and in all the nervous troubles appertaining thereto. For insomnia, Royat enjoys a special and most favourable reputation.

3rd.—*Affections of the throat, lungs, and uterus.*

The utility of the waters of Royat in this third class of ailments is what we might expect from the strong similarity between them and the waters of Ems—Royat being, in fact, the French counterpart of Ems, enjoying, however, the great advantage over the latter of a climate both bracing and tonic, in place of relaxing and debilitating.

Accordingly, we find chronic affections of the larynx and pharynx, bronchial catarrh, asthma, and even the earlier stages of pulmonary phthisis, improving at Royat, and the crowds which frequent the inhaling rooms give proof of the beneficial results felt by all who resort to this form of medication.

Chronic affections of the uterus are likewise found to derive immense service from these waters.

For myself, I am strongly disposed to believe that the efficacy of the waters of Royat is greatly augmented by the climate, which is, like all mountain air, revivifying in a marked degree. It is, moreover, temperate and dry, and its salubrity is proved by the abundance of fruit and flowers for which the whole district is celebrated.

I shall not dilate further upon the virtues of Royat, trusting that I have already given a sufficiently clear outline to enable my readers to select the cases best suited for the use of its waters.

ART. V.—*Puerperal Endocarditis with Hemiplegia after Delivery.**

By WM. C. NEVILLE, M.A., M.D. Univ. Dubl.; M.K.Q.C.P.; Physician to Pitt-street Institution for Diseases of Women and Children; late Assistant Physician to the Coombe Hospital and Maternity.

THE following case presents so many points of interest that I have thought it worthy of recording before this section:—

CASE.—*Left hemiplegia on morning after delivery in a 7-para. Aortic valvular disease and fatty degeneration of the heart. Death in a fortnight.*—E. C., aged thirty, married ten years, was confined of her seventh child on the morning of the 7th December, 1879. Labour was normal. Previous labours had also been normal. A few days after the birth of last child, eighteen months ago, she is stated to have suffered from some form of

* Read before the Obstetrical Section of the Academy of Medicine in Ireland.

eclamptic attack, attended with insensibility; the lochia then stopping permanently upon the second day. She had, however, recovered perfectly, and nursed the child until it died at four months. For the past year she has endured much hardship, her husband having been out of employment, "on the tramp."

During the evening after delivery she was restless, talking somewhat incoherently and sleeping scarcely at all during the night. On the following morning (8th instant) she felt much better, talked quite rationally, and complained only of some slight headache. She sat up in bed, and was combing her hair, when she suddenly felt giddy, fell back, and "was convulsed." The convulsions lasted only a short time, and were followed by partial insensibility and heavy breathing.

I saw her about two hours afterwards; she was then completely hemiplegic on the left side, the limbs of which were rigid, the left leg being extended and everted. The right limbs were subject to frequent choreiform movements, but could be moved at will. The head was kept sharply bent to the right side, towards which also both eyes were directed. The right pupil responded normally to light, but the left remained constantly dilated. There was well-marked paralysis of the left side of the face. Though some amount of stupor existed, the patient could easily be roused to understand questions, to which, however, she was quite unable to give any articulate reply. The power of speech was not completely lost, as she was still able, with some degree of indistinctness, to utter certain words, and made obvious efforts, when roused, to do so, to explain her symptoms. Her pulse was weak and irregular (80), and her temperature normal. Respiration was slow and laboured. No lochial discharge, and no abdominal tenderness, the uterus being well contracted, and milk having appeared in both breasts.

In the evening of the same day, the affection of her speech, which had become very marked, had almost entirely disappeared. The movements of the right limbs are also much less frequent. The bladder had been naturally emptied. A little urine, drawn off with a catheter, proved to be quite normal. Pulse 84. Temp. 98·5°.

9th December.—Complains of severe headache on the left side of the head. Milk more abundant. No lochia. General condition unaltered.

10th.—Headache less. Bowels having been only once moved slightly since labour, she was ordered a soap and water enema, which acted well. The lochia being still absent, the vagina was syringed with warm Condyl's solution, and turpentine stupes applied over the abdomen. Examination of the urine showed that it was acid in reaction, concentrated (sp. g. 1030), depositing a thick sediment of light-coloured urates. No albumen or casts.

