are more likely to occur in the presence of some active infection—of which Vincent's angina constitutes an example.

Conclusions

Vincent's infection sometimes develops in patients undergoing antisyphilitic treatment with intravenous arsenicals.

The use of intravenous arsenicals in the treatment of Vincent's infection is unsound, both on theoretical and on clinical grounds, particularly since the condition responds readily to other less expensive and less dangerous drugs.

I am indebted to Flight Lieut. S. C. Holms, R.A.F.V.R. (Dental Branch), for his help and advice.

REFERENCES

- Donson, S. D. (1933). *Dental Cosmos*, **75**, 893.
 Ehrlich, P. (1910). *Münch. med. Wschr.*, **57**, 2268.
 Farrell, G. W., and McNichols, W. A. (1937). *J. Amer. med. Ass.*, **108**, 630.
 Goodridge, D. L. (1942). *Brit. dental J.*, **62**, 12.
 Halcrow, J. P. A. (1943). *British Medical Journal*, **1**, 663.
 Hillsman, J. A., and Driscoll, T. L. (1925). *Va. med. Monthly*, **52**, 312.
 Hirschfeld, I. (1942). *J. Amer. dental Ass.*, **29**, 1150.
 King, J. D. (1943). *Brit. dental J.*, **74**, 169.
 Nelson, R. B., McGibbon, C., and Glyn-Hughes, F. (1943). *British Medical Journal*, **1**, 661.
 Reichmann, F. J. (1926). *J. Amer. dental Ass.*, **13**, 1665.
 Rosebury, T., and Foley, G. (1939). *Ibid.*, **26**, 1798.
 Smith, D. C., and Newbill, H. P. (1939). *Southern med. J.*, **32**, 381.
 Sutton, I. C. (1924). *J. Amer. med. Ass.*, **83**, 1919.
 Williams, G. A. (1929). *Arch. Derm. Syph.*, Chicago, **20**, 322.

A PHYSIOLOGICAL FACTOR IN HAEMOGLOBINOMETRY

BY

E. F. MCCARTHY, M.B., B.Ch., M.Sc.

St. Thomas's Hospital Medical School, Godalming

The recent Report to the Traumatic Shock Committee of the Medical Research Council on haemoglobin estimation (1943) fulfils its purpose admirably as a survey of methods including an analysis of technical limitations and suggestions for improvement. There is, however, a physiological factor in haemoglobinometry—namely, the diurnal variation—which merits the consideration of the physician. The blood haemoglobin may vary from increase or decrease of the total blood volume due to interchange of water with the tissues or to the withdrawal or addition of erythrocytes. Dreyer, Bazett, and Pierce (1920), on the basis of hourly or bi-hourly colorimetric haemoglobin estimations, assert that the haemoglobin may vary as much as 20 to 30% of the average throughout the day. Short (1934-5), using a colorimetric method, reported a variation of 17%. Price-Jones (1931) made 100 observations with a Haldane haemoglobinometer on blood obtained from his finger in the mornings and afternoons of successive days, and stated that there was no significant difference between afternoon and evening values. Rabinowitch (1923-4) used the oxygen-capacity method on 20 subjects, and reported a maximum variation of 26%. Photometric methods may be affected by the variation of substances in the blood other than haemoglobin, such as lipids, and the gasometric apparatus used by Rabinowitch was an early and not very accurate type.

Diurnal Variations in Hb Concentration

Some years ago, in an attempt to settle this question, I took part with Dr. van Slyke (1939) in an investigation of the diurnal variation in the blood of 18 normal men. Blood was obtained by venepuncture, with precautions to avoid stasis, at intervals of from two to three-hours during the day. Haemoglobin was estimated by the CO-capacity method of van Slyke and Hiller (1928), which is superior to the oxygen-capacity measurement for reasons stated in the Medical Research Council report (1943). The mean difference between duplicate analyses of our samples was 0.06 vol. %, or 0.3% on the Haldane scale. The greatest range between highest and lowest values in an individual in the day was 2.3 vols. % CO (or O₂) capacity—i.e., about 12% on the Haldane scale. The average range was 1.3 vols. %, or 7% on the Haldane scale. Observations were repeated on each of five subjects on two separate days about a week apart, and there seemed to be a tendency for the blood of each subject to follow a course characteristic for that individual. It is difficult to make any generalization concerning the direction of the change apart from the statement

that there seems to be a tendency for the haemoglobin concentration to diminish during the day; but a subject who showed this change on one day gave the opposite result on another.

