side, or fairly bracing inland, places, is often important during the convalescence from these diseases, but the fatigue of long journeys is to be avoided.

Preventive medicine has a very large field in the subject of phthisis. I need only remind you of the change in the mortality from phthisis of soldiers and prisoners by improved ventilation in barracks and prisons; and we must always have before our minds the important discovery of Bowditch and Buchanan, that drying of the soil by drainage diminishes the mortality from phthisis. The practical application requires no words.

THE GULSTONIAN LECTURES,

ON

MALIGNANT ENDOCARDITIS.

Delivered at the Royal College of Physicians of London, March, 1885.

By WILLIAM OSLER, M.D.,

Professor of Clinical Medicine at the University of Pennsylvania, Philadelphia.

Lecture II.

Symptoms.—In considering the symptoms of endocarditis, it is important to bear in mind the manifold conditions under which the disease may develop. A limited number of cases may be grouped together as forming a primary substantive disease; but in the great majority the affection is either an associated pathological state, or is of the nature of a secondary malady arising in the course of some other disease.

In the primary cases, individuals in perfect health may be attacked, or, more frequently, the disease affects those with chronic valvular endocarditis, with perfect or failing compensation. Where the affection occurs after an injury, or in the puerperal state, the cardiac condition must be regarded as part of the general sepsis, and is of the same nature as the pyæmic foci and the inflammation of serous membranes The existence of the endocarditis in these cases has no special influence, and the phenomena may be just as marked without it.

When the endocarditis supervenes in the course of some particular disease, as rheumatism or pneumonia, it is usually a secondary process, though indeed it may be regarded as directly produced by the causes which have excited the original diseases.

The different modes of onset, and the extraordinary diversity of symptoms which may arise, render it very difficult to present a satisfactory clinical picture. The general symptoms are those of a febrile affection of variable intensity, which may be ushered in, like any acute fever, with rigors, pain in the back, vomiting, headache, etc. Arising in the course of some other disease, there may be simply an intensification of the fever, or a change in its features. The pyrexia is constant, but variable in type and intensity, and more likely than any other symptom to lead to misinterpretation. Prostration of strength, delirium, sweating, and other signs of severe constitutional disturbance, are usually present.

Cardiac symptoms may be marked from the outset; pain, palpitation, sense of distress, and murmur; in many instances, there has been old valvular disease, but in a considerable number of cases the heart-symptoms remain in the background, hidden by the general condition, and giving no indication; or they may be so slight, that they are not even detected on special examination.

The embolic processes give a special prominence to local symptoms, which may divert attention from the general malady. Thus delirium, coma, or paralysis may arise from implication of the brain or its membranes; pain in the side and local peritonitis from involvement of the spleen; bloody urine and pain in the back from affection of the kidneys; loss of vision from retinal hæmorrhages; and suppuration in various organs, or gangrene, from the distribution of emboli.

So diverse are the features of malignant endocarditis, that a consideration of the symptoms is greatly facilitated by arranging the cases in groups, according as they display special characters. Dr. Kirkes, in 1852, called the attention of the profession to the occurrence of a typhoid-like condition in acute endocarditis, and he subsequently pointed out the fact that inflammation of the valves might lead to pyæmia. The investigations of Charcot and Vulpian (*Gazette Médicale de Paris*, 1862), of Virchow (*Gesammelte Abhandlungen*), of Jaccoud (*Nouveau Dictionnaire de Médecine*, etc., art. Endocarditis), and others, gradually led to the recognition of these two great types of the disease. Of late, still further separation has been made of the cases with features closely resembling ague or intermittent, and also of cases in which the cardiac symptoms are most prominent; and I shall call attention to certain cases in which the symptoms are those of an acute affection of the cerebro-spinal system.

And first let me direct your attention for a few moments to those cases in which the endocarditis is merely a part of a septic or pyæmic state, the result of an external wound, a puerperal process, or an acute necrosis. Somewhat over 18 per cent. of the cases I have analysed were of this nature, the majority of them occurring in connection with puerperal fever, 11 per cent.; the others in association with various wounds and injuries, or acute necrosis of bone. The puerperal cases appear most frequent after abortion, and the first symptoms usually develop within a week or ten days of delivery, beginning with rigors and fever, and running a course not essentially different from ordinary puerperal septicæmia or pyæmia without endocardial complication. Sometimes, the onset of the symptoms may be much delayed, and the patient up and about her duties when the attack comes on. Usually, there is local inflammation of the uterus or ligaments; membranous-diphtheritic-endometritis, and phlebitis, are common. Occasionally, there may be no special affection of the generative organs, as in a very severe case reported by Dr. Moxon (Pathological Society's *Transactions*, xxi), in which there was extensive endocarditis of the right heart, and sloughing patches in the lungs. The woman had been delivered within the month, and the uterus appeared in a state normal for the period. The endocardial lesions are not necessarily ulcerative, but may be vegetative, and occasionally suppurative. It is very evident, from the records, that valves with sclerotic changes are most often affected. The visceral lesions are always suppurative, but do not appear to be more numerous than in cases of puerperal sepsis without endocarditis. The heart-symptoms may be completely masked by the general condition, and the attention may be directed to them only by the occurrence of embolism. In this connection, it may be remarked that malignant endocarditis may attack pregnant women, and run a rapid course leading to abortion. In two cases of this kind, Litten (*Charité Annalen*, Band iii, Berlin) found no differences in the clinical features or anatomical condition, as regards valves and metastases. In other instances, there may be the rigors, sweats, and irregular fever, leading to abortion, without the occurrence of any suppurative foci, as in a case reported by Guyot (*Bulletin de Soc. d'Anatomie*, 1879). Dr. Trueman, of Maccan, New Brunswick, has also sent me notes of a case which developed during pregnancy.