The area of cardiac dulness is considerably increased, and the apex beat, badly marked and widely diffused, can be best felt on a line with,

and about two inches below, the nipple. The heart's action is variable, tumbling and irregular at times. The aortic sounds are both very indistinct, but with a binaural stethoscope I think that there are both an obstructive and a regurgitant murmur. The second sound is certainly louder over the pulmonary artery. The pulse in both radials is visible and jerky, and especially so on the right side. Temperature normal. Sensation is greatly decreased or abolished on the paralysed side. When the left leg is pricked with a needle, the patient denies feeling it; but brings up the right leg to rub the part, or to lift it out of the way. A prick of the needle is at once localised on the right side. The left leg makes some slight unconscious movements to escape irritation. Rigidity of the limbs is much less marked than at first. The face has a very waxen appearance, especially on the paralysed side, which is polished and glossy. Crumbs of bread stick, after eating, to the paralysed half of the lips.

14th.—The milk having become scanty, the child was removed from the breasts. The pulse is now quicker and weaker (104), and the evening temperature is $101\cdot4^{\circ}$. Rigidity has quite gone. Complaints of constant pain in the left ankle and up the left leg. Condition otherwise unaltered.

17th.—There has been a decided rise in the temperature for the last three days; the evening temperature varying from $100\cdot5^{\circ}$ to $102\cdot5^{\circ}$, with slight morning remissions. The pulse is weaker and faster than at first, and the respirations have become somewhat quickened and laboured. Appetite bad, and she is obviously losing ground. Quiet during the day, but considerable raving at night.

22nd.—Patient died this evening; the heart's action, for six hours previously, having been very irregular and weak. During this time she complained a great deal of severe angina-like pains, caused, she stated, by the heart's action. Respiration difficult. Semi-comatose before death, with lividity of face and extremities.

The *post mortem* examination was made eighteen hours after death, by the late Dr. Harvey, whose report was as follows:—

Rigor mortis slight. Breasts flaccid, still containing a good deal of milk. Uterus pale and well contracted, almost to its normal size. Peritoneal cavity normal. Kidneys and liver healthy. Spleen pulpy and enlarged. Pleural cavities healthy, except for some slight old adhesions. Lungs well collapsed. Slight excess of pale straw-coloured fluid in pericardium. Heart large and thickly enveloped in fat. Right auricle large, and contains a large-sized clot. In the right auricular appendix there is a clot, which is probably ante-mortem. Right ventricle large, with very pale muscular fibre. Left auricle not very large, with an indistinctly ante-mortem clot in its appendix. Left ventricle contains a similar clot, more characteristically ante-mortem. Its muscular walls

are somewhat hypertrophied, and better coloured than those of the other cavities. Water poured into aorta flows gradually into ventricle, through the valves. Slight commencing atheroma of the valves. One of the semi-lunar valves presents a small conical vegetation, with vascular and abraded apex, evidently of recent origin. Other valves healthy. Lungs healthy, excepting slight emphysema. On opening the dura-mater a considerable amount of semi-turbid fluid is found upon both sides, more especially beneath the arachnoid. The right carotid, cut across in removing the brain, is found to be occluded by an embolus, extending some distance along middle cerebral artery. The middle lobe of the right side is much softened, and some slight amount of purulent-looking fluid is found in the lateral ventricle of the same side. The optic thalamus and corpus striatum are soft and pulpy upon the same side, markedly contrasting with their healthy condition upon the left side.

I should add to the above history of this case that this patient had never, so far as I could ascertain, complained of any symptoms specially referable to the heart during her pregnancy, and that she had never suffered from rheumatic fever or any of the more usual causes of heart trouble.

The case which I have thus recorded, from notes taken at the time, raises, I think, some very interesting questions upon which much has not yet been written—the ætiological relations of endocarditis and of certain forms of paralysis occurring during pregnancy or the puerperal state. It is all the more worthy of record in consequence of the *post mortem* examination having been made by so well-known an authority as the late Dr. Reuben Harvey.

I purpose briefly considering, firstly, the connection, if any, existing between endocarditis and pregnancy, including the puerperal state; and, secondly, the causation of what has sometimes been called “puerperal hemiplegia.”

