Letter to the Editor

Inconsistency of Temperature in Plastic Containers

It is well known that the thermal conductivity of glass and different plastic materials vary considerably. Lack of consideration of this fact may lead to anomalous results in temperature-dependent experimental procedures.

The use of ^{51}Cr-labelled, heat-damaged red cells followed by scintillation scanning to visualize the spleen and to study splenic function has become an established procedure. In order to ensure consistent results it is necessary to use a standardized technique in which blood is heated in a water bath at a constant temperature of 49·5 to 50°C for exactly 20 minutes (Marsh *et al*, 1966). As a rule we have used glass (Universal) containers of 25 ml capacity. Recently, inconsistent results were found when the glass containers were replaced by plastic (polystyrene) containers of similar size. Clearance rate of heat-damaged red cells from circulation was found to be remarkably slow by comparison with the clearance time which had previously been obtained when incubation was carried out in glass containers. Examination of blood films showed that the blood needed incubation for one hour at a water-bath temperature of 49·5°C in plastic containers to exhibit the same degree of visible red-cell damage as blood incubated in glass containers for 20 minutes at the same water-bath temperature. The reason for this is shown in Fig. 1 in which 'contained' temperature is plotted against time of incubation. It takes seven minutes for the blood sample in the glass container to reach the water-bath temperature of 49·5°C, whereas in the plastic container the temperature reaches only 48·25°C after 40 minutes. Similar observations have been obtained at 37°C from an ambient room temperature of 23°C, blood in a glass container reaches the required temperature in 13 minutes, whereas it took 25 minutes in a plastic container.

Conversely, there is a slower fall in temperature in plastic containers as compared with glass containers of similar capacity when immersed in an ice bath. Figure 2 shows the rate of temperature fall within glass and polystyrene containers of different sizes (3-25 ml). It should be noted that temperature gradient is dependent on the capacity of the container as well as on its composition.

The implications of these observations in kinetic reactions and other temperature-dependent situations are obvious, especially when standardized conditions are desirable.

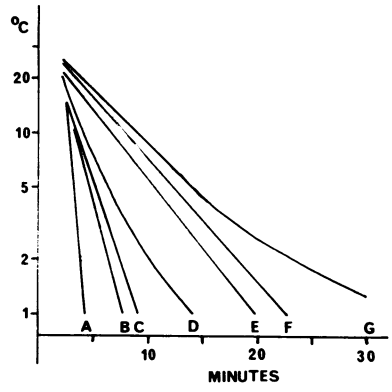

Fig. 2 *Gradient of fall of temperature in an ice bath from 23°C.* A, C *and* D *were glass containers* (*3, 16 and 25 ml respectively*); B, E, F *and* G *were polystyrene containers* (*3, 12, 16 and 25 ml respectively*).

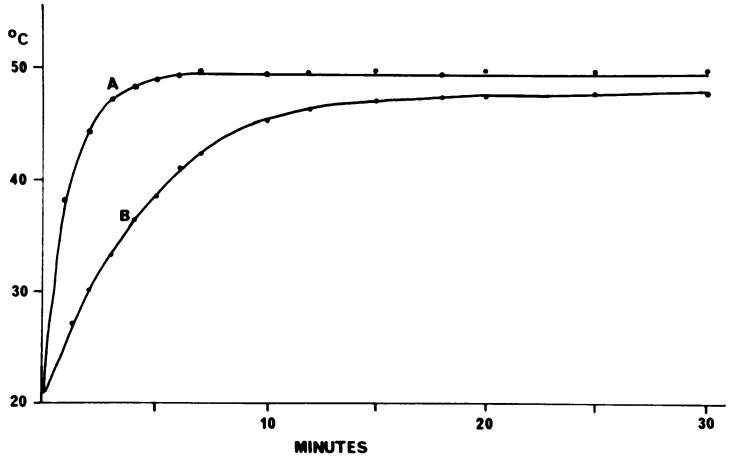

Fig. 1 *Gradient of temperature increase from 23°C. The water-bath temperature was 49·5°C.*
A = glass container (25 ml); B = polystyrene container (25 ml).

N. CORNER
S. AHUJA
S. M. LEWIS
Department of Haematology,
Royal Postgraduate Medical School,
London, W.12.

Book reviews

Medical History for Students By John R. Green. (Pp. viii + 197; 33 figures. $9.75.) Illinois: Charles C. Thomas, 1968.

It is a moot point whether medical students should have any more reading packed into their curriculum, but though there are a number of excellent histories of medicine in the English language, there is still a place for a book which caters effectively for beginners of any age who want an overall history in simple form.

Dr Green is a neurological surgeon who has been lecturing to students of various faculties at the Arizona State University for the past 10 years, and his book is based on those lectures. The first chapters deal with early medicine on a regional plan, starting from about 4,000 BC in Assyro-Babylonia, then going on, through the 11th century when the Hospitallers were running a Christian hospital in Jerusalem, up to the Middle