The cases of ulcerative endocarditis in traumatic and operative septicæmia are of a similar nature, but do not appear to occur so frequently as in the puerperal condition. Many of the cases occur after very slight injuries, as paring a hangnail, or a corn, a sloughing pile, or the passage of a sound through a stricture. There are usually suppurative infarcts in the lungs; and, even with extensive ulcerative changes in the left heart, the pyæmic foci may be all in connection with venous system and right heart. This was well illustrated in the case of a man, aged 25, who was admitted to the Montreal General Hospital, May 31st, with a wound of the radial artery. Phlebitis followed, and cellulitis of the arm, rigors, septic pneumonia, thrombosis of the femoral vein, and symptoms of pyæmia. At the necropsy, there were numerous foci in the lungs, and a suppurating thrombus in the femoral vein. The mitral valve presented, on the ventricular face of the anterior segment, a patch, of the size of a sixpence, swollen and greyish white in colour, and opposite to it, on the auricular face, was an ulcer big enough to contain a small pea. There was another also on the wall of the left auricle. There were no infarcts in the arterial system. In these cases of puerperal and traumatic septicæmia, the right heart is more frequently affected than in any other group of cases. Thus, of the thirty-seven cases of this kind, there were thirteen in which the tricuspid or pulmonary valves were involved.

In the acute necrosis of bone or acute osteo-myelitis, a secondary endocarditis may develop; and in some instances the clinical features may strongly resemble malignant endocarditis, as was well illustrated in the case of a lad, aged 10, who died after an illness of less than a week's duration, characterised by high fever, rigors, sweats, etc. No local trouble was complained of, and at the *post mortem* examination there was ulcerative endocarditis of the right side, and a purulent focus in the septum; and it was only after most careful search that the primary trouble was found in a small spot of acute necrosis of the tibia.

These forms do not strictly come within the province of the physician, but they must be taken into account in any description of malignant endocarditis. The source of the poison is very evident in the external wound; the metritis, etc., and the lesions, are chiefly in the territory of the venous system and right heart.

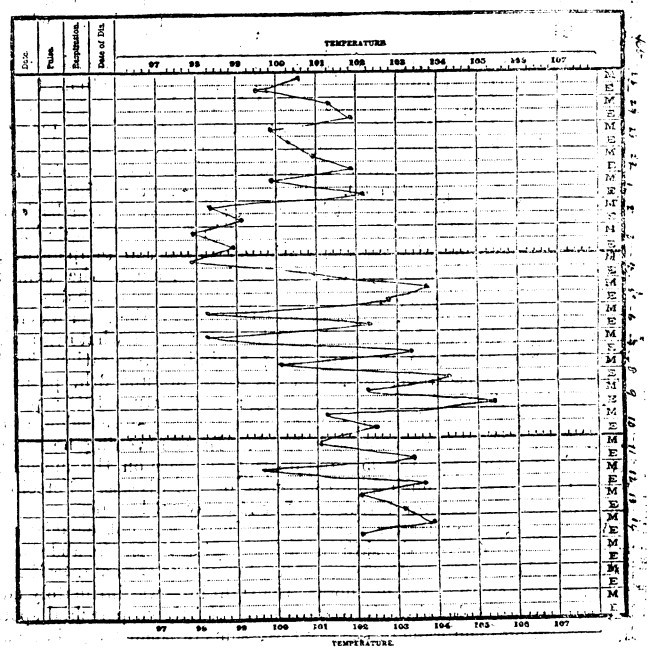
In the pyæmic group of cases, the clinical features are of a decided pyæmic type, and here the source of infection is at the heart, and the metastatic lesions are chiefly in the territory of the arterial system, rendering very applicable the name of arterial pyæmia given by Dr. Wilks to this class of cases. We may recognise two types of the pyæmic form: first, the cases in which the symptoms resemble closely those of ordinary pyæmia, with rigors at intervals, sweats, and other signs of septic infection; and, secondly, an important group, in which intermittent pyrexia is a striking feature, occurring in regular paroxysms like ague, with cold, hot, and sweating stages. These forms may develop as primary independent affections, or come on in the course of rheumatic fever, pneumonia, etc. In our Montreal cases, they have not been so marked as the typhoid type. The following case, with illustrative chart, is a fair example of pyæmic symptoms due to endocarditis developing in the course of pneumonia.