The conditions of the blood, and vascular system generally, of the pregnant woman, tend to establish an *à priori* probability in favour of the causative or predisposing influence of pregnancy in regard to endocarditis. These conditions, which may be assumed as being well established, consist in (1) an increased quantity but deteriorated quality of the blood; (2) an hypertrophy of the heart, especially of its left ventricle; and (3) an increased blood tension. The total mass of the blood is largely increased in quantity during pregnancy, a fact chiefly due to an increase of its watery part. The red globules are notably decreased, and the white ones increased

in proportion to the amount of fluid; and from the sixth month onwards there is a marked increase in the proportion of fibrin. It must be further remembered that shortly after delivery we have the blood stream further adulterated by the discharge into it of much of the waste stuffs of the disintegrative processes attending involution.

The hypertrophy of the heart, now generally admitted, though its constancy is by some denied, is simply an example of physiological adjustment to increased work. The increase in work is necessitated by the formation of the utero-placental arterial and venous systems, as well as by the increased volume of the blood and heightened arterial tension. The heart also beats more frequently than normally, so that in every way its work is increased.

Sir J. Simpson, in 1854, was among the first who suggested the influence of pregnancy upon the genesis of endocarditis. Having indicated the general connection existing between endocarditis and diseases attended by a vitiated condition of the blood, he argues thus:—"We cannot wonder that similar lesions should occasionally occur in the puerperal female, for the condition of her blood is temporarily changed even under normal circumstances, and often becomes much and morbidly changed under the abnormal circumstances to which she is then liable to be exposed, so that its characters are then more or less assimilated to those of the same fluid in the subjects of acute rheumatism and chronic albuminuria." Again: "During the puerperal condition the blood is more loaded with new materials—intended, some for secretion and some for excretion—than at any other term of life, and hence is specially liable to diseased changes under the superaddition of any exciting or septic cause." And in the same essays he pointed out quite clearly how the hyperfibrinous state of the blood before or after delivery predisposed to the formation of loosely adherent coagula upon the surface of any old endocardial roughnesses.

The five examples of puerperal endocarditis given by Sir J. Simpson were probably all cases of acute vegetative, grafted upon a previously chronic, endocarditis; and one of them is further specially interesting, as having been associated, as in the case I have recorded, with hemiplegia. I do not wish, however, to delay over the dangers which, since Simpson's time, have been universally accepted as pertaining to old endocarditis during pregnancy. It is sufficient to point out that they consist largely in the tendency of such chronic inflammations to become intensified and acute,

owing to conditions of the blood and vascular apparatus, which must be accepted as likewise tending towards the development *de novo* of endocardial inflammations at such times.

But beside this recrudescence of an old inflammation there is another form of endocarditis, universally acknowledged to arise, in some cases, as a result of pregnancy, and still more frequently shortly after delivery. It may then arise *de novo*, or graft itself upon a pre-existing endocarditis, and it may originate from a puerperal as from any other pyæmia, or spontaneously, so as to give rise of itself to a typhoid or pyæmic condition, marked by numerous small metastatic abscesses. Its attack in a previously healthy subject is often signalised by a rigor, and the true cause not being suspected, the disease is mistaken for some other acute disease. It is by no means improbable that some of the rare examples of the so-called "puerperal fever," arising during the last weeks of pregnancy, without any recognisable means of hetero-infection, may really have been cases of this quickly fatal form of endocarditis. It is almost certain, however, that this is really a septic endocarditis, though the source of the organisms (micrococci) cannot in many cases be explained. The micrococci of this disease do not propagate in the blood of the patient. They are carried in minute embolisms from their cardiac source, and seem to give rise to metastatic abscesses by the virulent properties of their chemical products. When inoculated they multiply locally in the tissues of other animals (rabbits), and give rise to a very intense inflammation. What I desire especially to point out as regards this disease is, that it may arise suddenly and spontaneously during pregnancy or the puerperal state without the necessary pre-existence of any pyæmic condition. A very striking fact in reference to this form of puerperal endocarditis is alluded to by Lancereaux (*Archives Generales de Medicine*, Vol. I., 1881, p. 402), viz., that it is specially likely to occur in patients whose nervous systems are for some reason depressed. Thus he has collected seven cases, in six of which the patients were unmarried primiparæ. We have to this fact a remarkable analogy in the well-known pre-disposition of unmarried primiparæ to suffer from the various kinds of septic diseases of childbed.

