release chuck designed to accept both metal and lint-capped bottles. To overcome the out-of-balance load of the bottle, the chuck is fitted with a flexible coupling allowing the bottle to precess around its dynamic centre while spinning. For loading and unloading the spinners a horizontal bar is fitted above the cabinet on which the spinners can hang.

Details of the design are shown in the sectional diagram (Fig. 2). With this equipment the times for freezing solutions starting at room temperature were as follows: 100 ml of solution in a standard 540 ml transfusion bottle three minutes or, in a 250 ml bottle five minutes; 400 ml of plasma in a 540 ml bottle 15 to 20 minutes.

We wish to thank Mr I. C. Costar for the diagrams.

REFERENCES

Greaves, R. I. N. (1946). The preservation of proteins by drying. *Spec. Rep. Ser. med. Res. Coun. (Lond.)*, **258**.

Rosenberg, G. J. (1964). In *Aspects Théoriques et Industriels de la Lyophilisation*, p. 335. Edited by L. R. Rey. Hermann, Paris.

Rowe, T. W. G. (1964). *Ibid.*, p. 47. Hermann, Paris.

CORRECTION

In Figure 1 of the paper by Helen McCullough, 'Semi-Automated method for the differential determination of plasma catecholamines' (*J. clin. Path.*, **21**, 759), showing the flow system the waste tube (no. 10) should pass through the pump once only. Reagents for the various tubes and tube diameters in inches should be shown as follows: (2) Sample (0·045); (4) Acetate-Ferricyanide (0·065); (6) Air (0·056); (8) 2·5N NaoH (0·045); (9) Stabilizing reagent (0·030); (10) Waste (0·065).

Letters to the Editor

THYROID FUNCTION TESTS

I was most interested in the paper by Thomson, Boyle, McGirr, Macdonald, Nicol, and Brown (1968)[1] in which they describe difficulties they have experienced in the interpretation of some thyroid function tests. I feel, however, that their conclusions are too dogmatic, and shall appreciate space to reply to some of their statements.

Thyroid function tests fall into two groups, first those which aim to determine 'thyroid status', and secondly those directed at specific thyroid disorders independent of thyroid status. The commonest example of the second group is the diagnosis of Hashimoto's disease by demonstration of high titres of specific antibodies to thyroid components in the peripheral blood. A patient with Hashimoto's disease may be euthyroid, hypothyroid or, rarely, thyrotoxic, but the antibody findings are quite independent of this aspect. It is useful, when considering and comparing tests of thyroid function, to separate the two groups of investigations to avoid confusion.

The authors state in their synopsis that 'an uptake test and estimation of the serum protein-bound radioactive iodine ($PB^{131}I$), supplemented as required by the protein-bound iodine (PBI), remain the best routine tests of thyroid function'. This conclusion is not based on a comparison with the variety of newer tests now available, of which they used only the triiodothyronine resin uptake in a few cases. Although their statement might have been valid between 1963 and 1965, when the work was done, it does less than justice to the many authors who have published studies since then.

Recent work on the determination of thyroid status has largely been concerned with the direct measurement of levels of thyroid hormone in blood. Ekins (1960) and Murphy (1965) developed specific thyroxine assay techniques based on the saturation analysis principle and Nauman, Nauman, and Werner (1967) described a method for the determination of serum triiodothyronine also based on this technique. These methods eliminate inaccuracies inherent in PBI measurements by being specific for the hormones themselves. Following the extensive development by Robbins and Rall (1957) of the concept of protein-binding of thyroid hormones in blood, it has been recognized that thyroid function is most closely related to the concentration of unbound hormone. This level is dependent on the concentrations of thyroxine-binding globulin (TBG) and thyroxine-binding prealbumin (TBPA), as well as on the level of total thyroid hormone. Free thyroxine can be measured directly by equilibrium dialysis or ultrafiltration, and indirectly by methods derived from that of Hamolsky, Stein, and Freedberg (1957) which reflect the concentration of thyroxine-binding proteins. These have been well