M. W., aged 43, a well built man, was admitted under Dr. Ross, February 26th, 1880. He served his time in the army; he had had syphilis, and had quite recently had syphilitic ulcers; had also been a hard drinker. In October 1879, he was in hospital with pneumonia, and had severe cerebral symptoms. On February 23rd, he had a severe rigor, followed by fever, cough, and pain in the side. On admission, February 26th, there were signs of consolidation at the left base. On the 28th, he was delirious. On March 1st, the crisis seemed to take place; temperature fell to 98°, remained low for three days, and he seemed to be doing very well. At 1 P.M. on the 4th, he had a severe chill, with vomiting, and followed by sweating. On the 5th, he was delirious; he had another severe chill at 2 P.M., in which the temperature rose to nearly 104°. He had five stools; there were no indications pointing to the heart. On the 6th, the morning temperature was normal; the patient was very prostrate, sweated a great deal, and there was low wandering delirium. From the 6th to the 9th, the temperature rose a degree each evening, reaching 105.3°, its highest point. Pulse over 120, and feeble. From this time until the 14th, he gradually sank, remaining unconscious. The lung-symptoms did not extend, but rather improved. The *post mortem* examination revealed extensive ulcerative vegetations on the aortic valves, purulent meningitis, and resolving pneumonia of the base of the left lung.

The attack may be ushered in with a single rigor, or more often a series of chills; and from the outset they may constitute a marked feature, and, with the sweating, prostration, and diarrhœa, give a septic character to the case. A light jaundice may develop, and still further intensify the resemblance. Sometimes the case may run on for a couple of weeks with marked typhoid symptoms, and then pyæmic features develop—rigors, sweats, etc.

But by far the most remarkable cases of the pyæmic group are those which present a marked intermittent type of pyrexia, simulating a quotidian or tertian ague. They may occur without any signs or indications of heart-disease, or the symptoms may develop in individuals the subjects of chronic valvulitis. The cases are not nearly so frequent as those of the typhoid type; but they have been specially studied by Drs. Wilks, Bristowe, and Coupland in this country, Lancereaux in France, Leyden and others in Germany. The paroxysms may have the absolutely typical features of intermittent; the chills, hot stage, and sweating succeeding each other with regularity; and in the intervals there may be an entire absence of the fever. The quotidian type is the most common; the tertian has occasionally been described; and in rare instances two paroxysms have recurred within the twenty-four hours. The cases may be much prolonged, even for three or four months. One of the first references I find to cases of this kind is in a foot-note to one of Dr. Ormerod's Gulstonian Lectures (*Medical Gazette*, 1851), in which a case of Dr. Bond of Cambridge is narrated—an instance of chronic valvular disease, with intermittent fever and diarrhœa, two paroxysms occurring in the day. The case lasted four months. In a remarkable case (Dr. Ray) described by Dr. Wilks (BRITISH MEDICAL JOURNAL, 1868), during a six or seven weeks' illness, rigors recurred with such regularity that a tertian ague was suspected for a time, although the patient was known to be the subject of heart-disease. In some instances, the existence of ague previously has rendered the condition much more puzzling. In several of Lancereaux's cases (*Gazette de Médecine*, 1862; *Archives Générales*, 1873), the patients had had intermittent fever a short time before; so also with one of Leyden's cases (*Zeitschrift für Klin. Med.*, Bd. iv, Berlin). But the most extraordinary case of the kind is recorded by Dr. Bristowe (BRITISH MEDICAL JOURNAL, 1881). A patient had ague in October, chills once or twice a day; she was ill for six weeks; and, after an interval of two or three weeks, they recurred in the second week of December, and continued until December 23rd. She was well for a few days, and then the attacks recurred after sleeping in a cold bed, and persisted until her admission to hospital on February 12th. For the four weeks previous to entrance, the attacks came every twelve hours regularly. A murmur was noticed; but the history of ague was so clear, and the attacks so characteristic, that a suspicion of malignant endocarditis was at first not entertained. It was only after the failure of quinine and a variation in the character of the paroxysms, that a diagnosis was reached. In Dr. Coupland's cases (*Med. Times and Gazette*, 1882, vol. i), the intermittent pyrexia was also well marked. In none of our Montreal cases was the aguish type very pronounced, though in one or two cases there were regularly recurring paroxysms of chills, fever, and sweating; but the conditions under which the attacks developed rendered the clinical features more like ordinary pyæmia. The majority of these cases appear to arise independently of other affections, and occur among what I have referred to as the primary class of cases; though, as already mentioned, some develop in chronic valvular disease, and others appear associated in some way with ague.

The typhoid type is by far the most common, and the majority of the cases present features which come under this heading. The disease may set in with a single rigor or a series of chills, most frequently the former; often a period of *malaise* or ill health has preceded the attack, and in very many instances the symptoms develop in the course of some fever. The characters of this form are irregular temperature, early prostration, and involvement of the nervous system, delirium, somnolence, and coma, dry tongue, relaxed bowels, sweats, petechial and other rashes, and occasionally parotitis. Perhaps the majority of cases are mistaken for typhoid, as the heart-symptoms may never be prominent, or even when sought for not found.



The Case of M. W

The following cases illustrate the chief features of this form.

