the development of the specific blood parasite. Saccharine diabetes is sometimes distinctly traceable to previous malarious impregnation. Neuralgia in various forms has been noted as a sequel affecting intercostal, occipital, sciatic, and testicular branches. The supra-orbital branch of the fifth cranial nerve is especially liable to be thus involved, the condition being sometimes described as "brow ague." We have to be careful in assigning to malarial influence any conditions of a periodic or intermittent character which may not certainly be connected with submission, at some time or other, to exposure to specific hæmatozoal infection. It is a character of all neuralgias to be paroxysmal and intermittent, even, as shown by Weir Mitchell, when of traumatic origin. But it appears certain that the effects of malarial impregnation may for many years induce a condition which modifies the course and characters of other ailments. Thus, according to Fayrer, "periodicity complicates all diseases in India." A chill induced in any way may awaken activity of febrile symptoms many years after subjection to malarial

influence. Neurasthenia and spasmodic asthma are amongst the protean manifestations recognised in this relation, also intermittent torticollis, and a rebellious form of hiccough. This peculiar latency of malarial influence has now been considered with reference to the modern doctrines held as to the nature of the disease. It is believed that the malarial germs are not absolutely destroyed, but only rendered impotent or latent by drugs held in repute for cure such as quinine and arsenic. Improved general health of the patient appears to render the hæmatozoa latent for a time. New forms of illness may induce fresh activity of the hitherto latent germs. According to Manson the causes of latency are various even for the same micro-organism. It has been proved that individuals may become immunised to the toxins of bacilli, although the microbes may continue to exist and grow. The latter may thus apparently remain latent or dormant, englobed in cells, or prevented by a barrier of cells from gaining access to the body (Washbourn). In malarial infection there is often evidence of the presence of varieties of hæmatozoa or admixture of parasites, each of which may cause various types of fever. Quinine has more power in destroying some of these than others. It appears certain that some of these bodies undergo development in various organs of the body, especially the liver, spleen, intestinal mucous membrane, brain, and bone marrow. Many of the symptoms appear to depend upon the organ selected for their accommodation and sporulation. The blood is most impregnated at the beginning of a paroxysm of fever, and least so in the apyretic intervals. As Manson has pointed out, the principal acts in the drama in pernicious cases are played out in the viscera, whence, at intervals, swarms of parasites are embolically shed into the circulation, producing the varied symptoms of malarial pyrexia. We may account for the lingering tendency to recurrence of paroxysms by supposing that the specific hæmatozoa in a given case have never been quite annihilated, but have remained latent and quiescent, locked up, as it were, in some viscus or tissue of the body, and only set free by the onset of some general disturbance which lowers the vitality and resistance of the patient. I think we may fairly anticipate that some absolute proof in support of this conception will be presented to us before the lapse of many years.

ON AN OUTBREAK OF SMALL-POX AT THE WORKHOUSE, CARDIFF.

By ALFRED SHEEN, M.D., D.P.H.,
Visiting Medical Officer.

THE workhouse buildings consist of the house proper, the hospital, and the isolation wards, and cover an area of about 8 acres. The house is built in blocks, three storeys high, and the hospital on the pavilion plan in two storeys. The isolation wards are one storey, and are surrounded by high walls. Each block in the house is isolated and walled in.

Four inmates of a block to the extreme right, occupied mainly by old and infirm inmates and chronic and venereal cases, were attacked with feverish symptoms—two on January 10th and two on January 11th. The dates of first symptoms, appearance of rash, of isolation, and removal to Borough Small-pox Hospital, with other particulars, are noted on the accompanying table.

By January 16th these four cases were disposed of, the bedding, etc., burnt, and revaccination commenced.

On January 7th, three days before the above outbreak, a man (No. 5) was brought to the workhouse with a rash on him, which, after consultation and careful inquiry, was pronounced not to be small-pox. After events proved the diagnosis to be wrong. This man was mixing for nine days with patients in two blocks of the hospital.

The next batch of 8 cases (Nos. 6 to 13), undoubtedly infected by No. 5, broke out in one block from January 17th to 25th. No. 16, taken ill on February 5th, evidently caught the disease from one of those infected by No. 5. No. 14 was an attendant on Nos. 1 and 2 in the isolation wards who had refused to be vaccinated.

I now come to another phase of the outbreak. No. 15 was an inmate of the house, who acted as assistant barber. He