We have seen that pregnancy is capable of starting fresh developments of inflammation in cases of old endocarditis, as also that it may originate a malignant form of endocardial inflammation. It has also been affirmed by some that it may constitute a true exciting cause to subacute or chronic valvular disease. Whether or no this

is true—as it may appear to have been so in the case recorded—I am not prepared to say upon the evidence I have been enabled to collect from various sources. Although in my case the opinion of Dr. Harvey seems amply sufficient to prove that the aortic lesion was of quite recent origin, yet it must be remembered that the patient had suffered unusual hardship and privations during her pregnancy. And endocarditis has been known to arise under such circumstances, apart altogether from pregnancy or any of its more generally recognised causes. This is just one of those cases in which we might, with some show of reason, fall into the error of mistaking a coincidence for an effect. Without wishing to give any decided opinion upon this question, I may say, without prejudice, that the evidence I have been able to collect appears insufficient to establish a true causal nexus between pregnancy and endocarditis other than ulceration attacking previously unhealthy valves.

The occurrence of various paralytic affections during pregnancy and the puerperal state has long been recognised and explained by different hypotheses, *e. g.*, hysteria, direct pressure upon the pelvic nerves, albuminuria, apoplexies, &c. It is only comparatively recently that the origin of the most common of these paralyses, *viz.*, hemiplegia, has been proved by accurate *post mortem* examinations to depend upon organic lesions of the brain, resulting from embolisms of various kinds. Simpson, in his papers upon puerperal arterial obstruction, has recorded two cases of hemiplegia resulting from organic lesions of the brain caused in this way; and Ollivier has also recorded an example of what was obviously an embolic hemiplegia. In 1879 Fordyce Barker recorded three cases of hemiplegia occurring in puerperæ, and due to embolism. In one of these cases the hemiplegia supervened suddenly during the first stage of labour in a previously healthy primipara, aged 32. The patient recovered, but the paralysis, though lessened, remained chronic. In Dr. Barker's other cases the patients died, but the nature of the cardiac lesion, the fever and delirium during life, and the numerous infarcts of other organs than the brain found after death, seem to show that these were cases of ulcerative endocarditis. In one a subacute rheumatism appears to have been present. It is further noteworthy, that in these two cases of ulcerative endocarditis, recorded by Fordyce Barker, the patients were unmarried, a fact which supports Lancereaux's observation already noted. In one of the latter's cases also an embolism is recorded as having obliterated the left Sylvian artery.

In February, 1881, Dr. Hughes Bennett published in the *British Medical Journal* a clinical lecture upon chronic hemiplegia, originating during the puerperal state. He records six cases of this affection which came under his notice during three years in hospital practice. In only one of these cases did there exist, at the period of their coming under his notice—at from eight weeks to eight years after the accident—any distinct evidence of cardiac affection. They all occurred in rather young women, averaging 25 years; and this fact is regarded by Dr. Bennett as decisive against the cause having been hæmorrhage. The permanence of the brain lesion is likewise against the theory that they were due to albuminuria, which was moreover absent at the time they came under notice. He sums up his conclusions as follows:—“1. These six cases of hemiplegia are due to a destructive lesion of that part of the brain supplied by the middle cerebral artery. 2. The disease began suddenly during the puerperal state, which was the pre-disposing cause of it. 3. The exciting cause was probably an embolus. 4. This embolus was the result of acute endocarditis, or due to the hyperinotic state of the blood, or possibly to both of these conditions combined.” All Dr. Bennett’s cases being still alive, there was of course no possibility of certainly verifying his conclusions.

In many of the cases of embolic hemiplegia previously recorded, and thus verified, the lesion appears to have arisen in consequence of the ulcerative form of endocarditis. In that, however, which I have now recorded, the history of the case, and the *post mortem* appearances, prove with sufficient clearness that the embolus arose in consequence of an acute or subacute simple endocarditis, originating during the latter months of pregnancy, and affecting one only, and that an aortic valve. Death seems to have resulted from the failure of a fatty heart to carry on the circulation, and from the largeness of the cerebral area which had its nutrition suddenly destroyed.