Ann O., aged 46, large well nourished woman, was admitted under Dr. Wilkins, June 5th, 1881. She had been a healthy woman. Dr. Blackader saw her on the 2nd, when she complained of severe pains in the back, loins, and hips, which were relieved by poultices. Pulse rapid, tongue furred, no diarrhœa. She was supposed to be suffering from typhoid fever. No reliable history, family or personal, could be obtained, but she had been out of sorts for four or five days previous to the onset of the attack. On admission, temperature 104°; pulse 110; perspiration 32; no eruption; lungs normal; no heart-murmur; no albumen in urine. On the 6th, she passed a restless night. Temperature, 104°; pulse 120, dicrotic; abdomen distended; two stools. She passed 18 ozs. of urine, slightly bloody, which might have been from the menses, which began to-day. On 7th, morning-temperature 103.2°;

pulse weak, 120; respiration 54, shallow; loud sonorous *râles* over chest; bowels and bladder emptied involuntarily; stools frequent, high coloured; patient could not be roused. The legs and general surface seemed tender, which caused her to cry out when moved. Urine drawn off by catheter contained much blood, 50 per cent. by volume of albumen, and many granular casts. Pupils unequal; head drawn to the right. Some rigidity of muscles of arms, most marked on the left; increasing coma, and death at 3.30 P.M. of the 7th, the sixth day of her serious illness. At necropsy, no hypertrophy of heart; mitral valves a trifle thick, with small superficial losses of substance on both curtains. Aortic valves normal; infarcts in spleen. Numerous small hæmorrhagic emboli in kidneys and throughout the intestines. Six or eight suppurating infarcts in brain, chiefly near longitudinal fissure and on median surfaces. The case is a good example of the primary malignant endocarditis occurring in a healthy individual, and running a rapid course, with symptoms of a typhoid character. The diarrhœa was not profuse, though the intestinal lesions were well marked.

In the following instance, occurring in connection with pneumonia, the profuse diarrhœa and severe nervous prostration were very suggestive of typhoid fever.

J. H., aged 40, drayman, a large well built man, was admitted, May 13th, with pneumonia. He had been a pretty healthy man, though he had had two previous attacks of inflammation of the lungs. He had been in the habit of taking stimulants. His present illness began on the 11th with the usual signs of pneumonia, for which he consulted Dr. Blackader. On admission, he was delirious; temperature 105°, respirations 60, pulse 110, consolidation of lower two-thirds of right lung, with the usual physical signs of hepatisation. On the 6th day, the delirium was less marked and the temperature had fallen to 101.5°. On the 9th day, the fever was 103°, and the condition of lung remained about the same. On the 12th day, I saw him with Dr. Molson. The dulness appeared to be diminishing at the right base; I could detect no murmur at either apex or base of heart. The condition of the patient resembled closely other cases of pneumonia in which ulcerative endocarditis had developed, and I suggested the possibility in this instance. The tongue was furred; no abdominal distension; no spots; diarrhœa had come on in the past few days; stools thin, yellowish in colour. The patient was dull and heavy, not actively delirious. On the 18th day, temperature rose to 104.5°, and for the next four days kept about that height. On 20th day, diarrhœa, which had been checked, began again. On 23rd day (June 1st), temperature 104.5°, pulse 96, respiration 30. Dulness diminished at right base, still evident in scapular region at lower part; moist *râles* over back of lung; rhonchi, sibilant and sonorous, heard in front. A single large dose (30 grains) of quinine, at 4 P.M. did not affect the temperature, which at 10 A.M. was 105.5°. On 26th day, much the same; temperature had kept about 104°; two or three loose stools each day; low delirium, restless at night. For the next three days, the fever was not quite so high, the diarrhœa ceased, and he became somewhat rational. Still deficient resonance in right lung behind. Respirations kept about 30, and pulse under 100. On the night of June 8th, patient very restless, required constant watching; temperature 105°; pulse more rapid, 130. On the 10th, patient more drowsy; pulse feeble, 140; large moist *râles* heard over both lungs. In the evening he had a rigor; temperature rose to 105°, and death took place on the morning of the 11th, just a month from the onset of the disease. Petechiæ had appeared on the skin during the last few days of his life.