I have no reason to doubt that these findings represent real changes in the haemoglobin concentration of the blood. It seems that data of similar accuracy are not available for the alterations in women and children. The diurnal variations recorded in health may be greater in abnormal conditions. Moreover, the fact that the variations recorded by most of the earlier workers on blood samples obtained by pricking the skin are higher than those obtained by us inclines one to the belief that this difference may be due to local alterations in the concentration of haemoglobin, to the interference of lipids or other substances with the photometric technique, or, more simply, to sampling errors. Price-Jones (1931) found excellent agreement between gasometric measurements and colorimetric Haldane estimations in the blood of 20 subjects. It is not clear, however, from his paper whether the colorimetric estimations were made on separate samples obtained by skin puncture or on the same samples used for gas analysis which were obtained by venepuncture.

Conclusions

Haemoglobin in the blood of normal men is subject to a diurnal variation which is less than that described by Rabinowitch and other workers but higher than that reported by Price-Jones. The average range is 7% in terms of the Haldane haemoglobinometer scale. The range of any diurnal variation which may occur in the haemoglobin of normal women and children appears to merit careful investigation.

REFERENCES

- Dreyer, G., Bazett, H. C., and Pierce, H. F. (1920). *Lancet*, **2**, 588.
 McCarthy, E. F., and van Slyke, D. D. (1939). *J. biol. Chem.*, **128**, 567.
 Price-Jones, C. (1931). *J. Path. Bact.*, **34**, 779.
 Rabinowitch, I. M. (1923-4). *J. lab. clin. Med.*, **9**, 120.
 Report to Traumatic Shock Committee of the M.R.C. on Haemoglobinometry (1943). *British Medical Journal*, **1**, 209.
 Short, J. J. (1934-5). *J. lab. clin. Med.*, **20**, 708.
 van Slyke, D. D., and Hiller, A. (1928). *J. biol. Chem.*, **78**, 807.

Medical Memoranda

Arteriosclerotic Aneurysm of Abdominal Aorta with Perforation into Upper Jejunum

In contrast to aneurysm of the thoracic aorta, aneurysm of the abdominal aorta is comparatively rare, and its diagnosis might easily be missed for years, as in the case reported below. A few days before admission the patient was seen by a consultant, who thought of a growth in the sigmoid, but after the negative x-ray evidence, considered that a small polyp in the colon might explain the rectal haemorrhages. The long-standing rectal and vaginal pain was very likely due to the aneurysm. Very often in cases of abdominal aneurysm there is pain in the upper abdomen due to pressure on the coeliac plexus. Here there was a history of "fibrositis" of the upper abdomen, but her main and more permanent complaint was of the rectal and vaginal pain. The explanation of the difference from the more usual upper abdominal pain may be that the situation of an aneurysm of the abdominal aorta is usually subdiaphragmatic, whereas in this case it extended down to the bifurcation. It might therefore be expected to exert pressure on the inferior mesenteric ganglion and so cause the pain referred to rectum and vulva. While the usual cause of thoracic aneurysm is syphilitic disease of the aorta, aneurysms of the abdominal aorta, at least in this country, are mostly due to arteriosclerosis, as it was in this case.

CLINICAL CASE RECORD

On Jan. 20, 1943, a lady aged 79 was admitted to the County Hospital, Otley. She had a long history of suffering. Seven years ago she was in bed for 6 months, and some form of heart disease was diagnosed. While in bed she developed a thrombophlebitis, followed by neuralgic pains in the vulva and rectum. Nothing local was found that would explain this latter condition and no discharge or haemorrhage of any kind. A diagnosis of "vulvitis and rectal neuralgia" was made. These pains had persisted and increased up to the time of admission, and finally invalidated her to such an extent that she had to spend the last two years in bed. The pains were very severe and were only relieved by morphine. Four years ago she had had a short attack of "fibrositis" in the upper half of the abdomen and in the lumbar region. Fourteen days before admission she had an unheralded rectal haemorrhage. At first she passed blood mixed with faeces and then pure blood-clots. She lost a fair