A telegram from the *Times* own correspondent dated Paris, Nov. 15th, states that the collection for the Red Cross Society in the St. Petersburg churches amounted to 60,000 roubles (£6,410) and that throughout the whole Empire to 400,000 roubles (£42,735).

The Omsk correspondent of the *Novosti* sends an account to his paper of the report submitted to the Omsk Medical Society on the humane nature of the Japanese bullet. The report included the following figures. The distribution of the wounds over parts of the body were 42·03 per cent. in the lower extremities, the thighs bearing almost the half, or 20 per cent., of this total. After the thigh comes the lower part of the leg with 15·68 per cent., then the foot with 4·74 per cent., and finally the joints with 1·68 per cent. The wounds were equally distributed between the right and the left sides. The upper extremities bore 24·74 per cent. of the wounds, of which the shoulders had to bear 6·78 per cent. Respecting the thorax, the abdomen, and the head, the percentage of through and through wounds was 18·47 and generally, as already quoted from reports by medical men from the seat of war, the wounds were of such a nature as to require the surgeon's attention but very rarely. There were seven cases of bullets having passed through the brain. One was that of a sergeant-major. The bullet entered by the centre of the forehead, finding its exit at the occiput. The patient lay unconscious in one of the Kharbin hospitals for about a month. When he regained consciousness he appeared to suffer merely from depression of spirits. Another case was that of a private who had a bullet wound a little above and further forward than the right ear, and extending almost to the top of the head. He developed paralysis in the left arm and leg. The paralysis has almost left the leg but the arm is still restricted in its movements. Hope is entertained of his complete recovery. Wounds in parts of the body not enumerated above were relatively few and slight.

The Council of the Royal Society has awarded a Royal medal to Colonel David Bruce, R.A.M.C., F.R.S., for his researches in the pathology of Malta fever, nagana, and sleeping sickness, and especially for his discoveries as regards the exact causes of these diseases.

Correspondence.

"Audi alteram partem."

AMYL NITRITE v. ADRENALIN IN HÆMOPTYSIS.

To the Editors of THE LANCET.

SIRS,—Under the head of "The Medical Treatment of Deep-seated Hæmorrhage"¹ I have pointed out the rapid hæmostatic action of inhalation of amyl nitrite in phthisical and cardiac hæmoptysis. The object of this article is to compare this action of amyl nitrite with the action of adrenalin, a drug which has been widely advocated of late in the same circumstances but which operates through an essentially different mechanism. And I shall endeavour to make the comparison in the main from a physiological standpoint. The dominant spirit of modern medical science is inductive or analytical. This arose as a salutary reaction against the almost exclusively deductive or synthetic spirit which prevailed in the past. Nevertheless, it may be that the reaction—as is the way with most reactions—has in its turn proceeded too far. At least, it can do no harm—it may even prove of advantage—to review from time to time some of the conclusions of inductive science from a deductive standpoint. In any such review of pathological problems we have no option but to start from established physiological principles. In all cases of hæmorrhage there are two proximate essential factors. At the bleeding point there must be a solution of continuity of the wall of the vascular system and an intravascular blood pressure exceeding the extravascular pressure of the tissues. Neither factor alone could result in hæmorrhage. From this it follows that in order to check hæmorrhage we may (1) restore the continuity of the wall of the vascular system, as is done in surgical hæmostasis; (2) supplement by artificial means the extravascular pressure of the tissues, as is done in some forms of compression; or (3) reduce the intravascular blood pressure. None but the last of these

means concerns us here, since we are considering only hæmoptysis, a hæmorrhage which is inoperable and inaccessible to general compression of the tissues.

Now the blood pressure at any given point in any given vessel may be reduced in three ways, and in three ways only: (1) by diminishing the systolic force of the heart; (2) by diminishing the general or aggregate peripheral resistance in the circulation; and (3) by increasing resistance in the bleeding vessel on the cardiac side of the bleeding point. The first indication is attained in the use of aconite which has a depressing action on the heart; the second, in the use of amyl nitrite which rapidly promotes widespread, or even general, peripheral vaso-dilation; the third, in compression exerted on the arterial trunk leading to the bleeding point, and in vaso-constriction of the bleeding vessel itself through the action of cold and of drugs such as adrenalin.

Amyl nitrite is used only for its *general* action on the circulation, which action is practically always the same. The drug promotes widespread, or general, vaso-dilation with acceleration of cardiac action. The acceleration of cardiac action depends upon the lowering of peripheral resistance and is evidently a conservative device adapted to prevent a serious fall of blood pressure. Such conservative acceleration, however, seems always less than fully adequate, for a material fall of blood pressure always does succeed the exhibition of the drug (Lauder Brunton). This fall of blood pressure commencing, as it does, at the periphery of the systemic arterial system, travels backwards in the course of the circulation through the left ventricle and left auricle into the periphery of the pulmonary arterial system. It is the fall of blood pressure in this last situation which is the proximate cause of the rapid cessation of hæmoptysis, and it was the anticipated inevitability of such fall which first prompted the use of the drug in this emergency. Unlike amyl nitrite, adrenalin is used for its local as well as for its general action on the circulation. Locally applied, adrenalin causes vaso-constriction of the arterioles of the part through its direct action on the vascular walls, and such localised action is purely salutary in hæmorrhage from the part. Given by the mouth or hypodermically adrenalin causes widespread or general vaso-constriction of the systemic arterioles with retardation of cardiac action. The retardation of cardiac action depends upon the rise of peripheral resistance and is evidently a conservative device adapted to prevent a serious rise of blood pressure. Such conservative retardation, however, seems usually less than fully adequate, for a material rise of blood pressure does commonly succeed the exhibition of the drug (Schäfer). This rise of blood pressure, commencing as it does at the periphery of the systemic arterial system, travels backwards in the course of the circulation through the left ventricle and left auricle into the periphery of the pulmonary arterial system, and a rise of blood pressure at the pulmonary periphery would of course be purely injurious in the case of hæmoptysis.

Now, there is but one way in which the injurious influence in hæmoptysis of a rise of pulmonary blood pressure so induced might be to some extent averted. The adrenalin might cause vaso-constriction of the pulmonary, in addition to vaso-constriction of the systemic, arterioles, and such pulmonary vaso-constriction might include, or preclude, the vessel immediately concerned in the bleeding. But it is more than doubtful whether adrenalin is capable of causing vaso-constriction of the pulmonary arterioles, for Dr. W. E. Dixon of Cambridge has demonstrated experimentally in the laboratory that under its use the pulmonary vessels become actually dilated. Such vaso-dilation is probably passive and dependent on the rise of general blood pressure.

The above physiological considerations and facts cast a grave doubt upon the expediency of giving adrenalin by the mouth or hypodermically in any form of hæmoptysis. And they prepare us to hear of cases in which the drug has acted harmfully. Dr. J. Gray Duncanson describes such a one.² In this case there seems little doubt that the exhibition of the drug was responsible for vaso-constriction of the systemic arterial system and for continuance of the hæmoptysis, for "as soon as the suprarenal treatment was abandoned the pulse became soft and bleeding ceased."

I am, Sirs, yours faithfully,

FRANCIS EVERARD HARE, M.D.,

Consulting Physician to the Brisbane Hospital; Visiting Physician to the Diamantina Hospital for Chronic Diseases, Brisbane; late Inspector-General of Hospitals for Queensland.

Nov. 6th.

¹ THE LANCET, August 20th (p. 522) and Oct. 1st (p. 942), 1904.

² Brit. Med. Jour., March 12th.