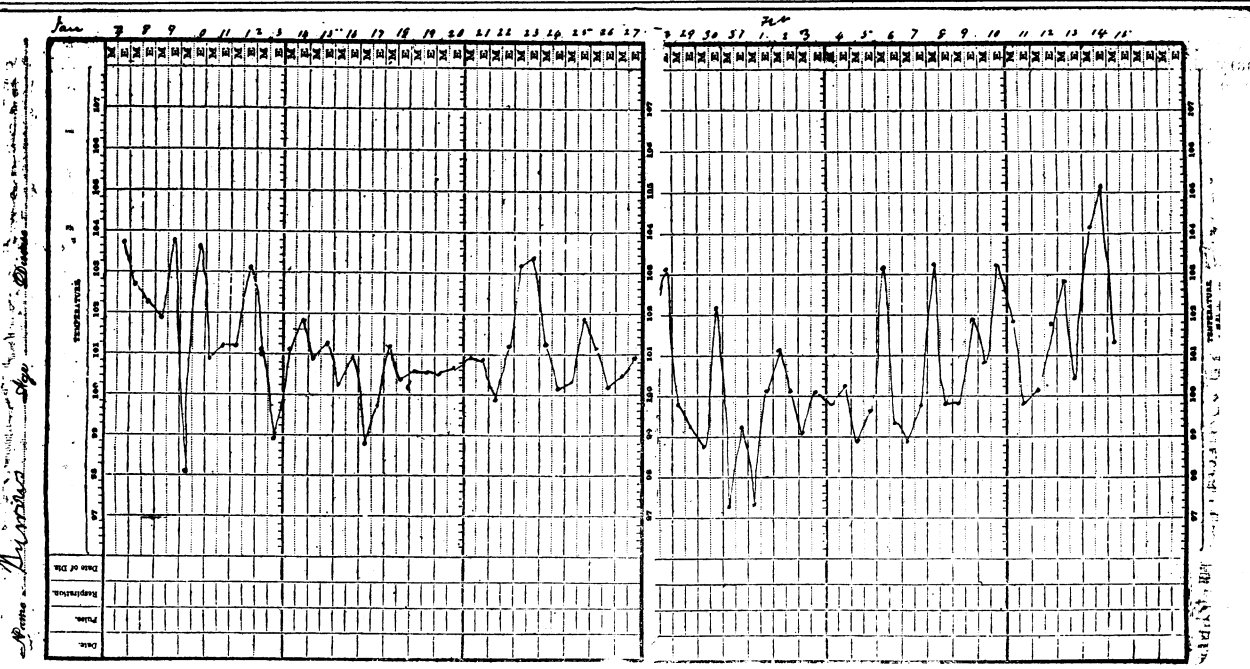
Necropsy, five hours after death. The body was not emaciated; there were petechiæ on the skin in various regions. In the abdomen, patches of dark extravasation were noticed upon the coils of intestines, both large and small. In the thorax, the right lung was intimately adherent. *Heart*, subpericardial ecchymoses. Numerous petechial spots beneath lining membrane of the cavities; some of them are as large as split peas, and on section present a greyish centre, as if they were small infarcts. The mitral segments were natural-looking on the ventricular surface, but on separating the edges, large masses of vegetations were seen blocking the orifice. They were attached to the auricular faces, about 2 to 3 millimètres from the edge; that in the anterior segment was about 2 centimètres in extent, and projected 12 millimètres. It was roughened on the surface. The growth on the posterior segment was smaller, irregularly divided into two bulbous portions, the surfaces of which were smooth. The aortic orifice was blocked with a clot; the right anterior valve presented an enormous mass of vegetation, which occupied the entire curtain, except the edge, and infiltrated the whole thickness, appearing in the sinus as small nodular masses. Two perforations existed between the outgrowths, each about the size of a crow-quill. The posterior segment presented a flattened vegetation, which encrusted the centre of the valve, and extended up to the corpus Arantii. All of these masses had the same appearance; colour greyish-yellow, except where coated with adherent blood-clot; the ones on the anterior mitral segment and on the posterior aortic were roughened, and the granular substance exposed; three others presented smooth surfaces, as if covered by a thin membrane. They were soft, on section granular, uniform throughout, and of the consistence of pith. The coronary arteries were free. *Lungs*. The right was closely bound to the chest-wall by old fibrous adhesions. The posterior part of the organ was heavy, but crepitant, except at the upper part of the lower lobe, which, with a band about 5 centimètres in breadth, of the lower part of the upper, and part of the middle lobes, were firm, airless, and granular on section. Colour liver-red, interspersed with small opaque areas, the plugs in the air-cells undergoing fatty change. The left lung healthy. The *spleen* weighed 185 grammes; pulp soft. No infarctions. The *kidneys* were of average size; numerous small infarcts, chiefly in cortex; small hæmorrhagic areas with grey centres. *Intestines*. The deeply ecchymotic patches seen externally corresponded with small infarcts situated in the submucous tissue, and surrounded by a zone of deeply hæmorrhagic tissue, above which the grey pale glandular layer could be distinctly seen. The infarct itself was about the size of a split pea, a little elevated, on section deep red or greyish red, not in any instance purulent, and surrounded by a zone of extravasation from 1 to 3 centimètres in diameter. They were most abundant in the ileum, about 20 in number. Peyer's glands were not swollen. The *liver* was pale, swollen and soft. *Brain*. Vessels of pia mater full, parts at base normal. Thick purulent lymph beneath arachnoid, covering central part of fissures of Sylvius on both sides, over both frontal lobes at anterior part, over the left intraparietal fissure and on upper part of cerebellum, close to great transverse fissure. A good deal of serosity beneath the membranes. No infarcts in substance of brain.

In some instances, the clinical features are mixed; typhoid and pyæmic characters may alternate, as in the following case.

