hyperemesis gravidarum or other complication, the pulmonary condition usually improves during pregnancy, and this improvement is particularly marked in the later months. Whether this improvement is due to metabolic changes such as increased absorption of calcium, production of calciferol, etc., or can be attributed to some extent to compression of the lungs from below by the rise in the diaphragmatic level, is not known, but there is no doubt of its occurrence.

Then comes parturition and the puerperium, at the end of which in only too many cases one finds that all the progress made during pregnancy is lost and that an acute flare-up of the disease may occur. If we knew the cause of this sudden drop in the patient's resistance we could, perhaps, take appropriate measures. Is it due to obstetric shock, to loss of blood, or to the sudden re-expansion of the lungs with abdominal relaxation? Does it occur in women of primitive races whose delivery is easy? Does it occur after delivery by early caesarean section?

Collapse therapy by artificial pneumothorax when practicable is of course continued during pregnancy and pushed after parturition. But when artificial pneumothorax, although desirable, is impossible, should the induction of pneumoperitoneum, with or without phrenic crush, as soon as practicable after parturition be regarded as the method of election in such cases; or are there special risks attributable to the condition of the pelvic floor, etc., which render this treatment inadvisable? These are some of the questions which call for answers, and until the answers are forthcoming the temptation to terminate pregnancy in women suffering from active and acute pulmonary tuberculosis will remain.—I am, etc.,

Chichester.

P. HEFFERNAN.

Heparin for Coronary Thrombosis

SIR,—Lest a massive dose of double strength be given as suggested in Dr. J. T. MacLachlan's letter (Nov. 1, p. 709), with what results I do not know, perhaps the massive dose recommended by Prof. Lambert Rogers in the *Practitioner*, October, 1947, p. 247—viz., 300 mg.—would be safer to give.—I am, etc.,

Worthing, Sussex.

R. H. WILSHAW.

SIR,—Dr. J. T. MacLachlan (Nov. 1, p. 709) advocates the use of heparin in cases of coronary thrombosis. On theoretical grounds it would seem that heparin is indicated in the treatment of this condition. On the other hand it would seem important to critically survey any extension of the use of an important therapeutic agent such as heparin before extending its use indiscriminately.

The interest in heparin has been stimulated recently by the classical work of Jorpes and other Swedish workers. It is of interest to note that these workers have confined themselves mainly to the use of heparin in the treatment or prevention of thrombosis arising in the femoral blood vessels following operations, and they have dealt with pulmonary embolism on the grounds that this condition arises as a consequence of undetected femoral-blood-vessel thrombosis. The femoral blood vessels have an elaborate collateral anastomosis, and heparin therapy will keep this collateral anastomosis open until such time as the original clot has become organized or canalized. In Jorpes's work there is no mention of heparin for use in either coronary or cerebral thrombosis, and it would seem that the question of coronary and cerebral thrombosis was shelved because these workers felt that heparin would not prove of much value in these conditions.

So far as coronary thrombosis is concerned I would not use it myself because (1) once a thrombus is formed heparin has no further action and will not dissolve the clot; (2) a large number of cases will die from the shock and spasm attached to the attack of coronary occlusion, and heparin will be of no value, as these cases will die instantaneously; (3) the coronary arteries are end-arteries, and as such there is no collateral circulation to carry on after the attack of thrombosis; and I cannot see how heparin will prevent infarction or ischaemia of the heart muscle leading to ultimate impairment of cardiac output or death from rupture of the heart; (4) it would also seem that if the thrombosis is, as it is so often in coronary

thrombosis, secondary to some disease or degeneration of the blood vessel such as arteriosclerosis or atheroma, then as heparin has no curative action upon the condition which is causing the thrombosis we must not expect too much from heparin therapy. I am putting these points forward not in order to air my own views but in the hope that some cardiologist will clear up the doubts in my mind. It would be a pity if a therapeutic agent such as heparin, which has been proved to be of value in certain specific conditions, should fall into disrepute because it has been used in conditions in which its use is unsuitable.—I am, etc.,

Southport, Lancs.

JOHN H. HANNAN.

SIR,—In his letter advocating heparin therapy for cases of coronary thrombosis Dr. John T. MacLachlan (Nov. 1, p. 709) suggests that it should be given after shock has been treated with morphine. He does not indicate clearly what delay there should be before using heparin. Unless someone can show any contraindications I would suggest that it be commenced as soon as possible after the attack. Pollard and I (*Quart. J. exp. Physiol.*, 1946, 33, 267) produced evidence that heparin, physiologically, does not appear to be a blood anticoagulant. It is stored in the tissues and only enters the blood as a result of trauma. The amounts released, as a result of trauma, are hardly enough to warrant its being called an anticoagulant. In fact, as normal clotting time lengthens, the action of heparin in physiological doses is to reduce it. We feel that heparin takes part in the "adaptation syndrome" described by Selye and almost certainly plays a defensive role in the body. The nature of its action is not yet understood, but its chemical character suggests that it will be an antibody to a number of substances which occur in the body, an example being histamine.

On the hypothesis that certain aspects of shock might be due to the action or overaction of histamine or similar substances, we tried heparin as follows. A female aged 72 years had been almost totally burned. When seen three hours after the accident she was very cyanosed. During 10 minutes 70 mg. of heparin was given. The cyanosis disappeared. A further 70 mg. was given by drip during the next 1½ hours. After another hour, during which no heparin was used, the patient developed acute pulmonary oedema. 75 mg. of heparin apparently completely relieved the condition. On two more occasions before the patient died (6 hours later) the pulmonary oedema returned and was similarly relieved by heparin. Heparin supplies were limited and this prevented more continuous administration.

We have seen several cases of migraine and a case of asthma quickly relieved by a skin prick, which would produce a natural outflow of heparin into the blood. It is likely, though not proved, that adrenaline is the chemical mediator by which heparin is discharged from the tissues into the blood. When its real action is understood, it is probable that heparin will find a useful place in therapy other than as an anticoagulant. Knowledge of this action will be gained more rapidly if clinicians are alert to its possibilities.—I am, etc.,

Ossett, Yorks.

S. B. STOKER.

Health Regulations for Air Travel

SIR,—At the present time, with a continually increasing volume of air travel, any measures directed to the prevention—as far as possible—of the introduction of disease into this country by air-borne passengers is bound to be of interest. Dr. R. H. Barrett's article (Nov. 8, p. 741) gives a résumé of the regulations approved by the International Convention for Aerial Navigation, 1944. These regulations show clearly the amount of thought and planning (blessed word!) which has been devoted to the subject. Planning, unfortunately, is not infallible.

That there is a very real danger of the introduction of infectious disease by air which might be the starting-point of an epidemic cannot be denied. "We have reached the stage when we no longer think of countries overseas as being separated by distance, but by time. . . . That is to say that countries where all sorts of unfamiliar diseases flourish are nearer to this country in point of time than the length of their incubation periods" (Presidential Address, Surrey Branch B.M.A., July 2, 1947).