J. B., aged 38, admitted January 7th, 1880, had been a healthy man. Ten years ago, he had a severe attack of pneumonia. On the night of January 4th, he felt uneasy, and did not rest well; got feverish, and in the morning had pain in the side and cough. No rigor. Symptoms continued, and he came to hospital on 7th. On admission, temperature was 103°, pulse 128, and respirations 40. Signs of pneumonia in right lung, lower three-fourths. Characteristic expectoration. During the first week in hospital, nervous symptoms appeared; he became delirious, and passed urine and fæces in bed; tongue dry; and on the 9th and 10th there was troublesome vomiting. The temperature was irregular, ranging from 100° to 104°; the evening record usually high, but twice it was lower than the morning. Pulse 120 to 148; respirations 32 to 50. During the second week, the intensity of the symptoms abated; the temperature kept lower, not once reaching 101°. The nervous prostration continued, with tremor of whole body, and the discharges were passed involuntarily. Tongue very dry. A very disgusting fœtor emanated from the body. He lay like a patient in the third week of severe typhoid fever; took food and stimulants well. On the 19th, a painful swelling appeared in the left parotid region, and he began to have chills, and sweated a great deal each day. No objective indications of heart-trouble. The lung cleared very much in the third week, but the prostration continued. During the fourth week, the swelling of the parotid increased, and on February 1st an abscess was opened in this region. On 30th, there were severe chills, with blueness of face and the finger-tips. Much sweating, of a profuse drenching character. He became brighter after the abscess was opened, and the nervous symptoms were less marked. Temperature ranged from 98° to 100°, rising with the chills. In the fifth week, he remained in this state, with but little change, occasional chills and profuse sweats, the picture being more like severe pyæmia. In the sixth week, the prostration increased, and he lay in a heavy unconscious state. No chills, but most profuse sweats. On February 13th and 14th, the temperature rose very high, reaching 105°, and death took place on the 15th, after an illness of forty-two days.

The necropsy revealed extensive mitral endocarditis, as the only special lesion. The base of the right lung was a little firmer than the left, but not granular on section. Only one infarct was found, which was in the upper part of the spleen. The intestines were healthy; there was no meningitis. The parotid abscess had almost healed.

Cardiac Group.—Under this heading may be arranged, as suggested by Dr. Bramwell (*Diseases of the Heart*), those cases in which patients, the subjects of chronic valve-disease, are attacked with febrile symptoms and evidences of a recent endocarditis engrafted upon the old process. I have already remarked on the great frequency with which ulcerative changes are found in connection with sclerotic endocarditis. Many of such cases present features of the pyæmic, typhoid, or cerebral types,



and may be of the most acute character; but, in others, the process appears much less intense, and the cause more chronic. In a considerable series of cases, the history is somewhat as follows. The patient has, perhaps, aortic valve-disease, and is under treatment for failing compensation, when he begins to have slight irregular fever, an evening exacerbation of two or three degrees, some increase in cardiac pain, and a sense of restlessness and distress. Embolic phenomena may develop; a sudden hemiplegia; pain in the region of the spleen, and signs of enlargement of the organ; or there is pain in the back, with bloody urine. In other instances, peripheral embolism may take place, with gangrene of the foot or hand. There may be hebetude or a low delirium. Instances such as these are extremely common; and while, in some, the process may be very intense, in others it is essentially chronic, and may last for weeks and months, so that the term malignant seems not at all applicable to them; still, in a large series of cases, all gradations can be seen between the most severe and the milder forms. Dr. Green (*Lancet*, 1884, vol. i) referred to a case which lasted six months, and to another in which, during eighteen months, there were attacks of irregular fever. I have known the febrile symptoms subside for weeks, to recur again with increased severity; and there are cases which render it probable that the process may subside entirely. The ulcerative destruction, in these cases, may be most extensive; and I have seen the aortic ring with scarcely a trace of valve-substance left. The process in the chronic cases is also mycotic, and it is to be carefully distinguished from the atheromatous changes. In very many instances, there is no history of rheumatic fever or of other constitutional disorder; but the endocarditis appears to attack the sclerotic valves as a primary process, and a very considerable number of the most typical cases are of this kind. A good example was the following case, in which the disease attacked peformed and hardened valves, and the clinical symptoms were prolonged for nearly three months.

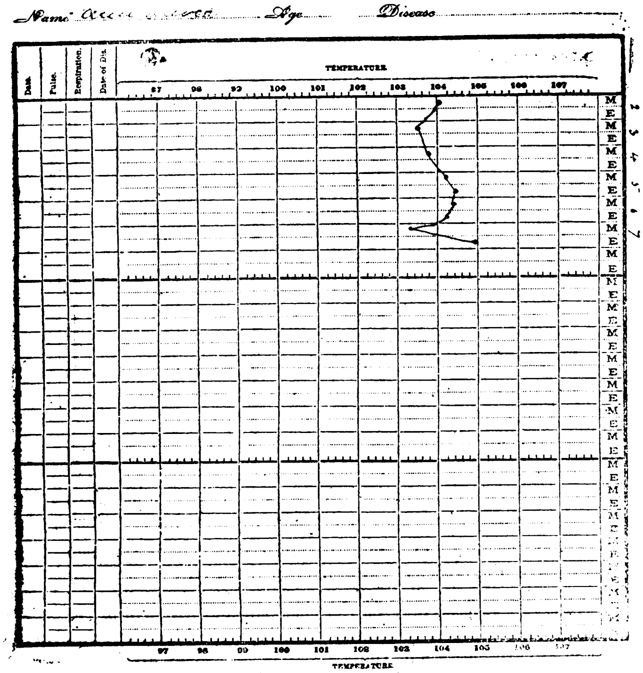
H. M., aged 38, was admitted September 8th, under Dr. Ross. He had a good family and personal history; he had always enjoyed excellent health. A month ago he had chilly feelings, fever, and sweating, with vomiting. He kept about until ten days before admission, when he took to bed, with pains at the heart, and fever. On admission, there was marked aortic incompetency; temperature 100° Fahr.; he seemed dull and heavy. On 15th, there was iliac tenderness, and some diarrhœa. For the next two weeks, he remained in same state, temperature rising at times to 103° Fahr. During the first week of October, the prostration increased, and there was slight delirium at night; temperature not higher than 102° Fahr. On the 14th, there was an eruption of petechiæ. From this time, the temperature kept lower—100° to 101° Fahr.—the delirium and prostration increased, and death took place on the 23rd. Two of the aortic cusps had fused, and there were old sclerotic changes; there were recent soft greyish vegetations; the spleen presented six or eight infarcts, one suppurative.

These are the cases of ulcerative endocarditis which present fewest difficulties in diagnosis. The existence of the chronic heart-disease excites attention; and even if compensation has previously been perfect, the ulcerative process may be the very cause of disturbing the balance and producing marked symptoms. In my experience, the existence of fever is invariable when the ulcerative processes are due to micrococci, whereas most extensive destructive changes may occur in atheromatous disease without any elevation of temperature. It may be possible that the granular detritus discharged from atheromatous foci on the valves, or on the aorta, may have irritating properties; yet, in two instances, I have met with most extensive atheromatous ulcers on valves and aorta, from which large quantities of material must have been discharged, and the patients were not febrile. Dr. Sansom (*Lancet*, 1884, vol. i), however, has referred to a case of ulcerative endocarditis in which there was no elevation of temperature throughout.

Cerebral Group.—A considerable number of cases of malignant endocarditis come under observation, perhaps, in hospital-practice, for the first time, with symptoms of cerebral, or even cerebro-spinal, trouble. In three of the Montreal cases, the patients were brought to hospital unconscious, and presented the appearance of profound cerebral affection. One of the first cases I saw was of this kind. The patient, a woman, aged 29, was admitted on October 22nd in an unconscious state, and no history could be obtained. On the 24th, she became partially conscious, and complained of great pain in the head and back of the neck. Symptoms of slight apex-pneumonia were detected. Temperature up to 104°. On the 25th, she passed urine and fæces involuntarily. There was strabismus of the right eye, and commencing ulceration of the left cornea. Death took place on the 26th. The symptoms were those of an acute meningitis. The *post mortem* examination revealed apex-pneumonia, a patch of endocarditis on the mitral valve, and suppurative meningitis, involving chiefly the cortex. Another case, almost the counterpart, was admitted last year, under Dr. Molson, in an unconscious state, and died eighteen hours after admission, when the necropsy revealed apex-pneumonia, extensive endocarditis, and suppurative meningitis. There may be early unconsciousness or delirium without any meningeal implication, as in a case of primary endocarditis admitted June 5th, 1881. The patient may be wildly delirious or unconscious at the first visit of the medical man, as in a case narrated by Eberth (Virchow's *Archiv*, Band lvii). Very many of these cases die within two or three days of admission, and the question of diagnosis has usually to be suspended; indeed, in looking over the records of eleven instances in which these cerebral symptoms were early, they appear to run a more rapid course than other cases.

In two remarkable cases, there was cerebro-spinal meningitis. Hunolle (*Bulletin de Soc. d'Anatomie*, 1873) records a case of a lad who was admitted with symptoms at first like those of typhoid fever,

and then of a marked cerebro-spinal character. There was also a pulmonary affection and endocarditis. The patient lived five days. At the necropsy, there were suppurative meningitis of the brain and cord, pneumonia of one lung, and extensive ulcerative endocarditis, with old sclerotic changes.



The Case of Ann O

A still more remarkable case is reported by Heineman (*New York Medical Record*, 1881, ii). A boy, aged 14, was admitted November 19th. For two days previously he had suffered with pains in back and legs, chills, fever, loss of appetite, vomiting, and constipation; he was rational on admission; tongue coated; temperature 105.2°; condition of heart and lungs negative.

November 20th. Temperature, morning, 103.4°; evening, 105.6°. Fæces and urine passed involuntarily.

November 21st. A purpuric eruption was noticed on the chest, then on the face, and afterwards on the legs and arms. Temperature 104.8°; pulse very feeble; delirium; hyperæsthesia along the spine; no opisthotonos; pericarditis suspected. At 11 P.M. of this day, a second crop of purpuric spots came out; temperature 106°; convulsive movements.

November 22nd, 3 A.M., second convulsive seizure, and death. At the necropsy, there was purulent exudation on the brain, and the meninges of the spinal cord were congested, opaque, and inflamed. There was congestion of lower lobe of the lungs. There were recent vegetations on the mitral valve; and near the apex on the anterior wall of the left ventricle, a small cavity, indicative of probable abscess and destruction of tissue. Purulent serum was found in the pericardium; the kidneys presented embolic abscesses.

Certain clinical features may be specially referred to in a few words. The fever, as will have been gathered from the previous statements, is of a very variable character. Irregularity is the prominent feature; periods of low may alternate with periods of high temperature, or a remittent may become an intermittent. A remittent type is most frequently met with, but the remissions do not occur with any regularity. Occasionally there may be a continuous high fever, the thermometer not registering below 103° for a week at a time. The pyæmic and aguish types have been sufficiently noted.

The occurrence of a rash has been described by many observers and, in some instances, has led to errors of diagnosis. The most common form is the hæmorrhagic, in the form of small petechiæ, distributed over the trunk, particularly the abdomen, less often in the face and extremities. They may be most abundant over the whole body, and at times are large and present small white centres. When severe nervous symptoms are also present, the resemblance of the cases to cerebro-spinal meningitis, or typhus, may be very close. In one instance, the case was thought to be hæmorrhagic variola (Duget and Hayem, *Comptes rendus de la Soc. de Biologie*, 1865). An erythematous rash has also been observed.

In a case of Dr. Cayley's (*Lancet*, 1884, i), there was a mottled red rash on the skin. Colson (*Bull. de Soc. d'Anatomie*, 1876) describes a case in which the rash was erythematous, and in spots distinctly papular.

The mental symptoms may be of a very varied character. By far the most frequent conditions are low delirium, and a dull, semi-conscious, apathetic state. There may be at the outset active delirium, or even maniacal outbursts. In a case of Dr. Habershon's (*Guy's Hospital Reports*, vol. xvii), there was a condition described as mental eccentricity. When there is extensive meningitis, there is usually a condition of deep coma.

Sweating is a very frequent symptom, and is worthy of special notice, from the peculiarly drenching character, which is, as Dr. Henry Thompson remarks (*Lancet*, 1880), second only to ague, and usually far beyond the average mark of phthisis or pyæmia.

The diarrhœa is not necessarily dependent on any recognisable lesion, and may not be very marked, even when the infarcts on the mucosa are most abundant. As noted in several of the cases, it may be profuse, and still further add to the resemblance which some of the cases bear to typhoid fever.

Jaundice may be present, but appears to be a rare symptom. Cases, some of which were mistaken for acute yellow atrophy, are reported by Schnitzler (*Wiener Med. Presse*, 1865), Gubler (*Gazette Médicale*, 1862), Luys (*Ibid.*, 1864), and Mattice and Chalvet (*Ibid.*, 1862).

The heart-symptoms may early attract attention, from the complaints of pain and palpitation; but, as a rule, they are latent, and unless looked for are likely to be overlooked. In those cases with chronic valve-disease, there is usually no difficulty, but where the affection sets in with marked constitutional symptoms, the local trouble is very apt not to attract attention. Even on examination, there may be no murmur present, with extensive vegetations, or it may be variable. There are many instances on record, by careful observers, in which the examination of the heart was negative.

The course of the disease presents many variations, well illustrated by the records I have given; very acute cases may run their course within the week, as in the patient Ann O., already referred to, while in others the duration may be even two or three months. Except in certain cases in which the patients are the subjects of chronic valvulitis, the course is rarely prolonged beyond four or five weeks. Some of the pyæmic group, particularly those with intermittent pyrexia, appear very prolonged, even two or three months. The most rapidly fatal case is described by Eberth (Virchow's *Archiv*, Band lvii), in which a man, who had enjoyed previous good health, was attacked on the evening of the 25th, with rigors, followed by high fever and rapid unconsciousness. The temperature that night, when seen by a physician, was 41° C., and the case seemed like one of typhus with meningitis. On the 27th, he was removed to the hospital, where he died at 5 P.M. The temperature was 42.4° C. There were extensive ulcers in the aortic valves, and suppurative infarcts in the brain. The duration in this case was scarcely two days. In a considerable number of instances, the disease terminates within a week or ten days.

THE MORTALITY IN INDIAN GAOLS.—It appears, from a recent Report, that since 1878, the year following the last famine, there has been a steady decrease in the gaol population of India—from 127,914 to 94,063. There has been an improvement in the health of prisoners as a whole; but it is admitted that in several gaols the range of sickness and mortality still continues very high. The most unfavourable return is from the Central Provinces, where the rate of mortality rose from 29.30 to 71.05 per thousand. This extraordinary increase is attributed to "the general unhealthiness of the country, and to the transference to the Raipur gaol of a number of prisoners from the feudatory State of Kalahundi, a people who are reported to be by habit and temperament utterly unable to bear the loss of freedom and separation from their families." The returns from certain gaols are still more unfavourable than those from the different provinces. There are still 12 gaols where the rate of mortality exceeds 10 per cent., and that at Mymensingh shows the extraordinary rate of 27 per cent. There appears to be no neglect on the part of the official authorities, and in consequence of the criticism which the facts have aroused against our gaol administration, the most trivial cases are sent into hospital. This has not been devoid of satisfactory result, and the decrease in the cases of Bombay, the Punjab, North-West Provinces, Berar, Assam, and British Burmah served to make a general diminution of the rate for the whole of India of about 4 per thousand. While the subject is still engaging much of the attention of the Indian Government, there seems no doubt that the high mortality is due, not to any official remissness, but to the prevalence of epidemics of cholera, which are necessarily peculiarly fatal among men who seem to be excessively sensitive to the irksomeness of imprisonment.